K.S. Rangasamy College of Technology

(Autonomous)

Curriculum & Syllabi

for

B.Tech. Computer Science and Business Systems

(For the batch admitted in 2024 – 2025)

R 2022

Courses Accredited by NAAC with A++ grade,
Approved by AICTE, Affiliated to Anna University,
Chennai.

KSR Kalvi Nagar, Tiruchengode – 637 215.
Namakkal District, Tamil Nadu, India.

COMPUTER SCIENCE AND BUSINESS SYSTEMS

VISION

To produce skilled professionals to the dynamic needs of the industry with innovative computer science Professionals associate with managerial services

MISSION

- To promote student's ability through innovative teaching in computer science to compete globally as an engineer
- To inculcate management skills to meet the industry standards and augment human values and life skills to serve the society

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will provide effective solutions for software and hardware industries by applying the Concepts of basic science and engineering fundamentals.

PEO2: Graduates will be professionally competent and successful in their career through Life-long Learing

PEO3: Graduates will contribute individually or as member of a team in handling projects and demonstrate Social responsibility and professional ethics.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. Graduates will contribute individually or as member of a team in handling projects and demonstrate social responsibility and professional ethics.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. Graduates will contribute individually or as member of a team in handling projects and demonstrate social responsibility and professional ethics.

PO3: Design /development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. Graduates will contribute individually or as member of a team in handling projects and demonstrate social responsibility and professional ethics

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. Graduates will contribute individually or as member of a team in handling projects and demonstrate social responsibility and professional ethics.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. Graduates will contribute individually or as member of a team in handling projects and demonstrate social responsibility and professional ethics.

PO9: **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. Graduates will contribute individually or as memberof a team in handling projects and demonstrate social responsibility and professional ethics

PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance**: Demonstrate knowledge and understanding of the engineering andmanagement principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

PSO1: Apply analytical and technical skill of computer science to provide justifiable solution for real world applications

PSO2: Analyze various managerial skills and business disciplines to improve the industry growth and Development

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) WITH PROGRAMME OUTCOMES (POs)

The B.Tech. Computer Science and Business systems Programme outcomes leading to the achievement of theobjectives are summarized in the following Table.

Programme Educational Objectives	Programme Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO1	3	1	3	2	2	1	1	1	2	2	3	1
PEO2	3	3	3	2	2	1	1	1	2	2	3	1
PEO3	3	2	3	2	2	1	1	1	3	2	3	1

Contributions: 1-low, 2- medium, 3-high

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

MAPPING-UG-COMPUTER SCIENCE AND BUSINESS SYSTEMS

Year	Sem	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	I	Business Communication and Value Science I	-	-	-	-	-	-	-	-	-	3	2	3	2	**3**	**-**
		Statistics and probability	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
		Fundamentals of Physics	3	3	-	3	-	-	-	3	3	2	2	2	2	-	-
		Computer Programming	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
		Principles of Electrical Engineering and Lab	3	3	-	-	2	2	2	-	-	-	3	3	2	1	-
		Environmental Studies and Climate Change	3	2	2	2	2	2	3	2	-	-	-	2	2	3	-
		Hertiage of Tamil	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
		Computer Programming Lab	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
		Fundamentals of Physics Lab	3	-	-	-	-	-	-	-	2	-	-	-	2	-	-
I	II	Business Communication and Value Science II	-	-	-	-	-	-	-	-	-	3	2	-	3	3	3
		Fundamentals of Economics	-	-	-	-	-	-	-	3	2	2	3	3	**-**	**3**	**-**
		Statistical Modeling	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
		Computer Organizationand Architecture	3	3	2	2	3	-	-	-	-	2	2	2	3	-	-
		Object Oriented Programming	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
		Tamil and Technology	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
		Fabrication and Reverse Engineering Laboratory	3	2	3	-	-	2	2	-	3	-	-	3	-	3	3
		Object Oriented Programming Lab	3	2	3	2	2	-	-	1	2	-	-	1	3	-	-

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BoS Chairman

		Career Skill Development - I	-	-	-	-	-	-	-	2	3	3	2	3	2	2	-
II	III	Introduction to Innovation,IP Management and Entrepreneurship	2	2	2	3	2	2	2	3	2	1	3	2	-	3	-
		Computational Statistics	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
		Automata and Compiler Design	3	3	-	2	2	-	-	2	-	1	2	2	-	-	-
		Database Management Systems	3	2	2	-	-	-	2	1	-	2	-	1	3	-	-
		Data Structures	3	3	3	2	1	-	-	-	2	-	-	-	3	-	-
		Software Engineering	3	3	3	2	1	-	2	2	2	2	2	2	2	3	-
		Database Management Systems Lab	1	3	2	-	2	-	-	-	2	1	-	2	3	-	-
		Data Structures Lab	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
		Career Skill Development –II	-	-	-	-	-	-	-	2	3	3	2	3	2	2	-
II	IV	Optimization Techiques	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
		Operating Systems	3	3	3	3	-	-	2	-	-	2	-	2	3	-	-
		Design and Analysis of Algorithms	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
		Software Design with UML	2	3	3	2	2	-	-	-	2	2	2	2	3	-	-
		MERN Stack	3	3	3	2	2	-	-	-	2	2	2	2	3	-	-
		Universal Human Values	-	-	-	-	-	3	3	3	3	3	2	3	-	2	-
		Operating Systems Lab	3	3	3	3	-	-	3	-	-	2	-	2	3	-	-
		Design and Analysis of Algorithms Lab	3	3	3	2	3	-	-	-	-	-	-	-	3	-	-
		Career Skill Development III	3	3	3	3	-	2	-	-	-	2	3	3	2	3	-
III	V	Computer Networks	2	3	-	-	2	-	-	-	-	-	-	3	-	-	-
		C# and .NET Programming	2	-	3	2	2	1	-	1	3	-	-	1	3	-	-
		Artificial Intelligence	3	2	2	-	-	-	2	1	-	2	-	1	-	2	-
		Design Thinking	2	3	2	2	3	2	1	1	1	2	3	2	3	2	-
		Start-ups and	3	3	3	2	2	2	2	2	1	2	2	2	-	2	-

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BoS Chairman

		Entrepreneurship															
		Computer Networks Laboratory	2	3	-	-	2	-	-	-	-	-	-	3	-	-	-
		C# and .NET Programming Laboratory	2	-	3	2	2	1	-	1	3	-	-	2	2	-	-
		Career Skill Development IV	-	-	-	-	-	-	-	2	3	3	2	3	2	3	-
III	VI	Business Strategy	2	3	3	3	2	2	2	2	3	2	3	3	2	3	-
		Financial and Cost Accounting	3	2	2	3	2	2	2	3	2	2	3	2	2	3	-
		Machine Learning	3	3	3	2	2	2	2	-	3	3	2	3	2	-	-
		Usability Design of Software Applications	2	2	2	2	2	-	-	-	-	-	-	-	2	2	2
		Machine Learning Laboratory	3	3	3	2	2	2	2	-	3	3	2	3	2	-	-
		Usability Design of Software Applications Laboratory	3	3	3	2	3	-	-	-	3	-	2	-	2	-	-
		Mini Project	2	3	2	2	3	2	1	1	1	2	3	2	3	2	2
IV	VII	Human Resource Management	3	2	3	2	2	-	-	3	3	3	3	2	-	2	-
		Cloud Application Development	3	2	3	2	3	-	-	-	-	-	-	-	2	-	-
		Data Analytics	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		Software Testing and Automation	3	2	1	1	3	-	-	-	-	-	-	-	2	2	-
		NCC/NSS/NSO/YRC/RRC/Fine Arts*	3	2	1	1	3	3	3	3	3	3	-	-	-	-	-
		Research Methodology	2	2	2	2	3	2	2	3	3	3	-	3	-	-	-
		Data Analytics Laboratory	2	2	2	2	1	-	-	-	2	2	2	2	2	3	-
		Project Work Phase-I	3	3	3	3	3	2	2	3	3	3	3	3	2	2	3
	VIII	Project Work Phase-II	3	3	3	3	3	2	2	3	3	3	3	3	2	2	3

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K.S. RANGASAMY COLLEGE OF TECHNOLOGY

Credit Distribution for B.Tech (CSBS) Programme–2024 –2025 Batch

S.No.	Category	Credits Per Semester								Total Credits	Percentage %
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	2	5	3	-	-	6	3	-	**19**	**11.6**
2.	BS	9	5	4	4	-	-	-	-	**22**	**13.4**
3.	ES	4	2	-	-	-	-	-	-	**6**	**3.7**
4.	PC	5	8	17	16	16	10	11	-	**83**	**50.6**
5.	PE	-	-	-	-	3	3	6	3	**15**	**9.1**
6.	OE	-	-	-	3	3	3	-	-	**9**	**5.5**
7.	CG	-	CSD I	CSD II	CSD III	CSDIV	-	2	8	**10**	**6.1**
8.	MC	MC I	-	-	MCII	MCIII	-	-	-	**-**	**-**
9.	AC	-	-	-	-	-	-	AC	-	**-**	**-**
10.	GE	GE I	GE II	-	-	-	-	-	-	**02***	**-**
Total		**20**	**20**	**24**	**23**	**22**	**22**	**22**	**11**	**164**	**100**

***General Elective – Extra credit is offered

HS – HUMANITIES AND SOCIALSCIENCES

BS - BASIC SCIENCE

ES - ENGINEERING SCIENCES

PC - PROFESSIONAL CORE

PE - PROFESSIONAL ELECTIVES

MC - MANDATORY COURSES

AC - AUDIT COURSES

OE - OPEN ELECTIVES

CG–CAREER GUIDENCE COURSES

GE - GENERAL ELECTIVE COURSES

- Open Electives are courses offered by different departments that do not have any prerequisites and could be ofinterest to students of any branch

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BoS Chairman

K.S. RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637 215

(An Autonomous Institution affiliated to Anna University)

HUMANITIES AND SOCIAL SCIENCE (HS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 EN 003	Business Communication and Value Science -I	HS	2	2	0	0	2	Basic knowledge of reading and writing in English
2.	60 EN 004	Business Communication and Value Science -II	HS	2	2	0	0	2	Basic knowledge of reading and writing in English and should have Completed Professional English I
3.	60 HS 001	Fundamentals of Economics	HS	3	3	0	0	3	Basic knowledge of Economics
4.	60 HS 004	Introduction to Innovation, IP Management and Entrepreneurship	HS	3	3	0	0	3	Basic Knowledge on Management, entrepreneurship, technology and innovation
5.	60 HS 005	Business Strategy	HS	3	3	0	0	3	Basic Knowledge on Business objectives, target audience and strategic Management
7.	60 HS 006	Financial & Cost Accounting	HS	3	3	0	0	3	Basic knowledge of Accounting
8.	60 HS 007	Human Resource Management	HS	3	3	0	0	3	Basic Knowledge of Human Resource Management
9.	60 AB 001	National Cadet Crops (Air Wing)	HS	4	2	0	2	3	Applicant should demonstrate a good and healthy moral character.
10.	60 AB 002	National Cadet Crops (ArmyWing)	HS	4	2	0	2	3	Applicant should demonstrate a good and healthy moral character.

BASIC SCIENCE (BS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	61 PH 008	Fundamentals of Physics	BS	3	3	0	0	3	Basic Science Knowledge , Mathematics, Familiarity with Basic

									Physical Concepts
2.	60 PH 0P3	Fundamentals of Physics Lab	BS	4	0	0	4	2	Basic Science Knowledge , Familiarity with Basic Physical Concepts
3.	60 MA 002	Statistics and probability	BS	5	3	1	0	4	Basic knowledge of Higher Secondary Mathematics: Probability Distributions
4.	60 MA 005	Statistical Modeling	BS	7	3	1	2	5	Statistics and Probability
5.	60 MA 013	Computational Statistics	BS	5	3	0	2	4	Statistics and Probability
6.	60 MA 018	Optimization Techniques	BS	5	3	1	0	4	Statistics and Probability

ENGINEERING SCIENCES (ES)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2	Basic Understanding of mechanics, thermodynamics, and structural analysis , Mathematics, Physics
2.	60 EE 003	Principles of Electrical Engineering and Lab	ES	5	3	0	2	4	Fundamentals of Physics

PROFESSIONAL CORE (PC)

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	61 CB 101	Computer Programming	PC	3	3	0	0	3	Basic Computer Knowledge, Mathematics.
2.	60 CB 1P1	Computer Programming Lab	PC	4	0	0	4	2	Basic Computer Knowledge.
3.	60 CB 201	Computer Organization and Architecture	PC	3	3	0	0	3	Foundations of Computer Design
4.	61 CB 202	Object Oriented Programming	PC	3	3	0	0	3	C
5.	61 CB 2P1	Object Oriented Programming Lab	PC	4	0	0	4	2	C++
6.	60 CB 301	Automata and	PC	4	3	1	0	4	Programming

		Compiler Design							Languages.
7.	60 CB 302	Database Management Systems	PC	3	3	0	0	3	Relational Algebra, Data Structure, Java Programming
8.	60 CB 3P1	Database Management Systems Lab	PC	4	0	0	4	2	Relational Algebra, Data Structure, Java Programming
9.	60 CB 303	Data Structures	PC	3	3	0	0	3	C
10.	60 CB 3P2	Data Structures Lab	PC	4	0	0	4	2	C
11.	60 CB 304	Software Engineering	PC	3	3	0	0	3	UML Concepts
12.	60 CB 401	Operating Systems	PC	3	3	0	0	3	Computer Fundamentals
13.	60 CB 4P1	Operating Systems Lab	PC	4	0	0	4	2	Good knowledge of C, Computer Organization and Architecture, x86 Assembly level programming.
14.	60 CB 402	Design and Analysis of Algorithms	PC	3	3	0	0	3	Basic knowledge of programming and mathematics
15.	60 CB 4P2	Design and Analysis of Algorithms Lab	PC	4	0	0	4	2	Basic knowledge of programming and mathematics
16.	60 CB 403	Software Design withUML	PC	3	3	0	0	3	Object Oriented Programming basics
17.	60 CB 404	MERN Stack	PC	5	1	0	4	3	Web technology, Database Management Systems
18.	60 CB 501	Computer Networks	PC	3	3	0	0	3	C or Java Programming
19.	60 CB 502	C# and .NET Programming	PC	3	3	0	0	3	Basic knowledge ofC or C++ or any programming language or programming fundamentals
20.	60 CB 503	Artificial Intelligence	PC	3	3	0	0	3	Computer Science Fundamentals,Data Structure,Basic Mathematics and python programming
21.	60 IT 003	Design Thinking	PC	4	2	0	2	3	Basic Programming Skills
22.	60 CB 5P1	Computer Networks	PC	4	0	0	4	2	C or Java

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BoS Chairman

		Laboratory							Programming
23.	60 CB 5P2	C# and .NET Programming Laboratory	PC	4	0	0	4	2	Basic knowledge ofC or C++ or any programming language or programming fundamentals
24.	60 CB 601	Machine Learning	PC	3	3	0	0	3	Data Mining, Basic Statistics
25.	60 CB 602	Usability Design of Software Applications	PC	3	3	0	0	3	Knowledge ofHTML, CSS, JavaScript, design thinking
26.	60 CB 6P1	Machine Learning Laboratory	PC	4	0	0	4	2	Basic Mathematics andProgramming Languages
27.	60 CB 6P2	Usability Design of Software Applications Laboratory	CGC	4	0	0	4	2	Knowledge ofHTML, CSS, JavaScript, design thinking
28.	60 CB 701	Cloud Application Development	PC	3	3	0	0	3	Basic understanding of Java, Spring, and Spring Cloud Framework.
29.	60 CB 7P1	Data Analytics Laboratory	PC	4	0	0	4	2	Machine Learning, Statistics, Programming, Database
30.	60 CB 703	Software Testing and Automation	PC	3	3	0	0	3	Programming languages, Database concepts, Software Engineering

PROFESSIONAL ELECTIVES (PE)

SEMESTER V, ELECTIVE I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB E11	Python Full Stack	PE	5	1	0	4	3	Basic knowledgeof HTML, CSS, JavaScript, Java and Object oriented programming.
2.	60 CB E12	MEAN Stack	PE	5	1	0	4	3	HTML, CSS and JavaScript programming languages.
3.	60 CB E13	Android Application Development	PE	5	1	0	4	3	Basic Knowledgeof Programming, Java and Conceptsof OOPs
4.	60 CB E14	Swift Coding and AppDevelopment	PE	5	1	0	4	3	MachineLearning
5.	60 CB E15	Robotics Process	PE	5	1	0	4	3	Java, C, C++, OOPs,

		Automation							AI and Machine Learning, Command over HTML, JavaScript, and other scripting languages.
6.	60 CB E16	Game Development	PE	5	1	0	4	3	AI Technology and tools, Software Engineering, Programming Language C, C++ and Java.

SEMESTER VI, ELECTIVE II

Marketing

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB E21	Marketing Research & Marketing Management	PE	3	3	0	0	3	Business Fundamentals, Statistics, Economics
2.	60 CB E22	Financial Analytics	PE	3	3	0	0	3	Principles of Finance, Mathematics, Statistics, Economics
3.	60 CB E23	Digital Marketing	PE	3	3	0	0	3	Marketing Fundamentals, Business Fundamentals, Analytical Skills and Communication Skills
4.	60 CB E24	Risk Analytics	PE	3	3	0	0	3	Mathematics, Statistics, Finance, Computer Science, Data Analysis
5.	60 CB E25	Financing New Business Ventures	PE	3	3	0	0	3	Business Fundamentals, Finance, Economics
6.	60 CB E26	Creativity & Innovation in Entrepreneurship	PE	3	3	0	0	3	Business Fundamentals, Marketing, Economics

SEMESTER VII, ELECTIVE III
Integrated Course

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB E31	Natural Language Processing	PE	4	2	0	2	3	Probability, linear algebra, and calculus.
2.	60 CB E32	Conversational Systems	PE	4	2	0	2	3	MachineLearning, Natural Language

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									Processing
3.	60 CB E33	Virtual and Augmented Reality	PE	4	2	0	2	3	Computer Programming , Multimedia and Animation
4.	60 CB E34	Cyber Security	PE	4	2	0	2	3	Cryptographyand Network Security
5.	60 CB E35	Cryptocurrency and Blockchain Technologies	PE	4	2	0	2	3	Object-oriented programming, distributed systems, networking, cryptography, and data structures
6.	60 CB E36	Cognitive Science	PE	4	2	0	2	3	Concepts of Mathematics, Statistics sequence, Fundamentals of Programming Course Calculus.

SEMESTER VII, ELECTIVE IV
Management

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB E41	Behavioral Economics	PE	3	3	0	0	3	Economics, Statistics, Psychology, Mathematics, Data Analysis Tools
2.	60 CB E42	Customer Relation Management	PE	3	3	0	0	3	Marketing Management, Business Fundamentals
3.	60 CB E43	Financial Management	PE	3	3	0	0	3	Finance, Accounting, Mathematics, Economics
4.	60 CB E44	Fintech Personal Finance and Payments	PE	3	3	0	0	3	Understanding of basic financial concepts, Digital Payments Knowled ge, Digital Banking and Payments
5.	60 CB E45	Fundamentals of Investment	PE	3	3	0	0	3	Basic knowledge of Higher Secondary Mathematics, Binary Operations & Mathematical Logic
6.	60 CB E46	Introduction to Fintech	PE	3	3	0	0	3	Finance, Basic Technology Literacy, Economics, Digital

									Payments Knowledge, Data Analytics, Analytical Skills and Communication Skills

SEMESTER VIII, ELECTIVE V
Integrated Course

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB E51	Exploratory Data Analysis	PE	4	2	0	2	3	Basic R programming skills, Statistics and Data visualization.
2.	60 CB E52	Recommender Systems	PE	4	2	0	2	3	Machine Learning, Linear Algebra.
3.	60 CB E53	Neural Networks and Deep Learning	PE	4	2	0	2	3	Programming, Statictics, Calculus,Linear Algebra,Data Science
4.	60 CB E54	Social, Text and Media Analytics	PE	4	2	0	2	3	Data Science, Natural Language Processing, Network Analysis, Information Visualization.
5.	60 CB E55	Computer Vision	PE	4	2	0	2	3	Maths, Image Processing, Programming, Machine Learning, Deep Learning.
6.	60 CB E56	Business Analytics	PE	4	2	0	2	3	Linear Algebra, Programming skills of Python language.

SEMESTER VII

AUDIT COURSES (AC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 AC 001	Research Methodology	AC	1	1	0	0	0	Critical Thinking, Academic Writing, Research Methods

MANDATORY COURSES (MC)

S.No.	Course Code	Course Title	Category	Cont act Periods	L	T	P	C	Prerequisite
1.	60 MY 001	Environmental Studies andClimate Change	MC	2	2	0	0	0	Basic Science Courses, Environmental Monitoring Techniques
2.	60 MY 002	Universal Human Values	MC	3	3	0	0	3*	Open-Mindedness, Empathy, Ethical Awareness, Curiosity
3.	60 MY 003	Startups and Entrepreneurship	MC	2	2	0	0	0	Business Fundamentals, Entrepreneurship Basics, Economics, Creativity and Innovation

OPEN ELECTIVES I / II / III / IV (OE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CB L01	C# and .NET Programming	OE	3	3	0	0	3	Basic knowledge ofC or C++ or any programming language or programming fundamentals
2.	60 CB L02	Automation Testing Tools	OE	3	3	0	0	3	Basic knowledge of programming languages
3.	60 CB L03	Usability Design of Software Applications	OE	3	3	0	0	3	Knowledge of HTML, CSS, JavaScript, design thinking

CAREER GUIDENENCE COURSES (CGC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CG 0P1	Career Skill Development I	CGC	2	0	0	2	1*	Communication Skills, Critical Thinking, Basic Computer Literacy
2.	60 CG 0P2	Career Skill Development II	CGC	2	0	0	2	1*	Career Skill Development I
3.	60 CG 0P3	Career Skill Development III	CGC	2	0	0	2	1*	Career Skill Development II

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.	60 CG 0P4	Career Skill Development IV	CGC	2	0	0	2	1*	Career Skill Development III
5.	60 CG 0P5	Comprehension Test	CGC	2	0	0	2	1*	Career Skill Development I.II,III ,IV
6.	60 CB 7P2	Project Work Phase-I	CGC	4	0	0	4	2	Core Subject Knowledge, Research Methods
7.	60 CB 8P1	Project Work Phase-II	CGC	16	0	0	16	8	Project Work Phase-I
8.	60 CG 0P6	Internship	CGC	0	0	0	0	1/2/ 3*	Industry Knowledge, Communication Skills, Time Management, Relevant Coursework

GENERAL ELECTIVE COURSES (GE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	61 GE 001	Heritage of Tamils	GE	1	1	0	0	1*	NIL
2.	60 GE 002	Tamils and Technology	GE	1	1	0	0	1*	NIL

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE -637215
(An Autonomous Institution affiliated to Anna University)

COURSES OF STUDY
B.Tech - Computer Science and Business Systems

(For the candidates admitted from 2024-2025 onwards)

SEMESTER I

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
		Induction Programme	-	-	-	-	-	0
THEORY								
1.	60 EN 003	Business Communication and Value Science I	HS	2	2	0	0	2
2.	60 MA 002	Statistics and probability	BS	5	3	1	0	4
3.	61 PH 008	Fundamentals of Physics	BS	3	3	0	0	3
4.	61 CB 101	Computer Programming	PC	3	3	0	0	3
5.	60 EE 003	Principles of Electrical Engineering and Lab	ES	5	3	0	2	4
6.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0
7.	61 GE 001	Heritage of Tamils / தமிழர் மரபு	GE	1	1	0	0	1*
PRACTICALS								
8.	60 CB 1P1	Computer Programming Lab	PC	4	0	0	4	2
9.	60 PH 0P3	Fundamentals of Physics Lab	BS	4	0	0	4	2
			Total	**29**	**17**	**1**	**10**	**20**

* Internship 3 additional credits not accounted for CGPA is offered based on the Internship duration
* Heritage of Tamils/ தமிழர் மரபு additional 1 credit is offered and not account for CGPA.

SEMESTER II

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 004	Business Communication and Value Science II	HS	2	2	0	0	2
2.	60 HS 001	Fundamentals of Economics	HS	3	3	0	0	3
3.	60 MA 005	Statistical Modeling	BS	7	3	1	2	5
4.	60 CB 201	Computer Organization and Architecture	PC	3	3	0	0	3
5.	61 CB 202	Object Oriented Programming	PC	3	3	0	0	3
6.	60 GE 002	Tamils and Technology/ **தமிழரும் தததொழில் நுட்பமும்**	GE	1	1	0	0	1*
PRACTICALS								
7.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2
8.	61 CB 2P1	Object Oriented Programming Lab	PC	4	0	0	4	2
9.	60 CG 0P1	Career Skill Development – I	CGC	2	0	0	2	1*
10.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3*
			Total	**29**	**15**	**1**	**12**	**20**

* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.
* Internship 3 additional credits not accounted for CGPA is offered based on the Internship duration
* Tamils and Technology/ தமிழரும் தததொழில் நுட்பமும் *extra credit is offered

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SEMESTER III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 004	Introduction to Innovation, IP Management andEntrepreneurship	HS	3	3	0	0	3
2.	60 MA 013	Computational Statistics	BS	5	3	0	2	4
3.	61 CB 301	Automata and Compiler Design	PC	5	3	1	0	4
4.	60 CB 302	Database Management Systems	PC	3	3	0	0	3
5.	60 CB 303	Data Structures	PC	3	3	0	0	3
6.	60 CB 304	Software Engineering	PC	3	3	0	0	3
PRACTICALS								
7.	60 CB 3P1	Database Management Systems Lab	PC	4	0	0	4	2
8.	60 CB 3P2	Data Structures Lab	PC	4	0	0	4	2
9.	60 CG 0P2	Career Skill Development II	CGC	2	0	0	2	1*
10.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3*
			Total	**32**	**18**	**1**	**12**	**24**

* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.
* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration.

SEMESTER IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 018	Optimization Techniques	BS	5	3	1	0	4
2.	60 CB 401	Operating Systems	PC	3	3	0	0	3
3.	60 CB 402	Design and Analysis of Algorithms	PC	3	3	0	0	3
4.	60 CB 403	Software Design with UML	PC	3	3	0	0	3
5.	60 CB 404	MERN Stack	PC	5	1	0	4	3
6.	60 OE L*	Open elective-I	OE	3	3	0	0	3
7.	60 MY 002	Universal Human Values*	MC	3	3	0	0	3*
PRACTICALS								
8.	60 CB 4P1	Operating Systems Lab	PC	4	0	0	4	2
9.	60 CB 4P2	Design and Analysis of Algorithms Lab	PC	4	0	0	4	2
10.	60 CG 0P3	Career Skill Development III	CGC	2	0	0	2	1*
11.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/ 3*
			Total	**35**	**19**	**1**	**14**	**23**

* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.
* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration
* UHV# additional 3 credit is offered and not accouted for CGPA

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SEMESTER V

S.No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 CB 501	Computer Networks	PC	3	3	0	0	3
2.	60 CB 502	C# and .NET Programming	PC	3	3	0	0	3
3.	60 CB 503	Artificial Intelligence	PC	3	3	0	0	3
4.	60 IT 003	Design Thinking	PC	4	2	0	2	3
5.	60 CB E1*	Professional Elective I	PE	5	1	0	4	3
6.	60 OE L*	Open elective-II	OE	3	3	0	0	3
7.	60 MY 003	Startups and Entrepreneurship	MC	2	2	0	0	0
PRACTICALS								
8.	60 CB 5P1	Computer Networks Laboratory	PC	4	0	0	4	2
9.	60 CB 5P2	C# and .NET Programming Laboratory	PC	4	0	0	4	2
10.	60 CG 0P4	Career Skill Development IV	CGC	2	0	0	2	1*
11.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3*
			Total	**33**	**17**	**0**	**16**	**22**

* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.

* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration.

SEMESTER VI

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 005	Business Strategy	HS	3	3	0	0	3
2.	60 HS 006	Financial and Cost Accounting	HS	3	3	0	0	3
3.	60 CB 601	Machine Learning	PC	3	3	0	0	3
4.	60 CB 602	Usability Design of Software Applications	PC	3	3	0	0	3
5.	60 CB E2*	Professional Elective II	PE	3	3	0	0	3
6.	60 OE L*	Open elective-III	OE	3	3	0	0	3
PRACTICALS								
7.	60 CB 6P1	Machine Learning Laboratory	PC	4	0	0	4	2
8.	60 CB 6P2	Usability Design of Software Applications Laboratory	CGC	4	0	0	4	2
9.	60 CB 6P3	Mini Project	PC	2	0	0	2	1*
10.	60 CG 0P5	Comprehension Test	CGC	2	0	0	2	1*
11.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3*
			Total	**30**	**18**	**0**	**12**	**22**

* Mini-project& - 1 additional credit is offered and not accounted for CGPA calculation.

* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.

* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration.

* Comprehension Test* -one additional credit is offered and not accounted for CGPA calculation.

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Approved in Academic Council Meeting held on 25/05/2024

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SEMESTER VII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 007	Human Resource Management	HS	3	3	0	0	3
2.	60 CB 701	Cloud Application Development	PC	3	3	0	0	3
3.	60 CB 702	Data Analytics	PC	3	3	0	0	3
4.	60 CB 703	Software Testing and Automation	PC	3	3	0	0	3
5.	60 CB E3*	Professional Elective III	PE	4	2	0	2	3
6.	60 CB E4*	Professional Elective IV	PE	3	3	0	0	3
7.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	HS	4	2	0	2	3*
8.	60 AC 001	Research Methodology	AC	1	1	0	0	0
PRACTICALS								
9.	60 CB 7P1	Data Analytics Laboratory	PC	4	0	0	4	2
10.	60 CB 7P2	Project Work Phase-I	CGC	4	0	0	4	2
11.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3 *
			Total	**28**	**18**	**0**	**10**	**22**

* NCC% - Course can be waived with 3 credits in VII semester or offered as extra credits
* NSS/NSO/YRC/RRC/Fine Arts% 3 credits is not accounted for CGPA
* Career Skill Development (CSD) - additional credit is offered not accounted for CGPA.
* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration

SEMESTER VIII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 CB E5*	Professional Elective V	PE	4	2	0	2	3
PRACTICALS								
2.	60 CB 8P1	Project Work Phase-II	CGC	16	0	0	16	8
3.	60 CG 0P6	Internship *	CGC	0	0	0	0	1/2/3 *
			Total	**20**	**2**	**0**	**18**	**11**

* Internship 3 additional credits not accouted for CGPA is offered based on the Internship duration

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 164

HS- Humanities and Social Sciences including Management Courses,
BS- Basic Science Courses,
ES-Engineering Science Courses,
PE-Professional Core Courses,
PE-Professional Elective Courses,
GE- General Elective Courses,
OE- Open Elective Courses,
CG - Career Enhancement Course,
MC- Mandatory Courses

Note:

1 Hour Lecture is equivalent to 1 credit
2 Hour Tutorial is equivalent to 1 credit
2 Hour Practical is equivalent to 1 credit

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2023-2024 onwards)

FIRST SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 EN 003	Business Communication and Value Science I	2	40	60	100	45	100
2	60 MA 002	Statistics and probability	2	40	60	100	45	100
3	61 PH 008	Fundamentals of Physics	2	40	60	100	45	100
4	61 CB 101	Computer Programming	2	40	60	100	45	100
5	60 EE 003	Principles of Electrical Engineering and Lab	2	50	50	100	45	100
6	60 MY 001	Environmental Studies and Climate Change	2	100	-	100	-	-
7	61 GE 001	Heritage of Tamils	2	-	100	100	100	100
PRACTICAL								
8	60 CB 1P1	Computer Programming Lab	3	60	40	100	45	100
9	60 PH 0P3	Fundamentals of Physics Lab	3	60	40	100	45	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 EN 003	Business Communication and Value Science I	Category	L	T	P	Credit
		HS	2	0	0	2

Objectives

- To embellish students' overall communication and interpersonal skills by engaging the min group activities and helping them to emerge as thorough professionals.
- To focus on the development of basic English language skills with appropriate usage of vocabulary both in general and technical specific terms pertaining to their domain.
- To sensitize the learners with the importance of communication and listening skill by overcoming the barriers for effectiveness.
- To equip the students with the ability of setting personal and career goals so as to self- appraise them on value and belief systems for better understanding cultural sensitivities at the workplace.
- To reinforce team dynamics in order to maximize personal effectiveness for the healthier understanding of both personal and corporate values.

Pre-requisites

- Basic knowledge of reading and writing in English

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Illustrate meaningful sentences by using suitable tenses, voices and academic lexical words with phonological proficiency	Understand
CO2	Classify different types of letters of correspondence and reports in the academic and professional contexts.	Understand
CO3	Recall and relate the importance of communication skills in general and listening skills in particular	Remember
CO4	Infer self-awareness by values and beliefs for better goal setting and understand the cultural sensitivities that is prevalent at the workplace	Understand
CO5	Demonstrate the team effectives and group dynamics in making better decisions by the effective managerial exposition of human values	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	-	3	2	3	2	1	-
CO2	-	-	-	-	-	-	-	-	-	3	2	3	2	1	-
CO3	-	-	-	-	-	-	-	-	-	3	1	3	2	1	-
CO4	-	-	-	-	-	-	-	-	-	3	3	3	2	1	-
CO5	-	-	-	-	-	-	-	-	-	3	3	3	2	1	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	50	50	80
Apply	-	-	-
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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Approved in Academic Council Meeting held on 25/05/2024

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech. - Computer Science and Business Systems								
60 EN 003 - Business Communication and Value Science I								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
I	2	0	0	30	2	40	60	100

Essential Grammar – I* Tenses: Basic forms and use - Sentence formation (general & Technical) - Common errors - Parts of speech through context - Direct and Reported Speech Structures and Voices - Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West - Academic word list (AWL) technical specific terms related to the field of technology - Phrases - Idioms - significant abbreviations formal business vocabulary - Phonetic: Pronunciation - Reduction of MTI in spoken English - Question formation with emphasis on common errors made during conversation.	[6]
Written Communication – I* Letter Writing - Formal and Informal letter writing - Application letters - Report writing: Academic and Business report - Job application letter.	[6]
Communication Skills* Importance of effective communication - Types of communication - Verbal and Non-verbal - Barriers to communication - Effective communication - Listening Skills: Law of nature- Importance of listening skills - Difference between listening and hearing - Types of listening.	[6]
Self – Awareness* Self-Assessment - Self-Appraisal - SWOT - Self-esteem - Self- awareness - Perceptions and attitudes - Positive attitude - Values and belief systems - Personal goal setting - Career planning - Personal success factors - Handling failures - Depression and habit - Relating SWOT analysis & goal setting and prioritization - Socio-cultural and cross-cultural sensitivities at the workplace: What is Inclusion? - Women's contributions in Industry - Work issues faced by women - what is sexual harassment? - What is appropriate behavior for everyone at work?	[6]
Interpersonal Skills* Team work - Team effectiveness - Group discussion - Decision making - Team communication team: Conflict Resolution - Team goal setting - Team motivation - Understanding team development – Team problem solving - Building the team dynamics – Multi-cultural team activity Time Management: The Time management matrix - Application of Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters - How to plan? - How to handle interruptions? - to maximize your personal effectiveness How to say no to time wasters - Values of a good manager: Understanding corporate values and behavior: Personal / Human Values - Pride and grace in Nationalist.	[6]
Total Hours:	**30**

Text Book(s):	
1.	Dr. Saroj Hiremath, 'Business Communication', Nirali Prakashan, Mumbai, 2017.
2.	Raymond Murphy, 'Essential English Grammar',2nd Edition, Cambridge University Press, 2015.
Reference(s):	
1.	Alan McCarthy and Felicity O'Dell,'English Vocabulary in Use', Preliminary and Advanced, 4 th Edition, Cambridge University Press, 2017
2.	Charles Marsh, David W. Guth, Bonnie Poovey Short, 'Strategic Writing Multimedia Writing for Public Relations, Advertising, and More',4thEdition, 2017
3.	Christopher Booker, 'The Seven Basic Plots', Bloomsbury, New Delhi, 2004
4.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020

*SDG 4:- Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Essential Grammar – I**	
1.1	Tenses: Basic forms and use	1
1.2	Sentence formation (general & Technical) - Common errors	1
1.3	Parts of speech through context - Direct and reported speech structures and voices	1
1.4	Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West	1
1.5	Academic word list (AWL) technical specific terms related to the field of technology	1
1.6	Phrases – Idioms - Significant abbreviations formal business vocabulary	1
1.7	Phonetic: Pronunciation - Reduction of MTI in spoken English	1
1.8	Question formation with emphasis on common errors made during conversation.	1
2.0	**Written Communication – I**	
2.1	Letter Writing - Formal and Informal letter writing	2
2.2	Application letters	2
2.3	Report writing: Academic report	1
2.4	Report writing: Business report - Job application letter	1
3.0	**Communication Skills**	
3.1	Importance of effective communication	1
3.2	Types of communication - Verbal and Non-verbal - Barriers to communication - Effective communication	1
3.3	Listening Skills: Law of nature- Importance of listening skills	1
3.4	Difference between listening and hearing - Types of listening.	2
4.0	**Self – Awareness**	
4.1	Self-Assessment - Self-Appraisal - SWOT - Self-esteem - Self- awareness	1
4.2	Perceptions and attitudes - Positive attitude - Values and belief systems	1
4.3	Personal goal setting - Career planning - Personal success factors	1
4.4	Handling failures - Depression and habit - Relating SWOT analysis & goal setting and prioritization	1
4.5	Socio-cultural and cross-cultural sensitivities at the workplace	1
4.6	What is Inclusion? - Women's contributions in Industry - Work issues faced by women - What is sexual harassment? - What is appropriate behavior for everyone at work?	1
5.0	**Interpersonal Skills**	
5.1	Team work - Team effectiveness - Group discussion - Decision making	1
5.2	Team communication team: Conflict Resolution - Team goal setting – Team motivation - Understanding team development - Team problem solving	1
5.3	Building the team dynamics – Multi-cultural team activity - Time Management: The Time management matrix	1
5.4	Application of Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters	1
5.5	How to plan? - How to handle interruptions? - to maximize your personal effectiveness - How to say no to time wasters	1

5.6	Values of a good manager: Understanding corporate values and behavior: Personal / Human Values	1
5.7	Pride and grace in Nationalist	1

Course Designer(s)

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 MA 002	Statistics and Probability	Category	L	T	P	Credit
		BS	3	1	0	4

Objectives

- To understand the basic concepts of statistics.
- To understand and have a well – founded knowledge of Descriptive Statistics.
- To acquire skills in the concept of probability.
- To familiarize discrete and continuous distributions.
- To learn the concepts of various testing techniques and its properties.

Pre-requisites

- Basic knowledge of Higher Secondary Mathematics: Probability Distributions.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the knowledge of different types of data.	Apply
CO2	Apply the concepts of descriptive method and frequency distributions.	Apply
CO3	Realize the concept of probability.	Apply
CO4	Apply the Knowledge of discrete and continuous distributions.	Apply
CO5	Interpret the various concepts of hypothesis testing.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	10	10	30
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S. Rangasamy College of Technology – Autonomous R2022								
B.Tech -Computer Science And Business Systems								
60 MA 002 -Statistics and Probability								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	4	40	60	100

Introduction to Statistics Definition of Statistics – Basic objectives – Applications in various branches of science with examples – Collection of Data: Internal and external data – Primary and secondary Data – Population and sample –Representative sample. **Hands - on:** Computing Summary Statistics /plotting and visualizing data using Tabulation and Graphical Representations.	[9]
Descriptive Statistics Classification and tabulation of univariate data – Graphical representation – Frequency curves – Descriptive measures – Central tendency and Dispersion – Bivariate data – Summarization – Marginal and conditional frequency distribution. Expected values and moments: Mathematical expectation and its properties – Moments (including variance) and their properties – Interpretation. **Hands - on:** Calculate the measures of central tendency	[9]
Probability Concept of experiments – sample space – Events – Definition of Combinatorial Probability – Conditional Probability – Baye's Theorem. **Hands - on:** Calculate the probability using Bayes Theorem.	[9]
Probability Distributions Moment Generating Function – Discrete & Continuous distributions: Binomial –Poisson and Geometric distributions, Uniform – Exponential and Normal distributions. **Hands - on:** Fitting the following probability distributions: Binomial distribution, Poisson distribution.	[9]
Testing of Hypothesis Procedure for testing of hypothesis - Test of significance of small samples– Student's 't' - test–Single Mean– Difference of means. Variance - 'F' - Test – Chi-Square Test of goodness of Fit–Chi-Square Test for Independence of attributes. **Hands - on:** Applying Chi-square test for goodness of fit test and Contingency test to real dataset.	[9]
Total Hours: Total Hours: 45 + 15(Tutorial)	**60**

Text Book(s):	
1.	S. M. Ross," Introduction of Probability Models", Academic Press, Springer Publication, 2000.
2.	S.P. Gupta, "Statistical Methods", SultanChand & Sons, 2012.
Reference(s):	
1.	A. Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", Vol. I, 2013 & Vol. II, 2016, Paper Back Edition, World Press.
2.	I. R. Miller, J. E. Freund and R. Johnson, "Probability and Statistics for Engineers". FourthEdition, PHI,2011.
3.	A.M. Mood, F. A. Graybill and D. C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education, 2010
4.	http://nptel.ac.in/courses/111104079/ , Probability Theory and Applications, IIT Kanpur, Prof. Prabha Sharma.

*SDG 9 – Industry Innovation and Infrastructure
*SDG 4:- Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Statistics**	
1.1	Definition of Statistics, Basic objectives, Applications in various branches of science with examples	1
1.2	Collection of Data: Internal and external data	1
1.3	Primary and secondary Data	1
1.4	Population and sample	1
1.5	Representative sample	1
1.6	Classification and tabulation of univariate data	1
1.7	Frequency curves.	1
1.8	Population and sample	2
1.9	Tutorial	2
1.10	Hands on	1
2.0	**Descriptive Statistics**	
2.1	Descriptive measures	1
2.2	Central tendency and Dispersion	1
2.3	Bivariate data (Correlation and Regression)	2
2.4	Marginal and conditional frequency distribution	1
2.5	Expected values and moments: Mathematical expectation and its properties	2
2.6	Interpretation	2
2.7	Tutorial	2
2.8	Hands on	1
3.0	**Probability**	
3.1	Concept of experiments	1
3.2	Sample space and Events	2
3.3	Definition of Combinatorial Probability	2
3.4	Conditional Probability	2
3.5	Bayes Theorem.	2
3.6	Tutorial	2
3.7	Hands on	1
4.0	**Probability Distributions**	
4.1	Moment Generating Function – Discrete: Binomial distribution.	2
4.2	Moment Generating Function – Discrete: Poisson distributions	2
4.3	Moment Generating Function – Discrete: Geometric distributions	1
4.4	Moment Generating Function – Continuous: Uniform distributions	1
4.5	Moment Generating Function – Continuous: Exponential distributions.	1
4.6	Moment Generating Function – Continuous: Normal distributions.	2
4.7	Tutorial	2
4.8	Hands on	1
5.0	**Testing of Hypothesis**	
5.1	Procedure for testing of hypothesis.	1
5.2	Test of significance of small samples –Student's 't' – test– Single mean	2
5.3	Student's 't' – test– difference of Means.	2
5.4	Fisher's 'F'- Test	1
5.5	Chi-Square Test of goodness ofFit	1
5.6	Chi-Square Test for Independence of attributes.	2
5.7	Tutorial	2
5.8	Hands on	1

Course Designer(s)

1. Dr.K.Prabakaran – prabakaran@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

61 PH 008	Fundamentals of Physics	Category	L	T	P	Credit
		BS	3	0	0	3

Objectives

- Understand the characteristics of simple and damped harmonic motion and illustrate the interference, diffraction, polarization and basic ideas of electromagnetism.
- Exemplify the dual nature of matter and apply the Schrodinger wave equation to determine the wave function of particle in one dimensional box
- To enhance students' knowledge of theoretical and modern technological aspects in semiconductor Physics and to assess the crystallographic parameters of seven crystal systems.
- Compare the different types of lasers based on pumping method, active medium and energy levels
- Analyze the laws of thermodynamics and different thermodynamic processes.

Pre-requisites

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the different types of harmonic oscillations and compare electrical oscillator withmechanical oscillator.	Understand
CO2	Acquire the interference, diffraction and polarization of light in Newtons rings, diffractiongrating and double refraction respectively.	Understand
CO3	Apply the concepts of quantum mechanics to solve the Schrodinger time dependent andtime independent wave equations	Apply
CO4	Infer the crystallographic parameters of seven crystal systems and compare the unit cellcharacteristics of SC, BCC, FCC and HCP crystal structures and classification of solids	Understand
CO5	Realize the different types of lasers and compare the different types of optical fibers based on mode and refractive index profile for data communication system, laws of thermodynamics and different thermodynamic process.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO4	3	-	-	-	-	-	-	-	-	2	-	-	2	-
CO5	3	-	-	-	-	-	-	-	-	2	-	-	2	-

3 - Strong; 2 - Medium; 1 - Low

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	40
Understand	40	40	60
Apply	-	-	-
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

61 PH 008- Fundamentals of Physics

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Oscillation: * Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple spring mass system. Resonance-definition damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators.	[9]
Interference-principle of superposition-young's experiment: * Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction-Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence. **Polarization of light:*** Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.	[9]
Basic Idea of Electromagnetisms: * Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium. **Quantum Mechanics:** Introduction- Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.	[9]
Crystallography: * Basic terms-types of crystal systems, Bravais lattices, Miller indices, d-spacing, Atomic packing factor for SC, BCC, FCC and HCP structures. **Semiconductor Physics**: Conductor, Semiconductor and Insulator; Basic concept of Band theory.	[9]
Laser and Fiber Optics: * Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers. **Thermodynamics:** Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.	[9]
Total Hours:	**45**

Text Book(s):

1.	Ajoy Ghatak, Optics, Tata McGraw Hill, 5th Edition., 2012
2.	Rajagopal, K., Engineering Physics, PHI Learning., 2010

Reference(s):

1.	Basics of laser physics: for students of science and engineeringhttp://www.springer.com/978-3-319- 50650-0
2.	Arthur Beiser, Shobhit Mahajan and S Rai Choudhury, Concepts of Modern Physics, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 6th Edition, 2014
3.	B. K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning India Pvt Ltd., New Delhi, 1st edition, 2017.
4.	Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc,11th edition, 2018

* **SDG:4- Quality Education**

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Oscillation:**	
1.1	Periodic motion-simple harmonic motion	1
1.2	Characteristics of simple harmonic motion-vibration of simple spring mass system	2
1.3	Resonance-definition, damped harmonic oscillator	1
1.4	Heavy critical and light damping	1
1.5	Energy decay in a damped harmonic oscillator	1
1.6	Quality factor, forced mechanical and electrical oscillators	1
1.7	Flash Evaporation	1
2.0	**Interference-principle of superposition-young's experiment**	
2.1	Theory of interference fringes-types of interference	1
2.2	Fresnel's prism	1
2.3	Newton's rings	1
2.4	Diffraction-Two kinds of diffraction	1
2.5	Difference between interference and diffraction	1
2.6	Emission Norms in India – Bharat Stage VI	1
2.7	Fraunhofer diffraction at single slit-plane diffraction grating.	1
2.8	Temporal and Spatial Coherence.	1
2.9	**Polarization of light:** Polarization - Concept of production of polarized beam of light from two SHM acting at rightangle	1
2.10	plane, elliptical and circularly polarized light Brewster's law, double refraction	1
3.0	**Basic Idea of Electromagnetisms**	
3.1	Continuity equation for current densities	1
3.2	Maxwell's equation in vacuum and non-conducting medium.	1
3.3	**Quantum Mechanics:** Introduction	1
3.4	Planck's quantum theory- Matter waves	1
3.5	De-Broglie wavelength	1
3.6	Heisenberg's Uncertainty principle	1
3.7	Time independent and time dependent Schrödinger's wave equation	1
3.8	Physical significance of wave function	1
3.9	Particle in a one dimensional potential box	1
3.10	Heisenberg Picture	1
4.0	**Crystallography**	
4.1	Basic terms-types of crystal systems	1
4.2	Bravais lattices	1
4.3	Miller indices, d-spacing,	2
4.4	Atomic packing factor for SC, BCC, FCC and HCP structures	1
4.5	**Semiconductor Physics**: Conductor	1
4.6	Semiconductor and Insulator	1
4.7	Basic concept of Band theory	1
5.0	**Laser and Fiber Optics**	

5.1	Einstein's theory of matter radiation interaction and A and B coefficients	1
5.2	Amplification of light by population inversion	1
5.3	Different types of lasers: Ruby Laser, CO2 and Neodymium lasers	1
5.4	Properties oflaser beams: mono-chromaticity, coherence, directionality and brightness	2
5.5	Laser speckles, applications of lasers in engineering	1
5.6	Fiber optics and Applications, Types of optical fibers	2
5.7	**Thermodynamics:** Zeroth law of thermodynamics,	1
5.8	First law of thermodynamics, brief discussion on application of1st law, second law of thermodynamics	
5.9	Concept of Engine, entropy, changes in entropy in reversible and irreversible processes.	

Course Designer(s)

1. Dr. V. Vasudevan - vasudevanv@ksrct.ac.in
2. Mr. S. Vanchinathan - vanchinathan@ksrct.ac.in
3. Dr. P. Suthanthira Kumar - suthanthirakumar@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

61 CB 101	Computer Programming	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To learn most fundamental element of the C language and to examine the execution of branching, looping statements
- To examine the concepts of arrays, its characteristics and types and strings.
- To understand the concept of functions, pointers and the techniques of putting them to use.
- To apply the knowledge of structures and unions to solve basic problems in C language.
- To enhance the knowledge in file handling functions for storage and retrieval of data.

Pre-requisites

- Basic Computer Knowledge, Mathematics.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the fundamental building blocks of structured Programming in C	Understand
CO2	Implement the different operations on arrays and strings	Apply
CO3	Develop simple real world applications utilizing functions, recursion and pointers.	Apply
CO4	Demonstrate the concepts of structures, unions ,user defined data types And Pre-processor	Apply
CO5	Interpret the file concepts using proper standard library functions for a given application	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	-	-	3	-	-	-	-	-	-	2	3	-	-
CO2	3	2	2	-	3	-	-	-	2	-	2	2	3	-	-
CO3	3	2	2	-	3	-	-	-	2	-	2	2	3	-	-
CO4	3	2	2	-	3	-	-	-	2	-	2	2	3	-	-
CO5	3	2	2	-	3	-	-	-	2	-	2	2	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	20	20	40
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
61 CB 101 – Computer Programming								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Basics of C, I/O, Branching and Loops* Structure of a C Program – Data types – Keywords - Variables – Type Qualifiers - Constants – Operators – Expressions and Precedence - Console I/O – Unformatted and Formatted Console I/O - Conditional Branching and Loops - Writing and Evaluation of Conditionals and Consequent Branching.	[9]
Arrays and Strings* Arrays: One Dimensional Arrays - Two Dimensional Arrays – Matrix Manipulation - Character arrays – Strings - String Manipulation with and without String Handling Functions.	[9]
Functions and Pointers* Functions: Scope of a Function – Library Functions and User defined functions - Function Prototypes - Call by Value and Call by Reference - Function Categorization - Arguments to main function - Recursion and Application - Passing Arrays to Functions – Storage class Specifiers - Introduction to Pointer Variables – The Pointer Operators - Pointer Expressions - Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers – Function and Pointers - Dynamic Memory Allocation.	[9]
Structures, Unions, Enumerations, Typedef and Preprocessors* Structures - Introduction to Structures and Initialization - Arrays of Structures: Arrays and Structures, Nested Structures - Passing Structures to Functions - Structure Pointers - Unions - Bit Fields - Enumerations – typedef – The Preprocessor and Commands.	[9]
File Handling* File: Streams – Reading and Writing Characters - Reading and Writing Strings - File System functions – File Manipulation-Sequential Access - Random Access Files – Command Line Arguments.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Herbert Schildt, “The Complete Reference C”, Fourth Edition, Tata McGraw Hill Edition, 2010
2.	Byron Gottfried, “Programming with C”, Third Edition, McGraw Hill Education, 2014.
Reference(s):	
1.	E.Balagurusamy, “Programming in ANSI C”, Seventh Edition, Tata McGraw Hill Edition, New Delhi, 2016.
2.	Brian W. Kernighan and Dennis M. Ritchie, “C Programming Language”, Prentice-Hall.
3.	ReemaThareja, “Computer Fundamentals and Programming in C”, Second Edition, Oxford Higher Education, 2016.
4.	K N King, “C Programming: A Modern Approach”, Second Edition, W.W.Norton, New York, 2008.

*SDG: 4-Quality Education.

Passed in BoS Meeting held on 24/05/24
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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Basics of C, I/O, Branching and Loops**	
1.1	Structure of a C Program, Keywords	1
1.2	Data types, Type Qualifiers	1
1.3	Variables and Constants	1
1.4	Operators–expressions and precedence	1
1.5	Console I/O– Unformatted and Formatted Console I/O	1
1.6	Conditional Branching	2
1.7	Iteration and loops	1
1.8	Writing and Evaluation of Conditionals and Consequent Branching	1
2.0	**Arrays and Strings**	
2.1	One Dimensional Array	1
2.2	Two-Dimensional Array and Matrix Manipulation	2
2.3	Character arrays and Strings Basics	2
2.4	String Manipulation without String Handling Functions	2
2.5	String Manipulation with String Handling Functions	2
3.0	**Functions and Pointers**	
3.1	Scope of a Function – Library Functions, User defined functions andFunction Prototypes	1
3.2	Function Call by value and Function Call by reference, Function Categorization	1
3.3	Arguments to main function	1
3.4	Recursion and application	1
3.5	Passing Arrays to Functions	1
3.6	Storage class Specifiers	1
3.7	Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions	1
3.8	Pointers and Arrays - Generating a Pointer to an Array - IndexingPointers	1
3.9	Function and pointers - Dynamic memory allocation	1
4.0	**Structures, Unions, Enumerations, Typedef and Preprocessors**	
4.1	Introduction to Structures and Initialization	1
4.2	Arrays and Structures, Arrays of Structures	2
4.3	Structures within Structures, Passing Structures to Functions	2
4.4	Structure Pointers	1
4.5	Unions and Bit Fields.	1
4.6	Enumerations - typedef	1
4.7	Preprocessor commands	1
5.0	**File Handling**	
5.1	File Streams – Reading and Writing Characters - Reading and Writing Strings	2
5.2	File System functions and File Manipulation	2
5.3	Sequential access	2
5.4	Random Access Files	2
5.5	Command Line arguments and files	1

Course Designer(s)

1. Mr.K.Karthikeyan - karthikeyank@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 EE 003	Principles of Electrical Engineering and Lab	Category	L	T	P	Credit
		ES	3	0	2	4

Objectives

- To familiarize the basic concept on electrical quantities
- To use the network theorems to analyze the DC circuit parameters
- To gain knowledge on AC circuits and impacts on various circuit parameters
- To provide exposure on the Electrostatic and Electromagnetic fields
- To familiarize the use of various measuring instruments

Pre-requisites

- Fundamentals of Physics

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the basic concepts and terminology of electrical quantities.	Understand
CO2	Compute the DC circuit using various network theorems.	Apply
CO3	Analyze the electrical parameters of AC circuits with R-L-C elements.	Analyze
CO4	Illustrate the Static and dynamic characteristics of Electro-static and electromagnetic fields.	Understand
CO5	Apply the concept of sensors in measurement of various electrical quantities.	Apply

Mapping with Programme Outcomes

COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	-	-	2	2	-	-	-	-	3	3	1	1	-
CO2	3	3	-	-	2	2	-	-	-	-	3	3	3	2	-
CO3	3	3	-	-	2	2	-	-	-	-	3	3	3	2	-
CO4	3	3	-	-	2	-	2	-	-	-	3	3	1	1	-
CO5	3	3	-	-	2	-	2	-	-	-	3	3	2	1	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)	End Sem Examination (Marks)	
	Test 1		Test 2				
	Theory	Lab	Theory	Lab	Lab	Theory	Lab
Remember	20	-	20	-	-	20	-
Understand	40	-	40	-	-	80	-
Apply	-	50	-	50	50	-	50
Analyse	-	50	-	50	50	-	50
Evaluate	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech - Computer Science and Business Systems

60 EE 003 - Principles of Electrical Engineering and Lab

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	2	75	4	50	50	100

Introduction * Concept of Potential difference*, voltage*, current*, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work*, power, energy*, and conversion of energy.	[9]
DC Circuits* Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Super position theorem.	[9]
AC Circuits * AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, powerfactor,3phase Balanced AC Circuits Star to Delta & Delta to Delta).	[9]
Electrostatics and Electro-Mechanics * Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.	[9]
Measurements and Sensors * Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices &system. For Further Reading **-** Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments.	[9]
Practical: 1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits 2. Determination of resistance temperature coefficient 3. Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power Transfer theorem) 4. Simulation of R-L-C series circuits for XL>XC, XL< XC 5. Simulation of Time response of RC circuit 6. Verification of relation in between voltage and current in three phase balanced star and delta connected loads 7. Demonstration of measurement of electrical quantities in DC and AC systems	[30]
Total Hours: (Lecture - 45; Practical - 30)	**75**

Text Book(s):

1. SmarjithGhosh, Fundamentals of Electrical and Electronics Engineering, Prentice Hall (India) Pvt. Ltd. 2nd Edition,2010.
2. A.Sudhakar, Shyammohan S Palli, Circuits and Networks Analysis and Synthesis, Tata McGraw Hill, 5 Edition, 2017.

Reference(s):

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

1.	T. K. Nagsarkar and M.S.Sukhija, Basic of Electrical Engineering, Oxford University Press, 3rd Edition, 2017.
2.	Muthusubramanian&Salivahanan, Basic Electrical and Electronics Engineering and Communication Engineering,Tata MC Graw Hill Education Private Limited, 7thEdition, 2011.
3.	William H. Hayt, Jr. John A. Buck, Engineering Electromagnetics, McGraw Hill Higher Education, 8th revisedEdition, 2011
4.	K. A. Gangadhar, P.M. Ramanathan, Electromagnetic Field Theory, Khanna Publishers, 16thEdition, 2011

*SDG 9: Industry Innovation and Infrastructure

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction**	
1.1	**Basic Concepts -** Potential Difference , Voltage and Current	1
1.2	**Basic Circuit Elements -** Active Elements – Resistance, Inductance and Capacitance , Passive Elements – Voltage and Current Sources	1
1.3	**Electrical Networks:** Terminology - Symbols	1
1.4	**Basic Concepts:** Dependent Sources , Independent Sources	2
1.5	**Kirchhoff's laws :**Current law and Voltage law - Statement and Explanation - Simple Problems	2
1.6	**Basic Concepts :**Work - Power - Energy - Conversion of Energy	1
2	**DC Circuits**	
2.1	**Relation of Electric Networks:** Current – Voltage	1
2.2	**Thevenin's Theorem:** Statement – Derivation - Simple Problems	1
2.3	**Norton's Theorem:** Statement – Derivation - Simple Problems	1
2.4	**Superposition Theorem:** Statement – Derivation - Simple Problems	1
2.5	**Maximum Power Transfer Theorem:** Statement – Derivation - Simple Problems	2
2.6	**Serial and Parallel Circuits:** Equivalent Resistance - Voltage & Current Division Rule ,Simple Problems	2
2.7	**Star/Delta Transformation:** Statement – Derivation	1
3	**AC Circuits**	
3.1	**Representation of sinusoidal waveforms:** Amplitude, Cycle, Frequency, Time period, Phase, Instantaneous, Average, RMS, Peak value, Form factor and Peak factor of Sine waveform	2
3.2	**Power Triangle:** Real power - Reactive power - Apparent power - Power factor	1
3.3	**Analysis of AC Circuits:** Pure Resistive Circuit - Pure Inductive Circuit - Pure Capacitive Circuit - Phasor Diagrams	2
3.4	**Analysis of RL Series Circuits:** Circuit Diagram &Phasor Diagram - Equations of Impedance, Current, Power, Power Factor - Simple Problems	1
3.5	**Analysis of RC Series Circuits:** Circuit Diagram &Phasor Diagram - Equations of Impedance, Current, Power, Power Factor - Simple Problems	1
3.6	**Analysis of RLC Series Circuits:** Circuit Diagram &Phasor Diagram Equations of Impedance, Current, Power, Power Factor - Simple Problems	1
4	**Electrostatics and Electro-Mechanics**	
4.1	**Statement:** Electrostatic Field - Electric Field Strength	1
4.2	**Basic Concepts:** Permittivity in Dielectrics - Capacitor Composite - Dielectric	1

	Capacitors	
4.3	**Capacitors in Series and Parallel:** Illustration - Comparison	1
4.4	**Energy Stored in Capacitors:** Illustration Charging and Discharging of Capacitors	1
4.5	**Comparison:** Electricity and Magnetism, Magnetic and Electric Circuits	1
4.6	**Laws of Electromagnetic Induction:** Faraday's Law - Fleming's Rule	1
4.7	**Self and Mutual Induction:** Statement – Illustrations	1
4.8	**Transformers:** Construction - Main Parts - Principle of Operation, Material used - Core type and Shell type – Comparison, Applications	1
4.9	**EMF Equation:** Expression of EMF Equation - Voltage Transformation Ratio	2
5	**Measurements and Sensors**	
5.1	**Introduction to Transducers:** Characteristics - Classification of Transducers	1
5.2	**Piezo-electric Transducers:** Properties - Equivalent circuit - Modes of operation - **Measurement of Temperature:** Thermocouples	1
5.3	**Measurement of Current and Single-Phase Power:** Construction & Working -Applications	1
5.4	**Basic House wiring tools and components:** Wiring materials – Accessories - Simple Wiring Layout	1
5.5	**Domestic Wiring:** Service main - Meter board - Distribution board - Energy meter	1
5.6	**Different types of wiring:** Staircase wiring - Florescent lamp wiring - Ceiling fan wiring	1
5.7	**Earthing:** Objectives – Necessity - Types **Electrical Safety:** Safety Measures and Precautions at Home & Industry	1
5.8	**Batteries:** Types of Batteries - Important Characteristics of Battery	1
5.9	**Indicating and Integrating Instruments:** Block Diagram - Principle of Operation	1
	Total	45
Practical:		
1.	Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits	2
2.	Determination of resistance temperature coefficient	4
3.	Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power Transfer theorem)	4
4.	Simulation of R-L-C series circuits for XL>XC, XL< XC	2
5.	Simulation of Time response of RC circuit	2
6.	Verification of relation in between voltage and current in three phase balanced star and delta connected loads.	4
7.	Demonstration of measurement of electrical quantities in DC and AC systems.	4

Course Designer(s)

1. M.Dhanapal -dhanapalm@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 MY 001	Environmental Studies and Climate Change	Category	L	T	P	Credit
		MC	2	0	0	0

Objectives

- To understand the impact climate changes in ecosystem and biodiversity.
- To analyze the impacts of pollution, control and legislation.
- To explain the importance of sustainable development practices.
- To explore the significance of organic farming.
- To identify the Geo-spatial tools for resource management.

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Interpret the impacts of pollution on climate change	Understand
CO2	Categorize the wastes and its management.	Analyze
CO3	Identify the different types of sustainable practices	Apply
CO4	Classify the organic farming techniques	Apply
CO5	Categorize the Geo-spatial tools for resource management	Analyze

Mapping with Programme Outcomes

COs	POs												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	-	-	3	-	-	-	-	2	-	-	-
CO2	3	2	-	-	-	3	3	2	-	-	-	2	-	-	-
CO3	3	2	-	-	-	3	3	2	-	-	-	2	-	-	-
CO4	3	2	-	-	-	2	3	-	-	-	-	2	-	-	-
CO5	3	2	-	-	3	-	2	-	-	-	-	2	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Quiz (20 marks)		Seminar presentation (50 marks)
	Case Study	Activity Report	Quiz1	Quiz2	
Remember	10	10	5	5	10
Understand	30	20	10	10	15
Apply	-	30	-	5	15
Analyse	20	-	5	-	10
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	60	60	20	20	50

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 MY 001 – Environmental Studies and Climate Change								
Common to all branches								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
I/II	2	0	0	20	0	100	-	100

Pollution and its Impact on Climate Change* Pollution: Sources and Impacts of Air Pollution – Greenhouse Effect- Global Warming- Climate Change - Ozone Layer Depletion - Acid Rain. Carbon Footprint - Climate Change on Various Sectors – Agriculture, Forestry and Ecosystem – Climate Change Mitigation and Adaptation. Action Plan on Climate Change. IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes.	[4]
Integrated Waste Management** Waste - Types and Classification. Principles of Waste Management (5R Approach) - Swachh Bharat Abhiyan – Commercial Waste, Plastic Waste, Domestic Waste, E-Waste - Biomedical Waste - RiskManagement: Collection, Segregation, Treatment and Disposal Methods. Waste Water Treatment- Activate Sludge Process.	[4]
Sustainable Development Practices*** Sustainable Development Goals (Sdgs) **–** Green Computing- Carbon Trading - Green Building – Eco- Friendly Plastic – Alternate Energy: Hydrogen – Bio-Fuels – Solar Energy – Wind – Hydroelectric Power. Water Scarcity- Watershed Management, Ground Water Recharge and Rainwater Harvesting.	[4]
Environment and Agriculture**** Organic Farming – Bio-Pesticides- Composting, Bio Composting, Vermi- Composting, Roof Gardening and Irrigation. Waste Land Reclamation. Climate Resilient Agriculture. Green Auditing	[4]
Geo-Science in Natural Resource Management Data Base Software in Environment Information- Digital Image Processing Applications in Forecasting. GPS - Remote Sensing and Geographical Information System (GIS) - World Wide Web (Www) - Environmental Information System (ENVIS).	[4]
Total Hours:	**20**

Text Book(s):	
1.	Anubha Kaushik , C P Kaushik. Perspectives in Environmental Studies, New Age International publishers;6th Edition 2018.
Reference(s):	
1.	G.Tyler Miller Environmental Science 14th Edition Cengage Publications, Delhi, 2013
2.	Gilbert M.Masters and Wendell P. Ela,"Environmental Engineering And Science", PHI Learning PrivateLimited, 3rd Edition, 2015
3.	Erach Bharucha. Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2000

*SDG: 13 – Climate Action
**SDG: 4 – Clean Water and Sanitation
***SDG: 6 - Affordable and Clean Energy
****SDG: 3 – Good Health and Well-being

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S.No	Topic	No. of hours
1.0	**Pollution and its impact on climate change**	
1.1	Pollution: Sources and impacts of air pollution – greenhouse effect- Global warming- climate change - ozone layer depletion - acid rain	2
1.2	Climate change on various sectors: Agriculture, forestry and ecosystem. – climate change mitigation and adaptation	1
1.3	Action plan on climate change - IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes	1
2.0	**Integrated Waste Management**	
2.1	Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan	1
2.2	Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste	1
2.3	Risk management: Collection, segregation, treatment and disposal methods.	1
3.0	**Sustainable development practices**	
3.1	Sustainable development goals (SDGs) **–** Green computing- Carbon trading - Green building – Eco- friendly plastic	1
3.2	Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power	2
3.3	Water scarcity- Watershed management, ground water recharge and rainwater harvesting	1
4.0	**Environment and Agriculture**	
4.1	Organic farming – bio-pesticides	1
4.2	Composting, bio composting, vermi-composting	1
4.3	Roof gardening and irrigation	1
4.4	Waste land reclamation. Climate resilient agriculture, Green auditing	1
5.0	**Geo-science in natural resource management**	
5.1	Data base software in environment information, Digital image processing applications in forecasting	2
5.2	GPS, Remote Sensing and Geographical Information System (GIS)	1
5.3	World wide web (www), Environmental information system (ENVIS)	1
	Total	20

Course Designer(s)

1. Dr.T.A.Sukantha - sukantha@ksrct.ac.in
2. Dr.B.Srividhya - srividhya@ksrct.ac.in
3. Dr.S.Meenachi - meenachi@ksrct.ac.in
4. Ms.D.Kirthiga - kiruthiga@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

61 GE 001	Heritage of Tamils	Category	L	T	P	Credit
		GE	1	0	0	1

Objectives

- To learn the extensive literature of classical Tamil
- To review the fine arts heritage of Tamil culture
- To realize the contribution of Tamils in Indian freedom struggle

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the extensive literature of Tamil and its classical nature.	Understand
CO2	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.	Understand
CO3	Review on folk and martial arts of Tamil people.	Understand
CO4	Insight thinai concepts, trade and victory of Chozha dynasty.	Understand
CO5	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-

3 - Strong; 2 - Medium; 1 - Some

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

Common to all Branches

61 GE 001 – Heritage of Tamils

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	0	15	1*	-	100	100

Language, Literature, Life Skills & Ethics* Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil - Secular Nature of Sangam Literature - Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan-Life, Responsibility, Self-exploration, Attitude, Self-confidence, Goals, Relationships, Leadership, Gender equality.	3
Heritage - Rock Art Paintings to Modern Art – Sculpture* Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making -Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.	3

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Folk and Martial Arts* Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	3
Thinai Concept of Tamils* Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.	3
Contribution of Tamils to Indian National Movement and Indian Culture* Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.	3
Total Hours	**15**

Text Book(s):

1.	முனைவர் கே. கே. பிள்ளை, தமிழக வரலாறு - மக்களும் பண்பாடும், தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம், 18th Ed ,2022.
2.	முனைவர் இல. சுந்தரம், கணினித்தமிழ்,விகடன் பிரசுரம், 2nd Ed 2021
3.	முனைவர் இரா.சிவானந்தம், மு.சேரன், கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம், தொல்லியல் துறை வெளியீடு, 6th Ed ,2020.
4.	முனைவர் இரா.சிவானந்தம் , முனைவர் ஜெ.பாஸ்கர், பொருநை - ஆற்றங்கரை நாகரிகம், தொல்லியல் துறை வெளியீடு,1st Ed ,2022
5.	ஈரோடு கதிர், உயர்தல் உரிமை, சிக்ஸ் ப்ளஸ் ஒன் ட்ரெயினிங் அகாடமி,1st Ed, 2024
6.	Dr.K.K.Pillay, Social Life of Tamils, TNTB & ESC and RMRL – (In print).
7.	Dr.S.Singaravel, Social Life of the Tamils - The Classical Period, International Institute of Tamil Studies, 1st, 2001.
8.	Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu, Historical Heritage of the Tamils, International Institute of Tamil Studies, 2nd, 2010
9.	Dr.M.Valarmathi, The Contributions of the Tamils to Indian Culture, International Institute of Tamil Studies,
10.	Dr.R.Sivanantham, Keeladi - Sangam City Civilization on the banks of river Vaigai, Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,
11.	Dr.K.K.Pillay, Studies in the History of India with Special Reference to Tamil Nadu, K.K. Pillay(Published by the Author.
12.	Dr.R.Sivanantham, Dr.J.Baskar, Porunai Civilization, Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation.
13.	R.Balakrishnan, Journey of Civilization Indus to Vaigai, Roja Muthiah Research Library,3rd Ed, 2022

*SDG 4 – Quality Education

Course Designer(s)

61 GE 001	தமிழர் மரபு	Category	L	T	P	Credit
		GE	1	0	0	1

பாடத்தின் நோக்கங்கள்:

- தமிழ் மொழியின் இலக்கணச் செறிவைக் கற்றுணர்தல்
- தமிழர் பண்பாட்டின் நுண்கலைகள் பற்றிய ஒரு மீள்பார்வை
- இந்திய சுதந்திரப் போராட்டத்தில் தமிழர்களின் பங்களிப்பை உணருதல்

முன்கூட்டிய துறைசார் அறிவு:

தேவை இல்லை

பாடம் கற்றதின் விளைவுகள்:

பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்

CO1	தமிழ் மொழியின் செந்தண்மை மற்றும் இலக்கியம் குறித்த தெரிதல்.	புரிதல்
CO2	தமிழர்களின் சிற்பக்கலை, ஓவியக்கலை மற்றும் இசைக்கருவிகள் குறித்த தெளிவு.	புரிதல்
CO3	தமிழர்களின் நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு.	புரிதல்
CO4	தமிழர்களின் திணைக் கோட்பாடுகள், சங்ககால வணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள்.	புரிதல்
CO5	இந்திய தேசிய இயக்கம், சுயமரியாதையை இயக்கம் மற்றும் சித்த மருத்துவம் பற்றிய புரிதல்.	புரிதல்

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2		3	-	-	-

3 - Strong; 2 - Medium; 1 - Some

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

அனைத்து துறைகளுக்கும் பொதுவானது

61 GE 001 – *தமிழர் மரபு*

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	0	15	1*	-	100	100

மொழி, இலக்கியம், வாழ்க்கைத் திறன்கள் மற்றும் நெறிமுறைகள்:* இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள் - தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு. வாழ்வியல், பொறுப்புணர்வு, சுய ஆய்வு, மனோபாவம், தன்னம்பிக்கை, இலக்குகள், உறவுகள், தலைமைப்பண்பு, பாலின சமநிலை.	3
மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை- சிற்பக் கலை. * நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர்	3

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.	
நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுள்: * தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து சிலம்பாட்டம், வளரி, புளியாட்டம், தமிழர்களின் விளையாட்டுகள் .	3
தமிழர்களின் திணைக் கோட்பாடுகள்: * தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி .	3
இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: * இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ் புத்தகங்களின் அச்சு வரலாறு.	3
Total Hours	**15**

Text Book(s):	
1.	முனைவர் கே. கே. பிள்ளை, தமிழக வரலாறு - மக்களும் பண்பாடும், தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம், 18th Ed ,2022.
2.	முனைவர் இல. சுந்தரம், கணினித்தமிழ்,விகடன் பிரசுரம், 2nd Ed,2021
3.	முனைவர் இரா.சிவானந்தம், மு.சேரன், கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம், தொல்லியல் துறை வெளியீடு, 6th Ed,2020.
4.	முனைவர் இரா.சிவானந்தம் , முனைவர் ஜெ.பாஸ்கர், பொருநை - ஆற்றங்கரை நாகரிகம், தொல்லியல் துறை வெளியீடு,1st Ed ,2022
5.	ஈரோடு கதிர், உயர்தல் உரிமை, சிக்ஸ் ப்ளஸ் ஒன் ட்ரெயினிங் அகாடமி,1st Ed,2024
6.	Dr.K.K.Pillay, Social Life of Tamils, TNTB & ESC and RMRL – (In print).
7.	Dr.S.Singaravel, Social Life of the Tamils - The Classical Period, International Institute of Tamil Studies, 1st, 2001.
8.	Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu, Historical Heritage of the Tamils, International Institute of Tamil Studies, 2nd, 2010
9.	Dr.M.Valarmathi, The Contributions of the Tamils to Indian Culture, International Institute of Tamil Studies,
10.	Dr.R.Sivanantham, Keeladi - Sangam City Civilization on the banks of river Vaigai, Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,
11.	Dr.K.K.Pillay, Studies in the History of India with Special Reference to Tamil Nadu, K.K. Pillay(Published by the Author.
12.	Dr.R.Sivanantham, Dr.J.Baskar, Porunai Civilization, Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation.
13.	R.Balakrishnan, Journey of Civilization Indus to Vaigai, Roja Muthiah Research Library,3rd Ed ,2022

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 1P1	Computer Programming Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To enable the students to apply the concepts of C to solve simple problems
- To use selection and iterative statements in C programs
- To apply the knowledge of library functions in C programming
- To implement the concepts of arrays, functions, structures and pointers in C
- To Implement The Handling Operations Through C

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Read, display basic information and use selection and iterative Statements.	Apply
CO2	Demonstrate C program to manage collection of related data.	Apply
CO3	Design and Implement different ways of passing arguments to functions, Recursion and implement pointers concepts.	Apply
CO4	Develop a C program to manage collection of different data using structures, Union, user-defined data types and preprocessor directives.	Apply
CO5	Demonstrate C program to store and retrieve data using file concepts.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
CO2	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
CO3	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
CO4	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
CO5	3	3	3	-	3	-	-	-	2	2	-	2	3	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	50	25	100	-	100
Analyse	-	-	-		-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 1P1 – Computer Programming Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
I	0	0	4	60	2	60	40	100

List of Experiments:

1. Implementation of Simple computational problems using various formulas*.
2. Implementation of Problems involving Selection statements*.
3. Implementation of Iterative problems e.g., sum of series*.
4. Implementation of 1D and 2D Array manipulation*.
5. Implementation of String operations*.
6. Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions*.
7. Implementation of Pointers*.
8. Implementation of structures and Union*.
9. Implementation of Bit Fields, Typedef and Enumeration*.
10. Implementation of File operations*.

Lab Manual

1.	"Computer Programming Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4: Quality Education

Course Designer(s)

1. Mr.K.Karthikeyan – karthikeyank@ksrct.ac.in

60 PH 0P3	Fundamentals of Physics Lab	Category	L	T	P	Credit
		BS	0	0	4	2

Objectives

- To infer the practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To demonstrate an ability to make physical measurements and understand the limits of precision in measurements
- To introduce different experiments to test basic understanding of physics concepts applied in optics and electronics
- To make ability to develop and fabricate engineering and technical equipments
- To analyze the behavior and characteristics of various materials for its optimum utilization

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the behaviour of electrical & magnetic properties by experimental verification	Apply
CO2	Interpret the knowledge of Hall coefficient and carrier concentration of a semiconductor for its potential applications	Apply
CO3	Realize the interference, diffraction and wave nature of light by experimentally.	Apply
CO4	Analyze the wavelength of laser by diffraction phenomenon and the propagation of light through an optical fibre	Apply
CO5	Demonstrate the wave and particle behavior of the light by experimentally	Analyze

Mapping with Programme Outcomes (BT)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	-	-	-	-	-	-	-	2	-	-	-	2	-	-
CO2	3	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	2	-	-	-	2	-	-
CO5	3	-	-	-	-	-	-	-	2	-	-	-	2	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom'sCategory	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	10	-	10	-	10
Understand	30	30	30	-	30
Apply	40	40	40	-	40
Analyse	20	30	20	-	20
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Total	100	100	100	-	100

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 PH 0P3- Fundamentals of Physics Lab

Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	0	0	4	45	2	60	40	100

List of Experiments:

1. Magnetic field along the axis of current carrying coil–Stewart and Gee.
2. Determination of Hall coefficient to a semi-conductor.
3. Determination of Plank constant.
4. Determination of wavelength of light by Laser diffraction method.
5. Determination of wavelength of light by Newton's Ring method.
6. Determination of laser and optical fiber parameters.
7. Determination of Stefan's Constant.
8. Characteristics of Zener diode.

Lab Manual

1. "Engineering Physics Lab Manual", Department of Physics, KSRCT.

*** SDG: 4- Quality Education**

Course Designer(s) – Physics

1. Dr. V. Vasudevan - vasudevanv@ksrct.ac.in
2. Mr. S. Vanchinathan - vanchinathan@ksrct.ac.in
3. Dr. P. Suthanthira Kumar - suthanthirakumar@ksrct.ac.in

SECOND SEMESTER

S. No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End SemesterExam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 EN 004	Business Communication and Value Science II	2	40	60	100	45	100
2	60 HS 001	Fundamentals of Economics	2	40	60	100	45	100
3	60 MA 005	Statistical Modeling	2	50	50	100	45	100
4	60 CB 201	Computer Organization and Architecture	2	40	60	100	45	100
5	61 CB 202	Object Oriented Programming	2	40	60	100	45	100
6	60 GE 002	Tamils and Technology/ தமிழரும்தததொழில் நுட்பமும்	2	-	100	100	100	100
PRACTICAL								
7	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	2	60	40	100	45	100
8	61 CB 2P1	Object Oriented Programming Lab	2	60	40	100	45	100
9	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
10	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 EN 004	Business Communication and Value Science II	Category	L	T	P	Credit
		PC	2	0	0	2

Objectives

- To equip the learners with lexical and syntactical proficiency in the professional and business scenario for better formal communication
- To facilitate the learners with the drafting skill of different types of letters for effective correspondence at the academic and workplace
- To re-orient the learners to infer the fundamentals of effective communication in deciphering the managerial qualities for better presentation at the workplace
- To groom the learners with corporate etiquette and implement them ethically in the corporate / business setting.
- To make them aware about the socio-cultural and cross-cultural diversities for the appropriate use of value science at the workplace.

Pre-requisites

- Must have completed Business Communication and Value Science I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Demonstrate formal communication with appropriate syntactical statements and lexical proficiency in the given business contexts and situations	Understand
CO2	Compare and contrast different types of letters of correspondence, emails and writing compositions	Understand
CO3	Infer and demonstrate the presentation skills and leadership qualities in making key decisions and provide effective feedback for efficient problem solving	Understand
CO4	Recall the professional etiquette and ethics in the corporate scenario for effective self-grooming at the workplace.	Remember
CO5	Outline and relate the cultural diversity at the workplace arena and understand the value science in business scenario	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	-	3	2	3	2	1	-
CO2	-	-	-	-	-	-	-	-	-	3	2	3	2	1	-
CO3	-	-	-	-	-	-	-	-	-	3	1	3	2	1	-
CO4	-	-	-	-	-	-	-	-	-	3	3	3	2	1	-
CO5	-	-	-	-	-	-	-	-	-	3	3	3	2	1	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	50	50	80
Apply	-	-	-
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech. - Computer Science and Business Systems

60 EN 004 - Business Communication and Value Science II

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	2	0	0	30	2	40	60	100

Essential Grammar – II* Application of tenses – auxiliaries - correct usage and importance in formal communication - business vocabulary - vocabulary exercises through web-based applications – vocabulary exercises through web-based applications, usage and application through mock meetings - situational conversation: application of grammar and correct spoken English according to context/ situation and application in business scenario.	[6]
Written Communication – II* Email writing- formal and Informal - email writing structure - Inquiry letters - Instruction letters - complaint letters - routine business letters - sales letters - technical writing - essay writing - paragraph writing.	[6]
Fundamentals of Effective Communication Public speaking: fundamentals of effective public speaking – types: extempore speech, manuscript speech, and ways to enhance public speaking skills – storytelling - oral review presentation skills: PowerPoint presentations - effective ways to structure the presentation - importance of body language - leadership skills - leader's role, responsibilities and skill required understanding good leadership behaviors - learning the difference between leadership and management - gaining insight into your patterns, beliefs and rules - defining qualities and strengths of leadership - determining how well you perceive what's going on around you- learning about commitment and how to move things forward - making key decisions - handling your and other people's stress, empowering, motivating and inspiring others, leading by example – effective feedback - problem solving skill - confidence building.	[6]
Corporate / Business Etiquettes* Corporate grooming and dressing - etiquettes in social and office setting - understand the importance of professional behavior at the work place - understand and Implement etiquettes in workplace – presenting oneself with finesse and making others comfortable in a business setting –Importance of first impression, grooming, wardrobe-Introduction to Ethics in engineering and ethical reasoning, rights and responsibilities.	[6]
Diversity and Inclusion* Socio-cultural and cross-cultural sensitivities at the workplace: PwD and LGBT at the workplace - learning disabilities at the workplace - caste, class, regionalism, religion and poverty - the different identities of Indian employees and employers and how to include everyone - global diversity identities of race, religion, nationhood - appropriate social media use values sciences - values of a good manager - ethics in business - embodying organizational pride with grace.	[6]
Total Hours:	**30**

Text Book(s):

1.	Courtland L. Bovee, John V. Thill and RoshanLalRaina, 'Business Communication Today',13th Edition, Pearson, 2017
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020

Reference(s):

1.	APAART: Speak Well 1 (English Language and Communication)
2.	APAART: Speak Well 2 (Soft Skills).
3.	Charles Marsh, David W. Guth, Bonnie Poovey Short, 'Strategic Writing Multimedia Writing for Public Relations, Advertising, and More', 4th Edition, 2017.
4.	Alan McCarthy and Felicity O'Dell, 4th Edition, English Vocabulary in Use', Preliminary and Advanced, Cambridge University Press, 2017.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

*SDG 9 – Industry Innovation and Infrastructure

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Essential Grammar – II**	
1.1	Application of tenses – auxiliaries	1
1.2	Correct usage and importance in formal communication	1
1.3	Business vocabulary - vocabulary exercises through web-based applications	1
1.4	Vocabulary exercises through web-based applications, usage and application through mock meetings	1
1.5	situational conversation: application of grammar	1
1.6	Correct spoken English according to context/ situation and application in business scenario	1
2.0	**Written Communication – II**	
2.1	Email writing- formal and Informal - email writing structure	1
2.2	Inquiry letters - Instruction letters	1
2.3	Complaint letters - routine business letters - Sales letters - technical writing	1
2.4	Essay writing - Paragraph writing	1
3.0	**Fundamentals of Effective Communication**	
3.1	Public speaking: fundamentals of effective public speaking	1
3.2	Extempore speech, manuscript speech, and ways to enhance public speaking skills	1
3.3	Storytelling - oral review	1
3.4	Presentation skills: PowerPoint presentations - effective ways to structure the presentation - importance of body language	1
3.5	Leadership skills - leader's role, responsibilities and skill required - understanding good leadership behaviors - learning the difference between leadership and management	1
3.6	Determining how well you perceive what's going on around you- learning about commitment and how to move things forward - making key decisions	1
3.7	Handling your and other people's stress, empowering, motivating and inspiring others, leading by example	1
3.8	Effective feedback - problem solving skill - confidence building.	
4.0	**Corporate / Business Etiquettes**	
4.1	Corporate grooming and dressing - etiquettes in social and office setting	2
4.2	Understand the importance of professional behavior at the workplace - understand and Implement etiquettes in workplace	1
4.3	Presenting oneself with finesse and making others comfortable in a business setting	1
4.4	Importance of first impression, grooming, wardrobe	1
4.5	Introduction to Ethics in engineering and ethical reasoning, rights and responsibilities	1
5.0	**Diversity and Inclusion**	
5.1	Socio-cultural and cross-cultural sensitivities at the workplace: PwD and LGBT at the workplace	1
5.2	Learning disabilities at the workplace - Caste, class, regionalism, religion and poverty	1
5.3	The different identities of Indian employees and employers and how to include everyone	1

5.4	Global diversity identities of race, religion, nationhood	1
5.5	Appropriate social media use values sciences - Values of a good manager	1
5.6	Ethics in business - Embodying organizational pride with grace	1
	Total	**30**

Course Designer(s)

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

60 HS 001	Fundamentals of Economics	Category	L	T	P	Credit
		HS	3	0	0	3

Objectives

- The objective of this course is to make the students to exemplify the demand curves of Households and supply curves of firms with the principles.
- To make them aware of production and cost analysis
- To enable them understand the different market structures
- To provide them knowledge on Macro Economics Concepts
- To make them to examine demand for money and supply of money.

Pre-requisites

- Nil.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the concepts of Micro Economics namely demand, supply, elasticity, consumer's surplus and derivation of demand curve and its applications	Understand
CO2	Analyse Production function, ISO Quant and Costs	Analyse
CO3	Interpret the equilibrium of a firm under perfect competition, monopoly and monopolistic competition.	Apply
CO4	Understand Macro Economic Concepts like National Income, Computation of National Income, Multiplier, Exports and Imports	Understand
CO5	Examine the Monetary economics concepts like demand for money, supply of money, Monetary Policy, Fiscal Policy, Voluntary and Involuntary Unemployment	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	2	2	3	3	3	-	3	-
CO2	-	-	-	-	-	-	-	3	2	2	3	3	-	3	-
CO3	-	-	-	-	-	-	-	3	3	2	2	3	-	3	-
CO4	-	-	-	-	-	-	-	3	2	2	3	3	-	3	-
CO5	-	-	-	-	-	-	-	2	3	2	3	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	20
Understand	-	-	-
Apply	10	10	40
Analyse	20	20	30
Evaluate	-	-	-
Create	10	10	10
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech- Computer Science and Business Systems

60 HS 001- Fundamentals of Economics

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

Concepts of Microeconomics Principles of Demand and Supply — Supply Curves of Firms — Elasticity of Supply; Demand Curves of Households — Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis — Consumers' and Producers' Surplus — Price Ceilings and Price Floors; Consumer Behavior — Axioms of Choice — Budget Constraints and Indifference Curves.	[9]
Production and Cost Analysis Theory of Production - Production Function and Iso-quants — Cost Minimization; Cost Curves Total, Average and Marginal Costs — Long Run and Short Run Costs.	[9]
Market Structure &Pricing Equilibrium of a Firm Under Perfect Competition; Monopoly and Monopolistic Competition, Consumer's Equilibrium — Effects of a Price Change, Income and Substitution Effects — Derivation of a Demand Curve; Applications — Tax and Subsidies — Intertemporal Consumption — Suppliers' Income Effect.	[9]
Concepts of Macro economics National Income and its Components — GNP, NNP, GDP, NDP; Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Government Sector — External Sector — Exports and Imports.	[9]
Concepts of Monetary Economics Money — Definitions; Demand for Money —Transaction and Speculative Demand; Supply of Money — Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets — IS, LM Model; Business Cycles and Stabilization—Monetary and Fiscal Policy—Central Bank and the Government; The Classical Paradigm — Price and Wage Rigidities — Voluntary and Involuntary Unemployment.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Dornbusch, Fischer and Startz, Macroeconomics, 10th Edition, Tata McGraw Hill, 2012
2.	Mote VL and Samual Paul Gupta G S, "Managerial Economics Concepts and Cases", Tata McGraw Hill, 2015
Reference(s):	
1.	Pindyck, Robert S and Daniel L. Rubinfeld , Microeconomics, 8 th Edition, 2013
2.	Paul Anthony Samuelson, William D. Nordhaus, Economics, 19th Edition, McGraw-Hill Education,2010.
3.	Hal R, Varia, Intermediate Microeconomics: A Modern Approach, 8 th Edition Affiliated EastWestPress, 2006
4.	Gilbert Strang, Introduction to linear algebra, 5 th Edition, ANE Books, 2016.

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Concepts of Micro economics**	
1.1	Principles of Demand and Supply	2
1.2	Supply Curves of Firms	1
1.3	Elasticity of Supply; Demand Curves of Households	1
1.4	Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis	2
1.5	Consumers' and Producers' Surplus	1
1.6	Price Ceilings and Price Floors; Consumer Behaviour	2
1.7	Axioms of Choice	1
1.8	Budget Constraints and Indifference Curves.	2
2.0	**Production and Cost Analysis**	
2.1	Theory of Production	1
2.2	Production Function and Iso-quants	2
2.3	Cost Minimization; Cost Curves Total, Average and Marginal Costs	2
2.4	Long Run and Short Run Costs.	1
3.0	**Market Structure & Pricing**	
3.1	Equilibrium of a Firm Under Perfect Competition	1
3.2	Monopoly and Monopolistic Competition	1
3.3	Consumer's Equilibrium	1
3.4	Effects of a Price Change	1
3.5	Income and Substitution Effects	1
3.6	Derivation of a Demand Curve & Applications	1
3.7	Tax and Subsidies	1
3.8	Inter temporal Consumption	1
3.9	Suppliers' Income Effect	1
4.0	**Concepts of Macroeconomics**	
4.1	National Income and its Components	1
4.2	GNP, NNP, GDP, NDP	1
4.3	Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier	3
4.4	Government Sector	1
4.5	External Sector	1
4.6	Exports and Imports	1
5.0	**Concepts of Monetary Economics**	
5.1	Money — Definitions; Demand for Money	1
5.2	Transaction and Speculative Demand; Supply of Money	2
5.3	Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets	1
5.4	IS, LM Model; Business Cycles and Stabilization	1

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Approved in Academic Council Meeting held on 25/05/2024

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5.5	Monetary and Fiscal Policy	1
5.6	Central Bank and the Government; The Classical Paradigm	1
5.7	Price and Wage Rigidities	1
5.8	Voluntary and Involuntary Unemployment	1

Course Designer(s)

1. Mr.P.Sabareesh -sabareesh@ksrct.ac.in

60 MA 005	Statistical Modeling	Category	L	T	P	Credit
		BS	3	1	2	5

Objectives

- To get exposed to the fundamentals of linear statistical models and Analysis of Variance
- To familiarize the basic concepts of estimation methods
- To understand the basic concepts of testing of hypothesis
- To familiarize various non-parametric inference techniques
- To acquire skills in using ARIMA models to make forecasts

Pre-requisites

- Statistics and Probability

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Calculate correlation, regression and analyze the design of experiments.	Apply
CO2	Determine the point estimates of the parameters of the distribution.	Apply
CO3	Test the statistical hypothesis using non parametric testing models.	Apply
CO4	Apply various non-parametric inferences techniques.	Apply
CO5	Apply ARIMA models to make forecasts.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	10	-	10	-	20	-	20	-
Understand	10	30	10	30	20	30	20	30
Apply	40	70	40	70	60	70	60	70
Analyse	-	-	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech - Computer Science and Business Systems

60 MA 005- Statistical Modeling

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	1	2	90	5	50	50	100

Linear Statistical Models and Analysis of variance: Multiple Correlations - Coefficient of Multiple correlations - Multiple Regression Analysis. Analysis of variance - Completely randomized design and Randomized block design. R statistical Programming: Introduction to R, Functions - Control flow and Loops.	[9]
Estimation Theory : Point estimation - Criteria for good estimates (un-biasedness, consistency) - Methods of estimation including maximum likelihood estimation. R statistical Programming: Working with Vectors and Matrices - Reading in Data - Writing Data.	[9]
Non-parametric Testing of hypothesis: Concept and formulation - Type I and Type II errors - Neyman Pearson lemma (without proof) - Simple examples with Neyman Pearson lemma. R statistical Programming: Working with Data, Manipulating Data, Graphics in R.	[9]
Non-parametric Inference: Comparison with parametric inference - Use of order statistics. Sign-test - Wilcoxon signed rank test - Mann-Whitney test - Run-test - Kolmogorov-Smirnov test - Spearman's and Kendall's test-Tolerance region. R statistical Programming: Sign test, Wilcoxon signed test and Mann-Whitney test	[9]
Basics of Time Series Analysis & Forecasting: Stationary - ARIMA Models: Identification - Estimation and Forecasting (simple Problems). R statistical Programming: Simulation, Linear model - Data Frame.	[9]
Practical: 1. Introduction to R, Functions, Control flow and Loops 2. Working with Vectors and Matrices 3. Reading in Data, Writing Data, Working with Data, Manipulating Data 4. Simulation 5. Linear model 6. Data Frame 7. Graphics in R 8. Building ARIMA models 9. Fitting the multiple regression	[30]
Total Hours: 45 +15(Tutorial) + 30 (LAB)	**90**

Text Book(s):

1.	R. Miller, J.E. Freund and R. Johnson, Probability and Statistics for Engineers, Fourth Edition, Pearson,2015.
2.	A.Goon. M.Gupta and B.Dasgupta, Fundamentals of Statistics (Vol. I), The Word Press, 1933.

Reference(s):

1.	Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, Second Edition, AddisonWesley Professional, 2017.
2.	D.C. Montgomery and E.Peck , Introduction to Linear Regression Analysis, Third Edition, Wiley, 2010.
3.	Garrett Grolemund, Hands-on Programming with R, Shroff Publishers & Distributors Pvt Ltd, 2018.
4.	S.C.Gupta and V.K.Kapoor, Fundamentals of mathematical statistics, 12 th Edition, sultan chand and sons,New Delhi 2020.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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5.	Web Reference: https://archive.nptel.ac.in/courses/111/105/111105090/, Probability and Statistics, IITKharagpur, PROF. SOMESH KUMAR.

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Linear Statistical Models and Analysis of variance**	
1.1	Multiple Correlations	2
1.2	Coefficient of Multiple correlations	2
1.3	Multiple Regression Analysis	1
1.4	Tutorial	2
1.5	Analysis of variance - Completely randomized design	1
1.6	Randomized block design.	2
1.7	Tutorial	2
2	**Estimation Theory**	
2.1	Point estimation	2
2.2	Criteria for good estimates (un-biasedness, consistency)	2
2.3	Tutorial	2
2.4	Methods of estimation	2
2.5	Methods of estimation including maximum likelihood estimation	2
2.6	Tutorial	2
3	**Non-parametric Testing of hypothesis**	
3.1	Concept and formulation –Type I and Type II errors.	2
3.2	Neyman Pearson lemma (without proof)	3
3.3	Tutorial	2
3.4	Simple examples with Neyman Pearson lemma	3
3.5	Tutorial	2
4	**Non-parametric Inference**	
4.1	Comparison with parametric inference, Use of order statistics	2
4.2	Sign-test –Wilcoxon signed rank test	1
4.3	Mann-Whitney test – Run-test	1
4.4	Tutorial	2
4.5	Kolmogorov-Smirnov test	1
4.6	Spearman's and Kendall's test	2
4.7	Tolerance region.	1
4.8	Tutorial	2
5	**Basics of Time Series Analysis & Forecasting**	
5.1	Stationary	2
5.2	ARIMA Models: Identification	2
5.3	Tutorial	2
5.4	Estimation (simple Problems)	2
5.5	Forecasting (simple Problems)	2
5.6	Tutorial	2
Practical:		

1.	Introduction to R, Functions, Control flow and Loops	4
2.	Working with Vectors and Matrices	3
3.	Reading in Data, Writing Data, Working with Data, Manipulating Data	3
4.	Simulation	4
5.	Linear model	3
6.	Data Frame	3
7.	Graphics in R	3
8.	Building ARIMA models	4
9.	Fitting the multiple regression	3

Course Designer(s)

1. Dr.K.PRABAKARAN - prabakaran@ksrct.ac.in

60 CB 201	Computer Organization and Architecture	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To recognize the basic structure of a digital computer and representation of nonnumeric data.
- To learn different arithmetic operations and organization of control unit.
- To understand the concept of pipelining and its impact in processor design.
- To understand the concept in memory system.
- To study memory organization different ways of communication with I/O devices and parallel processors.

Pre-requisites

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the functionalities of various blocks of a digital computer and express the data representation.	Apply
CO2	Apply the logic design of Arithmetic and control Unit.	Apply
CO3	Understand hazards in pipelining and outline its impact in the performance of the processors.	Understand
CO4	Analyze the concepts of memory system.	Analyze
CO5	Understand the concepts in memory organization, concurrence access in parallel processors and classify the approaches for I/O communication.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	-	-	-	-	2	2	2	2	1	-
CO2	3	3	2	2	3	-	-	-	-	2	2	2	3	1	-
CO3	3	3	3	2	2	-	-	-	-	2	2	2	-	1	-
CO4	3	3	2	2	3	-	-	-	-	2	2	2	-	1	-
CO5	3	3	2	3	3	-	-	-	-	2	2	3	3	1	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	20	20	40
Apply	30	30	50
Analyse	10	10	10
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K. S. Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 201 - Computer Organization and Architecture								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

Basic Structure of Computers* Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes –RISC – CISC. ALU design – Fixed point and floating point operations	[9]
Computer arithmetic** Integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift- andadd, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic, High performance arithmetic, Subword parallelism.	[9]
Pipelining** Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.	[9]
Memory system* Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.	[9]
I/O Organization** Accessing I/O devices – Programmed Input/output -Interrupts – Direct Memory Access – Buses –Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.
2.	Atul P. Godse and Deepali A. Godse, “Computer Architecture and Organization” Technical Publications AnUpThrust for Knowledge, 1993.
Reference(s):	
1.	David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Third Edition, Elsevier, 2005. 2. 3. 4.
2.	William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.
3.	John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
4.	V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education, 2004.

*SDG:4- Quality Education

**SDG: 9- Industry innovation and infrastructure.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Course Contents and Lecture Schedule		
S. No.	**Topics**	**No. of hours**
1.0	**Basic Structure of Computers**	
1.1	Functional units – Basic operational concepts	1
1.2	Bus structures – Performance and metrics	1
1.3	Hardware – Software Interface	1
1.4	Instructions and instruction sequencing	1
1.5	Instruction set architecture	1
1.6	Addressing modes	1
1.7	RISC – CISC	1
1.8	ALU design	1
1.9	Fixed point and floating point operations.	1
2.0	**Computer arithmetic**	
2.1	Integer addition and subtraction	1
2.2	ripple carry adder, carry look-ahead adder	1
2.3	multiplication – shift-and-add	1
2.4	Booth multiplier	1
2.5	carry save multiplier	1
2.6	Division restoring and non-restoring techniques	1
2.7	floating point arithmetic	1
2.8	High performance arithmetic	1
2.9	Subword parallelism	1
3.0	**Pipelining**	
3.1	Basic concepts	1
3.2	Data hazards	1
3.3	Instruction hazards	1
3.4	Influence on instruction sets	2
3.5	Data path and control considerations	1
3.6	Performance considerations	1
3.7	Exception handling	2
4.0	**Memory system**	
4.1	Basic concepts	1
4.2	Semiconductor RAM	1
4.3	ROM – Speed	1
4.4	Size and cost	1
4.5	Cache memories	1
4.6	Improving cache performance	1
4.7	Virtual memory	1
4.8	Memory management requirements	1
4.9	Associative memories – Secondary storage devices	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

5.0	**I/O Organization**	
5.1	Accessing I/O devices	1
5.2	Programmed Input/output	1
5.3	Interrupts	1
5.4	Direct Memory Access	1
5.5	Buses – Interface circuits	1
5.6	Standard I/O Interfaces (PCI, SCSI, USB)	2
5.7	I/O devices and processors	2

Course Designer(s)

1. Mrs.R.Loga priya – logapriyar@ksrct.ac.in

61 CB 202	Object Oriented Programming	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To explore object-oriented programming concepts, and apply them in solving problems.
- To learn the concepts of Arrays, String handling and Interfaces.
- To create applications to store the data with the aid of files classes.
- To develop programs using Collection APIs and multithreading.
- To understand the try catch finally statement and Regular expression.

Pre-requisites

- Basic knowledge of C Programming Language

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the concept of classes, objects and exhibit reusability through inheritance along with string and array.	Apply
CO2	Extrapolate different operations through Arrays, interfaces and string handling.	Apply
CO3	Explore the importance of Packages and Streams.	Apply
CO4	Implement problems using java collection framework and multi-threading.	Apply
CO5	Understand the uses of Regular expression and Exception handling.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
CO2	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
CO3	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
CO4	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
CO5	3	3	3	-	-	-	-	-	2	2	-	2	-	-	2
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	10	10	20
Apply	50	50	80
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

61 CB 202- Object Oriented Programming

CB

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

Introduction* Object-Oriented Concepts-Naming Convention, Object and Class, Method, Constructors, Use of Super, Final, Static and this keyword, Inheritance, Polymorphism, Abstraction, Encapsulation, Method Overloading, Method Overriding.	[9]
Java Basics* Introduction- Data Types, Variables, Operators, Control Statements, Arrays, String and String buffer, Interfaces, Exception Handling, Reading Console Input and Writing Console Output, The Console class	[9]
Packages and Streams* Defining a Package, Importing packages, Access protection, I/O: The Stream classes, Byte Streams and Character Streams, File Class, Reading and Writing Files, Random Access File Operations, Serialization and De-serialization	[9]
Collection Framework and Threads* Collections Overview, ArrayList, LinkedList, Queue, HashMap, HashSet, Iterator, Vector. Multithreaded Programming-The Java Thread Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priority, Synchronization	[9]
Regular Expressions and Exception handling Regular Expression: Matcher Class, Pattern class, Regex Character Classes and Quantifiers, Meta characters. Exception handling Fundamentals, Types, Nested try statements, Built-in-Exceptions	[9]
Total Hours:	**45**

Text Book(s):

1.	Herbert Schildt, “Java: The complete Reference”, Comprehensive coverage of the Java Language, Oracle press, 10th Edition, Tata McGraw-Hill, 2017..
2.	Y.Daniel Liang, “Introduction to Java Programming”, Comprehensive Version, 10th Edition, Pearson Education,2015

Reference(s):

1.	Java 7 Programming Black Book, Kogent Learning Solutions Inc, DreamTech Press, 2013
2.	Bert Bates and Kathy Sierra, "Head First Java", 2nd Edition, Publisher: O'Reilly's, 2009.
3.	Jeffrey E. F. Friedl, "Mastering Regular Expressions", 3rd Edition, O'Reilly Media, Inc.,2006
4.	Online Resources : https://www.tutorialspoint.com, https://www.javatpoint.com, https://www.journaldev.com, https://beginnersbook.com, https://www.w3schools.com

***SDG 4:- Quality Education**

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Object-Oriented Concepts-Naming Convention	1
1.2	Object and class	1
1.3	Method	1
1.4	Constructors	1
1.5	Use of super, final, static and this keyword	1
1.6	Inheritance, Polymorphism	1
1.7	Abstraction, Encapsulation	1
1.8	Method Overloading	1
1.9	Method Overriding	1
2.0	**Java Basics**	
2.1	Introduction	1
2.2	Data Types, Variables	1
2.3	Operators	1
2.4	Control Statements,Arrays	1
2.5	String and String buffer	1
2.6	Interfaces	1
2.7	Exception handling	1
2.8	Reading console Input and Writing Console Output	1
2.9	The Console class	1
3.0	**Packages and Stream**	
3.1	Defining a Package	1
3.2	Importing packages	1
3.3	Access protection	1
3.4	I/O: The Stream classes	1
3.5	Byte streams and Character streams	1
3.6	File class	1
3.7	Reading and writing Files	1
3.8	Random access file operations	1
3.9	Serialization and De-serialization	1
4.0	**Collection Framework and Threads**	
4.1	Collections overview	1
4.2	Arrays List, LinkedList,Queue	1
4.3	HashMap, HashSe	1
4.4	Iterator, Vector	1
4.5	Multithreaded programming	1
4.6	The Java Thread Model, The Main Thread	1

4.7	Creating a Thread, Creating multiple Threads	1
4.8	Thread priority	1
4.9	Synchronization	1
5.0	**Regular Expressions and Exception handling**	
5.1	Regular Expression: Matcher Class	1
5.2	Pattern class	2
5.3	Regex Character Classes	1
5.4	Quantifiers, Metacharacters	1
5.5	Exception handling Fundamentals	1
5.6	Types	1
5.7	Nested try statements	1
5.8	Built-in-Exceptions	1
	Total	**45**

Course Designer(s)

1. Mrs.R.Loga priya - logapriyar@ksrct.ac.in

60 GE 002	Tamils and Technology	Category	L	T	P	Credit
		GE	1	0	0	1

Objectives

- To learn weaving, ceramic and construction technology of Tamils
- To understand the agriculture, irrigation and manufacturing technology of Tamils
- To realize the development of scientific Tamil and Tamil computing

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the weaving and ceramic technology of ancient Tamil people nature.	Understand
CO2	Comprehend the construction technology, building materials in sangam period and case studies.	Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence.	Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving.	Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

Common to all Branches

60 GE 002 – Tamils and Technology

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	1	0	0	15	1	-	100	100

Weaving and Ceramic Technology Weaving Industry During Sangam Age – Ceramic Technology – Black and Red Ware Potteries (Brw) – Graffiti On Potteries.	3
Design and Construction Technology Designing and Structural Construction House & Designs in Household Materials During Sangam Age – Building Materials and Hero Stones of Sangam Age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and	3

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

other Worship Places – Temples of Nayaka Period - Type Study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal – Chetti Nadu Houses , Indo – Saracenic Architecture at Madras During British Period.	
Manufacturing Technology Art of Ship Building – Metallurgical Studies – Iron Industry – Iron Smelting ,Steel -Copper and Gold Coins as Source of History – Minting of Coins – Beads Making – Industries Stone Beads – Glass Beads – Terracotta Beads – Shell Beads/Bone Beats – Archeological Evidences -Gem Stone Types Described in Silappathikaram.	3
Agriculture and Irrigation Technology Dam, Tank,Ponds,Sluice,Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells Designed for Cattle Use – Agriculture and Agro Processing – Knowledge of Sea-Fisheries – Pearl – Conche Diving -Ancient Knowledge of Ocean – Knowledge Specific Society.	3
Scientific Tamil & Tamil Computing Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy- Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.	3
Total Hours	**15**

Text Book(s):	
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரீகம் (தொல்லியல் துறை வெளியீடு).
4.	பொருநை - ஆற்றங்கரை நாகரீகம் (தொல்லியல் துறை வெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
Reference(s):	
1.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

*SDG 4 – Quality Education
**SDG 15 – Life on Land
***SDG 16 – Peace, Justice and Strong Institutions

Course Designer(s)

60 GE 002	**தமிழரும் தொழில்நுட்பமும்** (அனைத்து துறைகளுக்கும் பொதுவானது)	**Category**	**L**	**T**	**P**	**Credit**
		GE	**1**	**0**	**0**	**1**

பாடத்தின் நோக்கங்கள்**:**

- தமிழர்களின் சங்ககால நெசவு, பனை வனைதல் மற்றும் கட்டிட தொழில் நுட்பம் குறித்து அறிதல்.
- தமிழர்களின் சங்ககால வேளாண்மை, நீர்ப்பாசனம் மற்றும் உற்பத்தி முறைகள் குறித்த கற்றல்.
- நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிதல்.

முன்கூட்டிய துறைசார் அறிவு**:**

தேவை இல்லை

பாடம் கற்றதின் விளைவுகள்:

பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்

CO1	சங்ககாலத் தமிழர்களின் நெசவு மற்றும் பானை வனைதல் தொழில்நுட்பம் குறித்த கற்றுணர்தல்	புரிதல்
CO2	சங்ககாலத் தமிழர்களின் கட்டிட தொழில்நுட்பம் கட்டுமானப் பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்த அறிவு.	புரிதல்
CO3	சங்ககாலத் தமிழர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.	புரிதல்
CO4	சங்ககாலத் தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு.	புரிதல்
CO5	நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிந்துகொள்ளலும் மற்றும் பயன்படுத்துதலும்.	பகுப்பாய்வு

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO2	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO3	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO4	-	-	-	-	-	-	3	3	-	2		3	-	-	-
CO5	-	-	-	-	-	-	3	3	-	2		3	-	-	-

3 - Strong; 2 - Medium; 1 - Some

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

அனைத்து துறைகளுக்கும் பொதுவானது

60 GE 002 – தமிழரும் தொழில்நுட்பமும்

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	1	0	0	15	1	-	100	100

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.	3
வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கல் - நாயக்கர் காலக் கோயில்கள் – மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை.	3
உற்பத்தித் தொழில் நுட்பம்: **கப்பல் கட்டும் கலை – உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு** மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள் ,	3

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.	
வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பம்: அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமு**ழி**த் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்கான வடிவமைக்கப்பட்ட கிணறுகள் – வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.	3
அறிவியல் தமிழ் மற்றும் கணித்தமிழ் அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.	3
Total Hours	**15**

Text Book(s):	
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரீகம் (தொல்லியல் துறை வெளியீடு).
4.	பொருநை - ஆற்றங்கரை நாகரீகம் (தொல்லியல் துறை வெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
Reference(s):	
1.	R.Balakrishnan , "Journey of Civilization Indus to Vaigai", Published by: RMRL

*SDG 4 – Quality Education
**SDG 15 – Life on Land
***SDG 16 – Peace, Justice and Strong Institutions

60 ME 0P1	Fabrication and Reverse Engineering Laboratory (Common to All branches)	Category	L	T	P	Credit
		ES	0	0	4	2

Objectives

- To acquire skills in operating hand tools and instruments.
- To provide hands-on training on Carpentry, Sheet metal, Fitting and Welding.
- To provide hands-on training on household wiring and electronic circuits.
- To offer real time activity on plumbing connections in domestic applications.
- To provide hands-on activities on dismantling, and assembling the Home Appliance, Center lathe operations, computer's internal components and peripherals.

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Perform power tools operations.	Apply
CO2	Make a wooden model using carpentry Process.	Apply
CO3	Make a model using sheet metal, filing and joining a MS Plate.	Apply
CO4	Repair and Maintenances of water lines for home applications.	Apply
CO5	Trouble shoots the electrical and electronic circuits, Electrical Machines and realizes the reputation of house wiring, home Appliance, computer internal components and peripherals.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	-	-	2	2	-	3	-	-	3	3	3	-
CO2	3	2	3	-	-	2	2	-	3	-	-	3	3	3	-
CO3	3	2	3	-	-	2	2	-	3	-	-	3	3	3	-
CO4	3	2	3	-	-	2	2	-	3	-	-	3	3	3	-
CO5	3	2	3	-	-	2	2	-	3	-	-	3	3	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	25	12	50	-	50
Apply	25	13	50	-	50
Analyse	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022

Common to All branches

60 ME 0P1– Fabrication and Reverse Engineering Laboratory

Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	4	6	2	60	40	100

List of Experiments:

2. **Fitting of Wall mounting Parts using Power Tools***
   a. Drilling in different Walls and Materials
   b. Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with Clamps
3. **Making of Wooden model using the Carpentry Process***
   a. T / Cross Joint
   b. Mortise and Tenon Joint / different joints Determination of viscosity of lubricating oil by Redwood and Saybolt viscometer
4. **Making of Metal Model***
   a. Making of Components using Sheet Metal Process
   b. Mating of Components using the Filling Process Heat Balance Test on 4-Stroke Diesel Engine**
5. **Fabrication of Welded model***
6. **Repair and Maintenance of Pipe Fitting for Home Applications***
   a. Assembly of GI pipes/PVC and Pipe Fitting
   b. Cutting of Threads in GI pipes by thread Cutting Dies Measurement of engine emission and smoke using exhaust gas analyser and smoke meter
7. **Assembling and dismantling of***
   a. Iron box
   b. Induction stove
   c. Water heater
   d. Mixer
   e. Table fan
   f. Ceiling fan
8. **S`Design and Execution of Residential house wiring***
   a. 1 BHK
   b. 2 BHK Performance test on vapour compression refrigeration test rig
9. **Design and Execution of Residential house wiring with UPS.***

a. 1 BHK
b. 2 BHK

10. Design and Execution of Residential house wiring with UPS.*

a. 1 BHK
b. 2 BHK

11. Assembling of Audio Amplifier*

a. Connecting USB/Bluetooth MP3 player board

b. Connecting Volume controllers

c. Connecting bass & treble filter boards
d. Connecting Surround and sub-woofer filter board

Study Exercises:

1. Demonstration of Centre Lathe and its operations like Facing, Turning, and drilling.
2. Dismantle and Assemble of Vacuum Cleaner / Refrigerator.
3. Study of components of computer. Dismantle and assemble of desktop computer systems.

Lab Manual	
1.	"**Fabrication and Reverse Engineering Laboratory**", Department of Mechanical Engineering, KSRCT.

*SDG 9 – Industry Innovation and Infrastructure

Course Designer(s)

1. Mr.S Sakthivel - sakthivel_s@ksrct.ac.in
2. Dr. D Sri Vidya - srividhya@ksrct.ac.in
3. Mr. K. Raguvaran – raguvaran@ksrct.ac.in

61 CB 2P1	Object Oriented Programming Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To develop programs using basic concepts of Java
- To create applications using java concepts
- To provide the permanent storage for programs using files
- To design and develop the programs using collection APIs and threads
  To understand the try catch finally statement .

Pre-requisites

- Basic Knowledge of C Programming

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Implement programs using object-oriented concepts.	Apply
CO2	Develop programs with the concept of interfaces, exception handling.	Apply
CO3	Implement programs using packages and the file operations using IO classes.	Apply
CO4	Develop programs using Collections and multi-threading.	Apply
CO5	Understand the try catch finally statement.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	1	-	-	1	2	-	-	1	3	-	-
CO2	3	2	3	2	2	-	-	1	2	-	-	1	3	-	-
CO3	3	2	3	2	2	-	-	1	2	-	-	1	3	-	-
CO4	3	2	3	2	2	-	-	1	2	-	-	1	3	-	-
CO5	3	2	3	2	3	-	-	1	2	-	-	1	3	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	25	13	50	-	50
Apply	25	12	50	-	50
Analyse	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
61 CB 2P1 - Object Oriented Programming Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
II	0	0	4	60	2	60	40	100

List of Experiments:

1. Classes and Objects *
2. Interfaces *
3. Packages *
4. Data storage using files *
5. Collections *
6. Multi-threading *
7. Regular Expressions *
8. Exception handling **

Mini project: Develop a mini project for any application using Java.

Lab Manual	
1.	"**Object Oriented Programming Lab**", Department of Computer Science and Business Systems, KSRCT.

***SDG 4:- Quality Education**

Course Designers

1. Ms.R.Loga priya –logapriyar@ksrct.ac.in

60 CG 0P1	Career Skill Development I	Category	L	T	P	Credit
		CGC	0	0	2	1

Objectives

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Pre-requisites

- Basic knowledge of reading and writing in English

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Listen and comprehend complex academic texts.	Understand
CO2	Read and infer the denotative and connotative meanings of technical texts.	Analyze
CO3	Write definitions, descriptions, narrations, and essays on various topics.	Apply
CO4	Speak fluently and accurately in formal and informal communicative contexts.	Apply
CO5	Appraise the verbal ability skills in the career development and professional contexts.	Analyze

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	2	3	3	2	3	-	-	-
CO2	-	-	-	-	-	-	-	2	3	3	2	3	2	-	-
CO3	-	-	-	-	-	-	-	2	3	3	2	3	2	2	-
CO4	-	-	-	-	-	-	-	2	3	3	2	3	-	-	-
CO5	-	-	-	-	-	-	-	2	3	3	2	3	2	2	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	40	-
Apply	-	-	20	-
Analyse	-	-	40	-
Evaluate	-	-	-	-
Create	-	-	-	-
Total	-	-	100	-

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science And Business Systems								
60 CG 0P1 - Career Skill Development I								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
II	0	0	2	30	1	100	00	100

Listening Listening for general information-specific details - audio / video (formal & informal) - Listen to podcasts/ TED talks/ anecdotes / stories / event narration / documentaries and interviews with celebrities - Listen to a product and process descriptions, advertisements about products or services.	[6]
Speaking Self-Introduction; Introducing a friend; conversation - politeness strategies - Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews - Picture description; giving instruction to use the product; presenting a product - Small Talk; Mini presentations - Group discussions, debates & role plays.	[6]
Reading Loud reading vs Silent reading, Skimming & Scanning of passages, reading brochures (technical context), social media messages relevant to technical contexts and emails - Biographies, travelogues, newspaper reports and travel &technica blogs - Advertisements, gadget reviews and user manuals - Newspaper articles and Journal reports -Editorials; and opinion blogs.	[6]
Writing Writing letters – informal and formal – basics and format orientation - paragraph texting, short report on an event (field trip etc.) - Definitions; instructions; and product /process description - Note-making / Note-taking; recommendations; transferring information from non-verbal (charts, graphs to verbal mode) - Essay texting.	[6]
Verbal Ability I Reading Comprehension (MCQs) – Cloze Test - Sequencing of sentences – Summarizing and paraphrase – ErrorDetection – Spelling Test – Sentence Improvement – Preposition.	[6]
Total Hours:	**30**

Text Book(s):	
1.	
2.	
Reference(s):	
1.	'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020.
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020.
3.	Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012.
4.	Lakshmi Narayanan, 'A Course Book on Technical English' Scitech Publications (India) Pvt. Ltd. 2020.

*SDG 4: Quality Education
*SDG 8: Decent work and Economic growth
***SDG 9 – Industry, innovation and Infrastructure

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Listening**	
1.1	Listening for general information and Specific details	1
1.2	Listening to podcasts, documentaries and interviews with celebrities	1
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	2
1.5	Listen to a product and process descriptions	1
2	**speaking**	
2.1	Self-introduction	1
2.2	Summarizing of documentaries& Picture Narration	1
2.3	Small Talk; Mini presentations	1
2.4	Group discussions, debates & role plays	2
2.5	Group discussions	1
3	**Reading**	
3.1	Loud reading vs Silent reading, Skimming & Scanning of passages	1
3.2	Reading social media messages relevant to technical contexts	1
3.3	Reading newspaper reports and travel & technical blogs	1
3.4	Reading advertisements, gadget reviews and user manuals	2
3.5	Reading newspaper articles and journal reports	1
4	**Writing**	
4.1	Writing letters – informal and formal	1
4.2	Paragraph Texting	1
4.3	Definitions and instructions	1
4.4	Note-making / Note-taking	2
4.5	Essay texting	1
5	**Verbal Ability**	
5.1	Reading Comprehension (MCQs) and Cloze Test	1
5.2	Sequencing of sentences	1
5.3	Paraphrasing and Summarizing	1
5.4	Error Detection and Spelling Test	2
5.5	Prepositions	1
	TOTAL	**30**

Course Designer(s)

1. Dr.A.Palaniappan- palaniappan@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

THIRD SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 HS 004	Introduction to Innovation, IP Management and Entrepreneurship	2	40	60	100	45	100
2	60 MA 013	Computational Statistics	2	40	60	100	45	100
3	61 CB 301	Automata and Compiler Design	2	40	60	100	45	100
4	60 CB 302	Database Management Systems	2	40	60	100	45	100
5	60 CB 303	Data Structures	2	40	60	100	45	100
6	60 CB 304	Software Engineering	2	40	60	100	45	100
PRACTICALS								
7	60 CB 3P1	Database Management Systems Lab	2	60	40	100	45	100
8	60 CB 3P2	Data Structures Lab	2	60	40	100	45	100
9	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
10	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 HS 004	Introduction to Innovation, IP Management and Entrepreneurship	Category	L	T	P	Credit
		HS	3	0	0	3

Objectives

- To identify and discover market needs.
- To manage an innovation program.
- To create, protect, assertive and commercialize intellectual property, opportunities and challenges for entrepreneurs.

Pre-requisites

- Basic Knowledge on Management, entrepreneurship, technology and innovation.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Summarize the life cycle and types of innovation	Understand
CO2	Interpret the needs, benefits and procedure of filing an IPR	Apply
CO3	Examine a business plan to ensure success of a start-up	Analyse
CO4	Devise an innovative idea, protect it through IPR	Apply
CO5	Explore the scope of converting it to a startup	Evaluate

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	2	2	2	2	2	2	3	1	2	1	-	3	-
CO2	2	2	2	3	1	2	1	3	3	2	3	2	-	3	-
CO3	2	1	1	3	1	1	3	3	1	2	2	1	-	3	-
CO4	2	3	2	3	2	2	1	2	2	1	3	2	-	3	-
CO5	2	1	2	3	3	2	2	3	2	1	3	2	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	20	20	20
Apply	20	20	40
Analyse	10	10	20
Evaluate	10	10	20
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.TECH – Computer Science and Business Systems								
60 HS 004 - Introduction to Innovation, IP Management and Entrepreneurship								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Introduction to Innovation * Adoption of Innovations, Exploring Innovations, Idea generation, Developing innovative culture, Executing innovations, Innovation attributes and their adoption rate, Measuring and evaluation of innovation, Exploiting and renewing innovations, Managing innovations in organizations, Innovation and intellectual property rights, Innovation portfolio.	[9]
Introduction to IPR * Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.	[9]
Registration of IPRS * Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad, Agreements and Legislations.	[9]
Entrepreneurship * Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur, Major Motives Influencing an Entrepreneur –Achievement Motivation Training, Self Rating, Business Games, Thematic Apperception Test – Stress Management.	[9]
Business and Financing * Small Enterprises – Characteristics, Ownership Structures – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal –Sources of Finance, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.	[9]
Total Hours:	**45**

Text Book(s):	
1.	V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
2.	S.V. Satarkar, Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002
Reference(s):	
1.	Intellectual Property and Open Source: A Practical Guide to Protecting Code, http://shop.oreilly.com/product/9780596517960.doc
2.	Edison in the Boardroom: How Leading Companies Realize Value from Their Intellectual Assets, https://www.wiley.com/enus/Edison+in+the+Boardroom%3A+How+Leading+Companies+Realize +Val ue+from+Their+Intellectual+Assets-p-9780471217350
3.	. Donald F Kuratko, “Entreprenuership – Theory, Process and Practice”, 9 th Edition, Cengage Learning, 2014.
4.	Khanka. S.S., “Entrepreneurial Development” S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.

*SDG 9: Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Innovation**	
1.1	Adoption of Innovations	1
1.2	Exploring Innovations - Idea generation	1
1.3	Developing innovative culture - Executing innovations	1
1.4	Innovation attributes and their adoption rate	1
1.5	Measuring and evaluation of innovation	1
1.6	Exploiting and renewing innovations	1
1.7	Managing innovations in organizations	1
1.8	Innovation and intellectual property rights	1
1.9	Innovation portfolio	1
2.0	**Introduction to IPR**	
2.1	Basic concepts and need for Intellectual Property	1
2.2	Patents, Copyrights, Geographical Indications	1
2.3	IPR in India and Abroad	1
2.4	Genesis and Development	1
2.5	The way from WTO to WIPO	1
2.6	TRIPS, Nature of Intellectual Property, Industrial Property	1
2.7	Technological Research, Inventions and Innovations	1
2.8	Important examples of IPR.	2
3.0	**Registration of IPRs**	
3.1	Meaning and practical aspects of registration of Copy Rights	1
3.2	Trademarks	2
3.3	Patents	2
3.4	Geographical Indications	2
3.5	Trade Secrets and Industrial Design registration in India and Abroad	1
3.6	Agreements and Legislations	1
4.0	**Entrepreneurship**	
4.1	Entrepreneur – Types of Entrepreneurs	1
4.2	Difference between Entrepreneur and Intrapreneur	1
4.3	Major Motives Influencing an entrepreneur	1
4.4	Achievement Motivation Training	1
4.5	Self Rating	1
4.6	Business Games	1
4.7	Thematic Apperception Test	2
4.8	Stress Management	1
5.0	**Business and Financing**	
5.1	Small Enterprises - Characteristics	1
5.2	Ownership Structures – Steps involved in setting up a Business	1
5.3	Identifying, selecting a Good Business opportunity, Market Survey and Research	1

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Approved in Academic Council Meeting held on 25/05/2024

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5.4	Techno Economic Feasibility Assessment	1
5.5	Preparation of Preliminary Project Reports	1
5.6	Project Appraisal –Sources of Finance, Management of working Capital, Costing	2
5.7	Break Even Analysis, Taxation – Income Tax	1
5.8	Excise Duty – Sales Tax	1

Course Designer(s)

1. Mr.R.Murugaganesh – murugaganesh@ksrct.ac.in

60 MA 013	Computational Statistics	Category	L	T	P	Credit
		BS	3	0	2	4

Objectives

- To get exposed to the concepts of multivariate normal distribution and multivariate regression
- To familiarize the basic concepts of discriminant analysis and principal component analysis
- To acquire basic knowledge of factor analysis and Python
- To get exposed to clustering, segmentation analysis and data wrangling
- To get knowledge on visualization of data and data aggregation

Pre-requisites

- Statistics and Probability

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Calculate the concepts of multivariate normal distribution and multivariate regression.	Apply
CO2	Interpret the results of Discriminant Analysis and Principal component analysis.	Apply
CO3	Develop programs using Factor analysis and Python concepts.	Apply
CO4	Apply the concepts of clustering, segmentation analysis and data wrangling	Apply
CO5	Interpret the data and visualize the graphs using Python	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	1		2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	10	-	10	-	20	-	20	-
Understand	10	30	10	30	20	30	20	30
Apply	40	70	40	70	60	70	60	70
Analyse	-	-	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

60 MA 013 & Computational Statistics

B.Tech – Computer Science and Business Systems

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	2	75	4	50	50	100

Multivariate Normal Distribution*: Multivariate Normal Distribution Functions – Conditional distribution and its relation to regression model. **Multivariate Regression:** Assumptions of Multivariate Regression Models - Parameter estimation - Multivariate Analysis of variance and covariance.	[9]
Discriminant Analysis*: Statistical background - Linear discriminant function analysis - Estimating linear discriminant functions and their properties. **Principal Component Analysis*:** Principal components - Algorithm for conducting principal component analysis - Deciding on how many principal components to retain - H-plot.	[9]
Factor Analysis*: Factor analysis model - Extracting common factors - Determining number of factors Transformation of factor analysis solutions - Factor scores. **Python Concepts, Data Structures, Classes*:** Interpreter - Program Execution - Statements – Expressions - Flow Controls - Functions - Numeric Types - Sequences and Class Definition – Constructors -Text and Binary Files - Reading and Writing.	[9]
Clustering and Segmentation Analysis*: Introduction - Types of clustering - Correlations and distances - Clustering by partitioning methods - Hierarchical clustering - Overlapping clustering - K-Means Clustering - Profiling and Interpreting Clusters. **Data Wrangling*:** Combining and Merging Datasets - Reshaping and Pivoting - Data Transformation - String Manipulation - Regular Expressions.	[9]
Visualization in Python*: Matplotlib package - Plotting Graphs - Controlling Graph - Adding Text - More Graph Types - Getting and setting values - Patches. **Data Aggregation, Group Operations, Time series*:** Group by Mechanics - Data Aggregation- Group wise Operations and Transformations - Pivot Tables and Cross Tabulations - Time Series Basics - Data Ranges - Frequencies and shifting	[9]
Practical: 1. Basic Python Programs 2. Program using String Operations 3. Program on python Data structures 4. Working with data in python using pandas. 5. Perform various numpy operations and special functions. 6. Draw statistical graphics using seaborn 7. Implement k-means, logistic and time series algorithm using Scikit-learn 8. Visualization in python using matplotlib.	[30]
Total Hours:	**75**

Text Book(s):

1.	T.W.Anderson, “An Introduction to Multivariate Statistical Analysis”, Wiley, 3rd Edition, 2009 .
2.	J.D. Jobson, “Applied Multivariate Data Analysis”, Vol I & II, Springer, 2012.
3.	Magnus Lie Hetland, “Beginning Python: From Novice to Professional”, Apress, 2nd Edition, 2009.

Reference(s):

1.	Stanley A Mulaik, “Foundations of Factor Analysis”, CRC Press, 2nd Edition, 2009.
2.	Douglas C. Montogomery, Elizabeth A. Peck, G. Geoffrey Vining, “Introduction to Linear Regression Analysis”, Wiley, 5th Edition,2012.
3.	Wes Mc Kinney, “Python for Data Analysis”, O’Reilly, 2018.
4.	Mark Lutz, “Programming Python”, Shroff Publishers, 3rdEdition, 2006
5.	Tim Hall and J-P Stacey, “Python 3 for Absolute Beginners”, Apress, 2009.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
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BoS Chairman

Course Contents and Lecture Schedule		
S. No.	**Topics**	**No. of hours**
1.0	**Multivariate Normal Distribution**	
1.1	Multivariate Normal Distribution Functions and Conditional Distribution and its relation	1
1.2	Conditional Distribution and regression model	1
1.3	Regression model problems	1
1.4	Multivariate Regression: Assumptions of Multivariate Regression Models	1
1.5	Parameter estimation	1
1.6	Multivariate Analysis of variance and covariance	1
1.7	Multivariate Analysis of variance problems	1
1.8	Covariance problems	1
1.9	Multivariate normal distribution problems	1
2.0	**Discriminant Analysis**	
2.1	Statistical background and Linear discriminant function analysis	2
2.2	Estimating linear discriminant functions and their properties.	1
2.3	Discriminant function problems	2
2.4	Principal Component Analysis: Principal components Algorithm	1
2.5	Principal component analysis problems	1
2.6	Principal components to retain, H-plot.	2
3.0	**Factor Analysis**	
3.1	Factor analysis model	1
3.2	Extracting common factors	1
3.3	Determining number of factors	2
3.4	Transformation of factor analysis solutions and Factor scores.	1
3.5	Python Concepts, Data Structures, Classes: Interpreter, Program Execution, Statements	2
3.6	Expressions, Flow Controls, Functions, Numeric Types.	1
3.7	Sequences and Class Definition, Constructors, Text & Binary Files - Reading and Writing	1
4.0	**Clustering and Segmentation Analysis**	
4.1	Introduction, Types of clustering	1
4.2	Correlations and distances, clustering by partitioning methods	2
4.3	Hierarchical clustering, overlapping clustering, K-Means Clustering	2
4.4	Profiling and Interpreting Clusters.	2
4.5	**Data Wrangling:** Combining and Merging Datasets	1
4.6	Reshaping and Pivoting, Data Transformation, String Manipulation, Regular Expressions.	1
5.0	**Visualization in Python**	
5.1	Visualization in Python	1
5.2	Adding Text, More Graph Types, Getting and setting values, Patches	1
5.3	Data Aggregation, Group Operations, Time series: Group By Mechanics, Data Aggregation	2
5.4	Group wise Operations and Transformations, Pivot Tables and Cross	2

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	Tabulations	
5.5	Time Series Basics	1
5.6	Data Ranges	1
5.7	Frequencies and Shifting.	1
Practical:		
1.	Basic Python Programs	4
2.	Program using String Operations	4
3.	Program on python Data structures	4
4.	Working with data in python using pandas	4
5.	Perform various numpy operations and special functions	4
6.	Draw statistical graphics using seaborn	4
7.	Implement k-means, logistic and time series algorithm using Scikit-learn	3
8.	Visualization in python using matplotlib	3

Course Designer(s)

1. Dr.K. PRABAKARAN prabakaran@ksrct.ac.in

61 CB 301	Automata and Compiler Design	Category	L	T	P	Credit
		PC	3	1	0	4

Objectives

- To understand the types of finite automata and the relationship between finite automata.
- To understand regular expressions, push down automata and context free grammar.
- To understand the properties of context free language.
- To learn the programming techniques of Turing machine and undecidable problems.
- To learn the concepts of Undecidability and interactable Problems.

Pre-requisites

Basic knowledge of Higher Secondary Mathematics, Binary Operations & Mathematical Logic.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Comprehend the formal proofs, Inductive proofs and Finite Automata	Understand
CO2	Understand regular expressions and the properties of regular languages	Understand
CO3	Construction of context-free grammar and Push-down automata Understand	Understand
CO4	Interpret the uses of Turing machine and properties of Context-Free Languages	Apply
CO5	Recognize the Undecidability, and Interactable problems	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	-	-	-	1	-	-	2	-	1	-	-
CO2	-	3	-	2	-	-	-	-	-	-	-	-	1	-	-
CO3	-	3	-	-	2	-	-	2	-	-	2	2	1	-	-
CO4	-	3	-	-	2	-	-	2	-	1	2	-	1	-	-
CO5	-	3	-	-	-	-	-	-	-	2	-	2	1	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	30	30	60
Apply	30	30	40
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech-Computer Science And Business Systems								
61 CB 301 - Automata and Compiler Design								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	40	60	100

Introduction to Finite Automata: * Alphabet, languages and grammars, Finite Automata ,Chomsky hierarchy of languages, Deterministic finite automata (DFA), nondeterministic finite automata (NFA) and equivalence with DFA, minimization of finite automata ,Finite Automata with Epsilon Transitions.	[9]
Regular Expression and Languages:* Regular expressions and languages, finite automata and equivalence with regular expressions, regular grammars and equivalence with finite automata, properties of regular languages, pumping lemma for regular languages.	[9]
Context-free Languages and Pushdown Automata:* Context-free grammars (CFG) and languages (CFL), Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs.	[9]
Linear bounded automata and Turing Machines:* Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG. The basic model for Turing machines (TM), Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, Nondeterministic TMs and equivalence with deterministic TMs.	[9]
Undecidability: * Universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages, Complexity Theory: Basic Introduction to Complexity, The Class P and NP, NP- completeness.	[9]
Total Hours: 45 + 15 (Tutorial)	60

Text Book(s):	
1.	John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, "Introduction to Automata Theory, Languages and Computation", Third Edition, Pearson Education, 2009.
2.	Peter Linz, "An Introduction to formal Languages and Automata", 6th Edition, Jones & Bartlett Pub, 2016.
Reference(s):	
1.	Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education, 2009.
2.	Lewis, H. and Papadimitriou, C.H "Elements of the Theory of Computation", 2nd Edition, Pearson Education/PHI, 2003.
3.	Michael Sipser, "Introduction to the Theory of Computation", 3rd Edition, Cengage Learning, 2013
4.	John C.Martin, "Introduction to Languages and the Theory of Computation", Fourth Edition, McGraw Hill Education, 2010.

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Finite Automata**	
1.1	Alphabet, languages and grammars	1
1.2	Finite Automata	1
1.3	Chomsky hierarchy of languages	1
1.4	Deterministic finite automata (DFA)	1
1.5	Nondeterministic finite automata (NFA)	1
1.6	Equivalence with DFA	2
1.7	Minimization of finite automata	1
1.8	Finite Automata with Epsilon Transitions.	1
2.0	**Regular Expression and Languages**	
2.1	Regular expressions and languages	2
2.2	Finite automata and equivalence with regular expressions	2
2.3	Regular grammars and equivalence with finite automata	1
2.4	Properties of regular languages	2
2.6	Pumping lemma for regular languages	2
3.0	**Context-free Languages and Pushdown Automat**	
3.1	Context-free grammar (CFG) and languages (CFL)	1
3.2	Chomsky and Greibach normal forms	1
3.3	Nondeterministicpushdown automata (PDA)	1
3.4	Equivalence with CFG, parse trees, ambiguity in CFG	2
3.5	Pumping lemma forcontext-free languages	1
3.6	Deterministic pushdown automata	1
3.7	Closure properties of CFLs.	1
4.0	**Linear bounded automata and Turing Machines**	
4.1	Context-sensitive grammar (CSG) and languages	1
4.2	Linear bounded automata and equivalence with CSG	1
4.3	The basic model for Turing machines (TM)	1
4.4	Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties	1
4.5	Variants of Turing machines	1
4.6	Nondeterministic TMs and equivalence with deterministic TMs.	1
5.0	**Undecidability**	
5.1	Universal Turing machine, the universal and diagonalization languages	1
5.2	Reduction between languages and Rice s theorem	1
5.3	Undecidable problems about languages	1
5.4	Complexity Theory	2
5.5	Basic Introduction toComplexity	2
5.7	The class P and NP, NP- completeness	2

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Designer(s)

1. Dr.K.Sakthivel – sakthivelk@ksrct.ac.in

60 CB 302	Database Management Systems	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To discuss the fundamentals of data models to conceptualize and depict a database system using ER diagram.
- To illustrate the relational database implementation using SQL with effective relational database design concepts.
- To demonstrate Query evaluation and optimization techniques.
- To explain the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To introduce the concepts of Database Security, Object Oriented, Data Warehousing and Data Mining

Pre-requisites

Basic knowledge of Relational Algebra, Data Structure, Java Programming

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Distinguish database systems from file systems and describe data models and DBMS architecture.	Understand
CO2	Demonstrate with understanding of SQL Programming language and normalization theory.	Remember
CO3	Practice the query evaluation techniques, query optimization and familiarwith basic database storage structures and access techniques.	Understand
CO4	Identify the basic issues of transaction processing and concurrency control.	Apply
CO5	Analyze and derive an information model expressed in the form of an entity relation diagram and transform into a relational database schema.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	-	-	2	2	-	2	-	1	3	1	-
CO2	3	2	3	-	-	-	2	2	-	2	-	1	3	1	-
CO3	3	2	2	-	-	-	2	1	-	2	-	1	2	1	-
CO4	3	2	2	-	-	-	2	1	-	2	-	1	3	1	-
CO5	3	2	2	-	-	-	2	1	-	2	-	1	3	1	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	40	40	60
Apply	10	10	20
Analyse	-	-	-

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech-Computer Science And Business Systems

60 CB 302- Database Management Systems

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Introduction to Databases: * Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model -Keys – Entity Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – DBMS Language- Open source and Commercial DBMS.	[9]
Relational query languages: * Relational algebra, Tuple and domain relational calculus, SQL basic commands, Join and Nested Queries, Procedures, Functions, Cursors, Triggers - Relational Database Design: Domain and data dependency, Armstrong's axioms, Functional Dependencies, Normal forms, Dependency preservation, Lossless design.	[9]
Query processing and optimization: * Evaluation of relational algebra expressions - Query Processing and Optimization – Heuristics and Cost Estimates in Query Optimization - Query equivalence, Join strategies, Storage strategies: Indexing and B+ tree, Hashing – ACID Properties.	[9]
Transaction Processing:* Transaction Concepts - Transaction Model - Desirable Properties of Transaction Schedule and Recoverability- Serializability – Concurrency Control - Lock-Based Protocols - Two-Phase Locking Protocol - Timestamp-Based Protocols – Recovery System.	[9]
Database Security: * Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection. Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Unstructured Databases- -MariaDB, MongoDBDatabase creation-CRUD operations.	[9]
Total Hours:	**45**

Text Book(s):

1.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 7th Edition, TataMcGraw Hill, March 2019.
2.	Gupta G K, “Database Management Systems”, Tata McGraw Hill Education Private Limited,New Delhi, 2011.

Reference(s):

1.	Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.
2.	Peter rob, Carlos Coronel, “Database Systems – Design, Implementation and Management”,9 th Edition, Thomson Learning, 2009.
3.	J. D. Ullman, “Principles of Database and Knowledge – Base Systems”, Vol 1, Computer SciencePress, Inc. New York, 1998.
4.	Serge Abiteboul, Richard Hull, Victor Vianu, “Foundations of Databases”, Addison-WesleyPublishing Company, 1995.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Databases**	
1.1	Purpose of Database System	1
1.2	Views of data – Data Models	1
1.3	Database System Architecture	1
1.4	Introduction to relational databases	1
1.5	Relational Model -Keys	1
1.6	Entity Relationship model – E-R Diagrams	1
1.7	Enhanced-ER Model- ER-to-Relational Mapping	1
1.8	DBMS Language	1
1.9	Open source and Commercial DBMS	1
2.0	**Relational query languages**	
2.1	Relational algebra	1
2.2	Tuple and domain relational calculus	1
2.3	SQL basic commands	1
2.4	Join and Nested Queries	1
2.5	Procedures, Functions, Cursors, Triggers	1
2.6	Relational Database Design	1
2.7	Domain and data dependency, Armstrong's axioms, Functional Dependencies	1
2.8	Normal forms	1
2.9	Dependency preservation, Lossless design.	1
3.0	**Query processing and optimization**	
3.1	Evaluation of relational algebra expressions	1
3.2	Query Processing and Optimization	1
3.3	Heuristics and Cost Estimates in Query Optimization	1
3.4	Query equivalence	1
3.5	Join strategies	1
3.6	Storage strategies: Indexing	1
3.7	B+ tree	1
3.8	Hashing	1
3.9	ACID Properties	1
4.0	**Transaction Processing**	
4.1	Transaction Concepts	1
4.2	Transaction Model	1
4.3	Desirable Properties of Transaction Schedule and Recoverability	1
4.4	Serializability	1
4.5	Concurrency Control	1
4.6	Lock-Based Protocols	1
4.7	Two-Phase Locking Protocol	1

4.8	Timestamp-Based Protocols	1
4.9	Recovery System	1
5.0	**Database Security**	
5.1	Authentication, Authorization and access control	1
5.2	DAC, MAC and RBAC models	1
5.3	Intrusion detection, SQL injection	1
5.4	Advanced topics: Object oriented and object relational databases	1
5.5	Logical databases, Web databases	1
5.6	Distributed databases, Unstructured Databases	1
5.7	MariaDB	1
5.8	MongoDB	1
5.9	Database creation-CRUD operations	1
	Total	45

Course Designers

1. Mrs.R.Loga priya – logapriyar@ksrct.ac.in

60 CB 303	Data Structures	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the concepts of ADTs
- To understand linear data structures – lists, stacks, and queues
- To understand non-linear data structures – trees and graphs.
- To understand sorting, searching and hashing algorithms
- To apply Tree and Graph structures

Pre-requisites

- Basic knowledge of C Programming Language C

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply linear and non-linear data structures.	Apply
CO2	Apply linear and non–linear data structure operations.	Apply
CO3	Evaluate appropriate linear/non–linear data structure operations for solving a given problem	Evaluate
CO4	Analyze appropriate graph algorithms for graph applications.	Analyze
CO5	Apply the various searching and sorting algorithms.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	1	-	-	-	2	-	-	-	3	1	-
CO2	3	3	3	2	1	-	-	-	2	-	-	-	3	1	-
CO3	3	3	3	2	1	-	-	-	2	-	-	-	3	1	-
CO4	3	3	3	2	1	-	-	-	2	-	-	-	3	1	-
CO5	3	3	3	2	1	-	-	-	2	-	-	-	3	1	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	10	10	20
Apply	30	30	40
Analyse	10	10	20
Evaluate	10	10	20
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 303- Data Structures								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Lists* Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT – Radix Sort – Multi lists.	[9]
Stacks And Queues* Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions Infix to Postfix conversion – Function Calls – Queue ADT – Operations – Circular Queue – De Queue – Applications of Queues	[9]
Trees* Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap	[9]
Multi way Search Trees And Graphs B-Tree – B+ Tree – Graph Definition – Representation of Graphs – Types of Graph - Breadth-first traversal – Depth-first traversal –– Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm	[9]
Searching, Sorting And Hashing Techniques* Searching – Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Shell sort –. Merge Sort – Hashing – Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing	[9]
Total Hours:	**45**

Text Book(s):	
1.	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education, 2005.
2.	Kamthane, “Introduction to Data Structures in C”, 1st Edition, Pearson Education, 2007.
Reference(s):	
1.	Langsam, Augenstein and Tanenbaum, “Data Structures Using C and C++”, 2nd Edition, Pearson Education, 2015..
2.	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, “Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
3.	Alfred V. Aho, Jeffrey D. Ullman,John E. Hopcroft ,”Data Structures and Algorithms”, 1st edition, Pearson, 2002.
4.	Online Resources : https://www.tutorialspoint.com, https://www.javatpoint.com, https://www.journaldev.com, https://beginnersbook.com, https://www.w3schools.com

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Lists**	
1.1	Abstract Data Types (ADTs)	1
1.2	List ADT	1
1.3	Array-based implementation	1
1.4	Linked list implementation	1
1.5	Singly linked lists	1
1.6	Circularly linked lists	1
1.7	Doubly linked lists	1
1.8	Applications of lists	1
1.9	Applications of lists – Polynomial ADT – Radix Sort – Multi lists.	
2.0	**Stacks And Queues**	
2.1	Stack ADT	1
2.2	Operations - Applications	1
2.3	Balancing Systems	1
2.4	Evaluating arithmetic expressions	1
2.5	Infix to Postfix conversion	1
2.6	Function Calls	1
2.7	Queue ADT	1
2.8	Operations – Circular Queue	1
2.9	De Queue – Applications of Queues	1
3.0	**Trees**	
3.1	Tree ADT	1
3.2	Tree Traversals	1
3.3	Binary Tree ADT	1
3.4	Expression trees	1
3.5	Binary Search Tree ADT	2
3.6	AVL Trees	1
3.7	Priority Queue (Heaps)	1
3.8	Binary Heap	1
4.0	**Multi way Search Trees and Graphs**	
4.1	B-Tree- B+ Tree	1
4.2	Graph Definition – Representation of Graphs- Types of Graphs	1
4.3	Breadth-first traversal- Depth-first traversal	1
4.4	Bi connectivity	1
4.5	Euler circuits – Topological Sort	1
4.6	Dijkstra's algorithm	1
4.7	Minimum Spanning Tree	1
4.8	Prim's algorithm	1
4.9	Kruskal's algorithm	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

5.0	**Searching, Sorting And Hashing Techniques**	
5.1	Searching	1
5.2	Linear Search – Binary Search	1
5.3	Sorting – Bubble sort	1
5.4	Selection sort – Insertion sort	2
5.5	Shell sort –. Merge Sort	1
5.6	Hashing – Hash Functions	1
5.7	Separate Chaining – Open Addressing	1
5.8	Rehashing – Extendible Hashing	1
	Total	**45**

Course Designer(s)

1. Karthikeyan K – karthikeyan@ksrct.ac.in

60 CB 304	Software Engineering	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the phases in a software project
- To understand fundamental concepts of requirements engineering and Analysis Modeling.
- To understand the various software design methodologies
- To learn various testing and maintenance measures
- To learn various project cost models and risk management

Pre-requisites

- UML Concepts

Course Outcomes

On the successful completion of the course, students will be able to

CO1	To learn various project cost models and risk management	Undersatnd
CO2	Concepts of requirements engineering and Analysis Modeling.	Remember
CO3	Apply systematic procedure for software design and deployment.	Apply
CO4	Compare and contrast the various testing and maintenance	Analyse
CO5	Manage project schedule, estimate project cost and effort required.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	-	-	-	-	-	-	-	2	3	-	-
CO2	3	3	3	-	3	-	-	2	2	2	2	2	-	3	-
CO3	3	3	3	-	3	-	-	2	-	-	3	2	3	-	-
CO4	3	3	3	2	3	-	2	2	-	2	3	2	3	-	-
CO5	3	3	3	3	3	-	2	2	-	2	3	2	3	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	30	30	40
Analyse	10	10	20
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB 304- Software Engineering

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Software Process and Agile Development * Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models– Introduction to Agility-Agile Process-Extreme programming-XP Process. Case Studies.	[9]
Requirements Analysis and Specification * Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document –Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis, Petri Nets-Data Dictionary. Case Studies	[9]
Software Design * Design process–Design Concepts-Design Model–Design Heuristic–Architectural Design-Architectural styles, Architectural Design, Architectural Mapping using Data Flow-User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components. Case Studies	[9]
Testing and Maintenance Software testing fundamentals-Internal and external views of Testing-white box testing-basis path testing- control structure testing-black box testing-Regression Testing–Unit Testing –Integration Testing–Validation Testing– System Testing and Debugging–Software Implementation Techniques: Coding practices- Refactoring Maintenance and Reengineering-BPR model-Reengineering process model-Reverse and Forward Engineering. Case Studies	[9]
Project Management * Software Project Management: Estimation–LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model–Project Scheduling–Scheduling, Earned Value Analysis Planning–Project Plan, Planning Process, RFP Risk Management–Identification, Projection-Risk Management-Risk Identification -RMMM Plan-CASE Tools. Case Studies	[9]
Total Hours:	**45**

Text Book(s):	
1.	Roger S. Pressman, Software Engineering – A Practitioner's Approach, Seventh Edition, McGraw Hill International Edition, 2010.
2.	Ian Sommerville, Software Engineering, 9th Edition, Pearson Education Asia, 2011.
Reference(s):	
1.	Pankaj Jalote, Software Engineering, A Precise Approach, Wiley India, 2010.
2.	Rajib Mall, Fundamentals of Software Engineering, Third Edition, PHI Learning Private Limited, 2009.
3.	Kelkar S.A., Software Engineering, Prentice Hall of India Pvt Ltd, 2007.
4.	Stephen R.Schach, Software Engineering, Tata McGraw-Hill Publishing Company Limited, 2007
5.	https://nptel.ac.in/courses/106105182

*SDG 4 – Quality Education

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Software Process and Agile Development**	
1.1	Introduction to Software Engineering	1
1.2	Software Process	1
1.3	Perspective and Specialized	1
1.4	Process Models	1
1.5	Introduction to Agility	1
1.6	Agile process	1
1.7	Extreme programming	1
1.8	XP Process	1
2.0	**Requirements Analysis and Specification**	
2.1	Software Requirements	1
2.2	Functional and Non-Functional	1
2.3	User requirements	1
2.4	System requirements	1
2.5	Software Requirements Document	1
2.6	Requirement Engineering Process	1
2.7	Feasibility Studies, Requirements elicitation and analysis	1
2.8	requirements validation, requirements management	1
2.9	Classical analysis: Structured system Analysis	1
2.10	Petri Nets-Data Dictionary	1
3.0	**Software Design**	
3.1	Design process, Design Concepts	1
3.2	Design Model, Design Heuristic	1
3.3	Architectural Design	1
3.4	Architectural styles, Architectural Design, Architectural Mapping using Data Flow-User Interface Design	1
3.5	Interface analysis, Interface Design	1
3.6	Component level Design	1
3.7	Designing Class based components	1
3.8	Traditional Components	1
4.0	**Testing and Maintenance**	
4.1	Software testing fundamentals	1
4.2	Internal and external views of Testing	1
4.3	white box testing	1
4.4	basis path testing	1
4.5	control structure testing	1
4.6	black box testing-Regression Testing ,Unit Testing ,Integration Testing	1
4.7	Validation Testing– System Testing And Debugging	1
4.8	Software Implementation Techniques - Coding practices- Refactoring Maintenance and Reengineering	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.9	BPR model Reengineering process model - Reverse and Forward Engineering	1
5.0	**Project Management**	
5.1	Software Project Management	1
5.2	Estimation–LOC, FP Based Estimation, Make/Buy Decision COCOMO I & IIModel, Project Scheduling	1
5.3	Scheduling, Earned Value Analysis Planning	1
5.4	Project Plan, Planning Process	1
5.5	RFP Risk Management	1
5.6	Identification	1
5.7	Projection-Risk Management	1
5.8	Risk Identification	1
5.9	RMMM Plan-CASE Tools	1

Course Designer(s)

1. Dr .K.Sakthivel -sakthivelk@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 3P1	Database Management Systems Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To understand data definitions and data manipulation commands.
- To learn the use of nested and join queries.
- To understand functions, procedures and procedural extensions of databases.
- To be familiar with the use of a front end tool.
- To design and implementation of typical database applications.

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Implement the Data Definition Language commands, Data Manipulation Language, Data Control Language Commands and Transaction Control Language in RDBMS	Apply
CO2	Construct Sub queries, views and joins to retrieve data from multiple tables	Analyse
CO3	Implement the database programming with Cursors, Triggers, Procedures and Functions in PL/SQL.	Apply
CO4	Design and implement applications using Front end tools.	Apply
CO5	Create and manipulate data using Mongo database.	Create

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	3	1	-	1	-	-	-	2	1	-	2	3	-	-
CO2	1	3	1	-	1	-	-	-	2	1	-	2	3	-	-
CO3	1	3	2	-	3	-	-	-	-	1	-	-	2	-	-
CO4	1	3	2	-	2	-	-	-	-	1	-	-	3	-	-
CO5	1	3	2	-	1	-	-	-	2	1	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Low															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech-Computer Science And Business Systems								
60 CB 3P1- Database Management Systems Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	0	0	4	60	2	60	40	100

List of Experiments:

1. Conceptual Database design using E-R DIAGRAM.*
2. Implementation of SQL commands DDL, DML, DCL and TCL.*
3. Queries to demonstrate implementation of Integrity Constraints.*
4. Practice of Inbuilt functions.*
5. Implementation of Join and Nested Queries AND Set operators.*
6. Implementation of virtual tables using Views.*
7. Practice of Procedural extensions using Procedure and Function.*
8. Database Programming: Implicit and Explicit Cursors.*
9. High level language extension with Triggers.*

Design Experiments:

10. Implementation and performance comparison of Indexing and Hashing Techniques.
11. Mini Project (Application Development using MongoDB).

Lab Manual	
1.	"**Database Management Systems Lab**", Department of Computer Science and Business Systems, KSRCT.
	*SDG4 – Quality Education

Course Designer(s)

1. Mrs.R.Loga priya – logapriyar@ksrct.ac.in

60 CB 3P2	Data Structures Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To understand the concepts of ADTs
- To understand linear data structures – lists, stacks, and queues
- To understand non-linear data structures – trees and graphs.
- To understand sorting, searching and hashing algorithms
- To apply Tree and Graph structures

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply linear and non-linear data structures.	Apply
CO2	Apply linear and non–linear data structure operations.	Apply
CO3	Evaluate appropriate linear/non–linear data structure operations for solving a given problem	Evaluate
CO4	Analyse appropriate graph algorithms for graph applications	Analyse
CO5	Apply the various searching and sorting algorithms.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
CO2	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
CO3	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
CO4	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
CO5	3	3	3	2	3	-	-	-	2	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Low															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

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BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 3P2 – Data Structures Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	0	0	4	60	2	60	40	100

List of Experiments:

1. Array implementation of Stack, Queue and Circular Queue ADTs *
2. Implementation of Singly Linked List
3. Linked list implementation of Stack and Linear Queue ADTs
4. Implementation of Polynomial Manipulation using Linked list
5. Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion *
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
8. Implementation of Heaps using Priority Queues

Design Experiments:

1. Implementation of Dijkstra's Algorithm
2. Implementation of Prim's Algorithm

Lab Manual	
1.	"Data Structures Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4 – Quality Education

Course Designer(s)

1. Mr.K.Karthikeyan – karthikeyank@ksrct.ac.in

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BoS Chairman

60 CG 0P2	Career Skill Development II	Category	L	T	P	Credit
		CS	0	0	2	1

Objectives

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Pre-requisites

- Basic knowledge of reading and writing in English

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	2	3	3	2	3	-	-	-
CO2	-	-	-	-	-	-	-	2	3	3	2	3	-	2	-
CO3	-	-	-	-	-	-	-	2	3	3	2	3	2	-	-
CO4	-	-	-	-	-	-	-	2	3	3	2	3	2	-	-
CO5	-	-	-	-	-	-	-	2	3	3	2	3	-	2	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	40	-
Apply	-	-	20	-
Analyse	-	-	40	-
Evaluate	-	-	-	-
Create	-	-	-	-
Total	-	-	100	-

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science And Business Systems								
60 CG 0P2 - Career Skill Development II								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
III	0	0	2	30	1	100	00	100

Listening Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organizer (choosing a product or service by comparison) - Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects, documentaries depicting a technical problem and suggesting solutions - Listening to TED Talks	[6]
Speaking Marketing a product, persuasive speech techniques - Describing and discussing the reasons of accidents or disasters based on news reports, Group Discussion (based on case studies), presenting oral reports, Mini presentations on select topics with visual aids, participating in role plays, virtual interviews	[6]
Reading Reading advertisements, user manuals and brochures - longer technical texts– cause and effect essays, and letters / emails of complaint - Case Studies, excerpts from literary texts, news reports etc. - Company profiles, Statement of Purpose (SoPs)	[6]
Writing Professional emails, Email etiquette - compare and contrast essay - Writing responses to complaints Precis writing, Summarizing and Plagiarism- Job / Internship application – Cover letter & Résumé	[6]
Verbal Ability I Reading Comprehension (Inferential fillups) – Spotting Errors – Verbal Analogies – ThemeDetection – Change of Voice – Change of Speech – One word substitution	[6]
Total Hours:	**30**

Text Book(s):	
1.	
2.	
Reference(s):	
1.	English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020
3	Raman. Meenakshi, Sharma. Sangeeta, 'Professional English'. Oxford University Press. New Delhi. 2019
4	Arthur Brookes and Peter Grundy,' Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003

*SDG 4: Quality Education
*SDG 8: Decent work and Economic growth
***SDG 9 – Industry, innovation and Infrastructure

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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Listening**	
1.1	Evaluative Listening: Advertisements, Product Descriptions	1
1.2	Listening to longer technical talks and completing– gap Filling exercises.	1
1.3	Listening technical information from podcasts	1
1.4	Listening to process/event descriptions to identify cause & effects and documentaries depicting a technical problem and suggesting solutions	1
1.5	Listening to TED Talks	1
2	**Speaking**	
2.1	Marketing a product, persuasive speech techniques	1
2.2	Describing and discussing the reasons of accidents or disasters based on news reports,	1
2.3	Group Discussion (based on case studies)	1
2.4	Presenting oral reports, Mini presentations on select topics with visual aids	1
2.5	Participating in role plays and virtual interviews	1
3	**Reading**	
3.1	Reading advertisements, user manuals and brochures	1
3.2	Reading - longer technical texts– cause and effect essays, and letters / emails of complaint	1
3.3	Case Studies, excerpts from literary texts, news reports etc.	1
3.4	Company profiles	1
3.5	Statement of Purpose (SoPs)	1
4	**Writing**	
4.1	Professional emails, Email etiquette	1
4.2	Compare and contrast essay	1
4.3	Writing responses to complaints	1
4.4	Precis writing, Summarizing and Plagiarism	1
4.5	Job / Internship application – Cover letter & Résumé	1
5	**Verbal Ability**	
5.1	Reading Comprehension (Inferential fillups) and Theme Detection	1
5.2	Spotting Errors	1
5.3	Verbal Analogies	1
5.4	Change of Voice and Change of Speech	1
5.5	One word substitution	1
	TOTAL	**30**

Course Designer(s)

1. Dr.A.Palaniappan- palaniappan@ksrct.ac.in

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FOURTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 MA 018	Optimization Techniques	2	40	60	100	45	100
2	60 CB 401	Operating Systems	2	40	60	100	45	100
3	60 CB 402	Design and Analysis of Algorithms	2	40	60	100	45	100
4	60 CB 403	Software Design with UML	2	40	60	100	45	100
5	60 CB 404	MERN Stack	2	50	50	100	45	100
6	60 OE L*	Open elective-I	2	40	60	100	45	100
7	60 MY 002	Universal Human Values	2	100	-	100	-	-
PRACTICALS								
8	60 CB 4P1	Operating Systems Lab	2	60	40	100	45	100
9	60 CB 4P2	Design and Analysis of Algorithms Lab	2	60	40	100	45	100
10	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
11	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 MA 018	Optimization Techniques	Category	L	T	P	Credit
		BS	3	1	0	4

Objectives

- To familiarize the basic concepts of linear programming problems.
- To get exposed to transportation and assignment problems.
- To acquire skills in handling situations involving network models.
- To familiarize various queuing models.
- To learn basics of inventory models.

Pre-requisites

- Statistics and Probability

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Formulate the linear programming problems and solve by simplex algorithms.	Apply
CO2	Apply suitable method to predict the optimum solution for transportation and assignment problems.	Apply
CO3	Apply CPM and PERT techniques to control project activities and cost.	Apply
CO4	Apply various queuing models to find the optimum service rate.	Apply
CO5	Determine optimal order quantity for various deterministic Inventory models.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	2	-	-

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	10	10	30
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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BoS Chairman

Syllabus

K.S. Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 MA 018 - Optimization Techniques

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	1	0	60	4	40	60	100

Linear Programming Problems Origin of OR and its definition - Types of OR problems - Phases of OR problem approach - Mathematical formulation of LPP - Solution of LPP by Graphical method - Simplex method – Big-M method. **Hands - on:** Solve linear programming problems using different methods	[9]
Transportation and Assignment Problems Mathematical formulation of transportation problem – Methods for finding Initial Basic Feasible Solution – Optimum solution – Degeneracy – Mathematical formulation of Assignment Models – Hungarian Algorithm – Transshipment Problems. **Hands - on:** Solve Assignment problem	[9]
Network Analysis Introduction - Network and Basic Components - Rules of Network Construction – Critical Path Method – Probability Considerations in PERT - Concept of Project Crashing / Time-Cost trade-off. **Hands - on:** Calculate Project scheduling with critical Paths, Estimation of Project time and its variance in PERT	[9]
Queueing Models Markovian models – Single and Multiple server queuing models with finite and infinite capacity - Pollaczek-Khintchine formula (excluding proof) – Problem. **Hands - on:** Compute the Markovian models	[9]
Inventory Control Types of inventory models - Inventory cost - Deterministic Inventory models - Economic Order Quantity (EOQ) - Purchase and Production models with and without shortages - Determination of buffer stock and re-order levels - EOQ with price breaks. **Hands - on:** Generate Inventory models	[9]
Total Hours: 45 + 5(Hands on) + 10 (Tutorial)	**60**

Text Book(s):

1. Kanti Swarup, P.K.Gupta, Manmohan, Priyanshu Gupta “Operations research”, Sultan Chand and Sons, New Delhi, 20t h Edition, 2022
2. H.A.Taha, “Operation Research an introduction”, Pearson Education, Noida,10th Edition, 2019.

Reference(s):

1. F.S. Hiller and G.J. Lieberman, “Introduction to Operations Research”, McGrawHill, 9 th Edition, New Delhi, 2010.
2. J.K.Sharma, “Operation Research Theory and Applications”, Trinity Press, Norcross, 6t h Edition, 2016.
3. V.K.Kapoor, “Operation Research: Concepts Problems and Solutions”, Sultan Chand and Sons 5th Edition, New Delhi, 2011.
4. P.Rama Moorthy, “Operation Research“, New Age International Publication, New Delhi, 2rd Edition, 2007.

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*SDG 4:Quality Education

60 CB 401	Operating Systems	Category	L	T	P	Credit
		PC	3	0	0	3

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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Linear Programming Models**	1
1.1	Origin of OR and its definition	1
1.2	Types of OR problems - Phases of OR problem approach	1
1.3	Mathematical formulation of LPP	1
1.4	Solution of LPP by Graphical method	2
1.5	Simplex method	2
1.6	Big-M method	1
1.7	Case study related problems	2
1.8	Tutorial	1
1.9	Hands on	1
2.0	**Transportation and Assignment Models**	
2.1	Mathematical formulation of transportation problem	1
2.2	Methods for finding Initial Basic Feasible Solution	1
2.3	Optimum solution	1
2.4	Degeneracy problems	1
2.5	Mathematical formulation of Assignment Models	1
2.6	Hungarian Algorithm	1
2.8	Case study related problems	1
2.9	Tutorial	1
2.10	Hands on	2
3.0	**Network Analysis**	
3.1	Introduction - Network and Basic Components	1
3.2	Rules of Network Construction	2
3.3	Critical Path Method	2
3.4	Probability Considerations in PERT	2
3.5	Concept of Project Crashing / Time-Cost trade-off	2
3.6	Tutorial	2
3.7	Hands on	1
4.0	**Queueing Models**	
4.1	Markovian models	2
4.2	Single server queuing models with finite and infinite capacity	3
4.3	Single server queuing models with finite and infinite capacity	2
4.4	Pollaczek-Khintchine formula (excluding proof) - Problem	2
4.5	Tutorial	2
4.6	Hands on	1
5.0	**Inventory Control**	
5.1	Types of inventory models	1
5.2	Inventory cost	1
5.3	Deterministic Inventory models	1
5.4	Economic Order Quantity (EOQ)	2
5.5	Purchase and Production models with shortages	1
5.6	Production models with and without shortages	1
5.7	Determination of buffer stock and re-order levels	1

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5.8	EOQ with price breaks	1
5.9	Tutorial	2
5.10	Hands on	1

Course Designer(s)

1.Dr.K.PRABAKARAN - prabakaran@ksrct.ac.in

Objectives

- To recognize the fundamentals of operating systems.
- To describe the mechanisms of OS to handle processes and threads and their communication.
- To discuss the principles of concurrency and Deadlocks.
- To identify the mechanisms involved in memory management and its schemes.
- To identify I/O management, File systems and security issues.

Pre-requisites

- Basic knowledge of Computer Fundamentals

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the basic concepts and design issues of operating systems.	Remember
CO2	Apply Process management concepts including scheduling, Inter process communication, deadlocks and multithreading in real world problems	Apply
CO3	Apply concepts of memory management including Virtual Memory and Page Replacement to the issues that occur in Real time applications.	Apply
CO4	Identify issues related to IO hardware	Understand
CO5	Identify basic concepts of file system and disk management	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2	-	-	-	-	-	-	-	-	3	3	-	-
CO2	3	3	3	3	-	-	2	-	-	2	-	2	3	-	-
CO3	3	3	3	3	-	-	2	-	-	2	-	2	3	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	2	3	-	-
CO5	3	3	3	3	-	-	2	-	-	-	-	2	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Semester Examination (Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB 401 - Operating Systems

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction: * Concept of Operating Systems (OS), Generations of OS, Types of OS, OS Services, Interrupt handling and System Calls, Basic architectural concepts of an OS, Concept of Virtual Machine, Resource Manager view, process view and hierarchical view of an OS.	[9]
Processes, Thread and Process Scheduling: * Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching. Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads. Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.	[9]
Deadlocks and Inter process communication: * Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery-Inter-process Communication: Concurrent processes, precedence graphs, Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Semaphores, Strict Alternation, Peterson's Solution, The Producer/ Consumer Problem, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem,Barber's shop problem.	[9]
Memory Management: * Basic concept, Logical and Physical address maps, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page allocation, Partitioning, Paging, Page fault, Working Set, Segmentation, Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).	[9]
I/O Hardware, File and Disk Management: * I/O devices, Device controllers, Direct Memory Access, Principles of I/O. File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed),Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency and performance. Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks. **Case study:** UNIX OS file system, shell, filters, shell programming, programming with the standard I/O, and UNIX system calls.	[9]
Total Hours:	**45**

Text Book(s):

1.	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts Essentials",2nd Edition,2014.
2.	William Stallings,"Operating Systems: Internals and Design Principles", Old Edition 2013.

Reference(s):

1.	Charles Patrick Crowley, "Operating System: A Design-oriented Approach", McGraw Hill Education,2017
2.	Gary J. Nutt,"Operating Systems: A Modern Perspective", Pearson, 1997.
3.	Maurice J. Bach,"Design of the Unix Operating Systems" 1st Edition, Pearson,1986.
4.	Daniel Pierre Bovet, Marco Cesati ,"Understanding the Linux Kernel", O'Reilly Media , 2005.

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BoS Chairman

*SDG4 – Quality Education

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Concept of Operating Systems (OS),	1
1.2	Generations of OS, Types of OS	1
1.3	OS Services, Interrupt handling and System Calls	1
1.4	Basic architectural concepts of an OS	1
1.5	Concept of Virtual Machine, Resource Manager view	1
1.6	Process view and hierarchical view of an OS	1
2.0	**Processes, Thread and Process Scheduling**	
2.1	Definition, Process Relationship, Different states of a Process	1
2.2	Process State transitions, Process Control Block (PCB)	1
2.3	Context switching Thread Definition	1
2.4	Various states, Benefits of threads	1
2.5	Types of threads, Concept of multithreads	1
2.6	Process Scheduling: Foundation and Scheduling objectives	1
2.7	Types of Schedulers Scheduling criteria: CPU utilization	1
2.8	Throughput, Turnaround Time, Waiting Time, Response Time	1
3.0	**Scheduling algorithms and Inter process communication**	
3.1	Inter-process Communication: Concurrent processes	1
3.2	SJF,RR, Multiprocessor scheduling: Real Time scheduling	1
3.3	RM and EDF. Inter-process Communication: Concurrent processes	1
3.4	precedence graphs, Critical Section, Race Conditions, Mutual Exclusion	1
3.5	Hardware Solution, Semaphores, Strict Alternation, Peterson's Solution	1
3.6	The Producer/ Consumer Problem, Event Counters	1
3.7	Monitors, Message Passing	1
3.8	Classical IPC Problems: Reader's & Writer Problem	1
3.9	Dinning Philosopher Problem, Barber's shop problem	1
4.0	**Deadlocks, Concurrent Programming:**	
4.1	Definition, Necessary and sufficient conditions for Deadlock	1
4.2	Deadlock Prevention, Deadlock Avoidance, Banker's algorithm	1
4.3	Deadlock detection and Recovery, Concurrent Programming: Critical region	1
4.4	conditional critical region, monitors, concurrent languages, communicating sequential process (CSP)	1
4.5	Deadlocks – prevention, avoidance, detection and recovery.	1
4.6	Remote Method Invocation (RMI)	1
4.7	Regular Expressions and Database Connectivity	1
5.0	**Memory Management:**	
5.1	Basic concept, Logical and Physical address maps, Memory allocation: Contiguous Memory allocation	1

5.2	Fixed and variable partition–Internal and External fragmentation and Compaction. Virtual Memory: Basics of Virtual Memory	1
5.3	Hardware and control structures – Locality of reference, Page allocation	1
5.4	Partitioning, Paging, Page fault	1
5.5	Working Set, Segmentation, Demand paging	1
5.6	Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC),	
5.7	Not recently used (NRU) and Least Recently used (LRU)	1
6.0	**I/O Hardware, File and Disk Management:**	1
6.1	I/O devices, Device controllers, Direct Memory Access, Principles of I/O	1
6.2	File Management: Concept of File, Access methods, File types, File operation	1
6.3	Directory structure, File System structure, Allocation methods (contiguous, linked, indexed)	1
6.4	Free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency	1
6.5	Performance. Disk Management: Disk structure, Disk scheduling - FCFS	1
6.6	SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks	1
7.0	**Case study:**	
7.1	UNIX OS file system, shell, filters, shell programming	1
	Programming with the standard I/O, UNIX system calls.	1
	Total	45

Course Designer(s)

1. Dr.P.MANIMARAN- manimaran@ksrct.ac.in@ksrct.ac.in

60 CB 402	Design and Analysis of Algorithms	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To design algorithms in both the science and practice of computing.
- To choose the appropriate data structure and algorithm design method for a specified.
- To understand how the choice of data structures and algorithm design

Methods impacts the performance of programs.

- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound
- To solve NP-hard and NP-complete problems.

Pre-requisites

- Basic knowledge of Data Structures

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Classify the problem types and compare orders of growth to represent asymptotic notations.	Understand
CO2	Apply 'Brute Force' and 'Divide and conquer' design techniques for sorting and searching problems.	Apply
CO3	Illustrate Graph and Tree Algorithms	Analyze
CO4	Identify Np-Complete and NP hard problems.	Analyze
CO5	Apply Approximation, Randomized and Quantum Algorithms	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	2	3	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	20	20	30
Apply	20	20	40
Analyse	20	20	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 402- Design and Analysis of Algorithms								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction:* Characteristics of Algorithm, Analysis of Algorithm: Asymptotic analysis of Complexity Bounds – Best, Average and Worst-Case behavior; Performance Measurements of Algorithm, Time and Space Trade-Offs, Analysis of Recursive Algorithms through Recurrence Relations: Substitution Method, Recursion Tree Method and Masters' Theorem	[9]
Fundamental Algorithimic Strategies* Brute-Force, Heuristics, Greedy, Dynamic Programming, Branch and Bound and Backtracking Methodologies, Illustrations of these techniques for Problem Solving, Bin Packing, Knapsack, Travelling Salesman Problem.	[9]
Graph and Tree Algorithms* Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting...	[9]
Tractable and Intractable Problems* Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.	[9]
Advanced Topics* Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE, Introduction to Quantum Algorithms	[9]
Total Hours:	**45**

Textbook(s):	
1.	Chris Bates, "Web Programming: Building Internet Applications", Wiley Dream Tech, 3 rd Edition,2010
2.	Steven Holzner,"The Complete reference PHP",TataMcGraw-Hill,3rd Edition,2013
Reference(s):	
1.	Herbert Schildt, "Java, The Complete Reference", Hill - Osborne, 12th Edition, 2021.
2.	W Hans Bergsten, "Java Server Pages", O"Reilly, 3rdEdition, 2003
3.	D. Flanagan, "Java Script", O"Reilly, 6th Edition, 2011.
4.	Jeffrey C K Jackson, Web Technologies", Pearson Education, 3rd Edition, 2011.

*SDG4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule		
S. No.	**Topics**	**No. of hours**
1.0	**Introduction:**	
1.1	Characteristics of Algorithms	1
1.2	Analysis of Algorithm	1
1.3	Asymptotic analysis of Complexity Bounds	1
1.4	Best, Average and Worst-Case behavior	1
1.5	Performance Measurements of Algorithm	1
1.6	Time and Space Trade-Offs	1
1.7	Analysis of Recursive Algorithms through Recurrence Relations	1
1.8	Substitution Method	1
1.9	Recursion Tree Method and Masters' Theorem	1
2.0	**Fundamental Algorithimic Strategies:**	
2.1	Brute-Force	1
2.2	Heuristics,	1
2.3	Greedy	1
2.4	Dynamic Programming	1
2.5	Branch and Bound and Backtracking Methodologies	1
2.6	Illustrations of these techniques for Problem Solving	1
2.7	Bin Packing	1
2.8	Knapsack	1
2.9	Travelling Salesman Problem	1
3.0	**Graph and Tree Algorithms:**	
3.1	Traversal algorithms:	1
3.2	Depth First Search (DFS)	1
3.3	Breadth First Search	1
3.4	Shortest path algorithms	2
3.5	Transitive closure	2
3.6	Minimum Spanning Tree	1
3.7	Topological sorting	1
4.0	**Tractable and Intractable Problems:**	
4.1	Computability of Algorithms	1
4.2	Computability classes – P	2
4.3	NP, NP-complete	1
4.4	NP-hard.	1
4.5	Cook's theorem	1
4.6	Standard NP	1
4.7	Complete problems and Reduction techniques.	2
5.0	**Advanced Topics**	
5.1	Approximation algorithms	2
5.2	Randomized algorithms	1
5.3	Class of problems beyond NP	2
5.4	P SPACE	2
5.5	Introduction to Quantum Algorithms	2

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Course Designer(s)

1. Dr.P.Manimaran – manimaran@@ksrct.ac.in

60 CB 403	Software Design with UML	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To know the importance of modeling in the software development life cycle.
- To understand the object-oriented approach to analyzing and designing systems and software solutions.
- To employ the UML notation and symbols to create effective and efficient system designs.
- To learn various testing and maintenance measures.
- To learn various project cost models and risk management.

Pre-requisites

Basic knowledge of Software requirements

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyze and understand Software Engineering Lifecycle Models	Understand
CO2	Exemplify the concept of software requirements analysis	Remember
CO3	Design concepts using UML and System Analysis	Understand
CO4	Understand software testing and maintenance approaches	Apply
CO5	Develop project management scheduling using DevOps	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	1	2	2	-	-	-	-	1	1	2	3	-	-
CO2	2	3	2	3	2	-	-	-	2	2	3	2	3	-	-
CO3	2	3	2	1	1	-	-	-	2	2	3	2	3	-	-
CO4	2	3	3	2	3	-	-	-	2	2	3	2	3	-	-
CO5	2	3	1	2	2	-	-	-	-	-	-	1	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	20	10	30
Apply	20	20	40
Analyse	-	-	-
Evaluate	-	-	-
Create	10	10	10
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 403-Software Design with UML								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction to on Object Oriented Technologies and the UML Method* Software development process: The Waterfall Model vs. The Spiral Model. -The Software Crisis, description of the real world using the Objects Model. -Classes, inheritance and multiple configurations- Quality software characteristics. -Description of the Object-Oriented Analysis process vs. the Structure Analysis Model	[9]
Introduction to the UML Language * Analysis of system requirements -Actor Definitions- Writing a case goal. - Use Case Diagram -Use Case Relationships-Requirements Analysis Using Case Modeling.	[9]
Transfer from Analysis to Design in the Characterization Stage* Interaction Diagrams-Description of goal Defining UML Method, Operation, Object Interface, Class Sequence Diagram -Finding objects from Flow of Events-Describing the process of finding objects using a Sequence Diagram-Describing the process of finding objects using a Collaboration Diagram	[9]
The Logical View Design Stage * The Static Structure Diagrams-The Class Diagram Model-Attributes descriptions.-Operations descriptions. - Connections descriptions in the Static Model. -Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity.	[9]
Package Diagram Model * Description of the model-White box, black box-Connections between packagers. -Interfaces. - Create Package Diagram. -Drill Down. Dynamic Model: State Diagram / Activity Diagram Description of the State Diagram. -Events Handling. -Description of the Activity Diagram. - Exercise in State Machines. Component Diagram Model- Physical Aspect. -Logical Aspect. -Connections and Dependencies. -User face. -Initial DB design in a UML environment. Deployment Model Processors-Connections -Components-Tasks. -Threads. -Signals and Events.	[9]
Total Hours:	**45**

Textbook(s):

1.	Bernd Bruegge and Allen H. Dutoit, “Object-Oriented Software Engineering: Using UML, Patterns and Java”, Third Edition, Pearson Education, 2009.
2.	Craig Larman, “Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development”, Pearson Education, 3rd Edition, 2005

Reference(s):

1.	Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Ph.D., Jim Conallen Kelli A. Houston, “Object Oriented Analysis and Design with Applications”, Addision-Wesely, 3rd Edition, 2007
2.	Erich Gamma, Richard Helm, Ralph Johnson, John M. Vlissides, “Design Patterns: Elementsof Reusable Object-Oriented Software”, Pearson, 2012
3.	Roger. S. Pressman and Bruce R. Maxim, “Software Engineering – A Practitioner’s Approach”, 7 th Edition, Tata McGraw Hill, 2015.
4.	Freeman, Eric & Robson, Elisabeth, “Head First Design Patterns” 1st Edition, O’Reilly, 2004

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to on Object Oriented Technologies and the UML Method**	
1.1	Software development process: The Waterfall Model vs. The Spiral Model	1
1.2	The Software Crisis, description of the real world using the Objects Model	1
1.3	Classes	1
1.4	Inheritance and multiple configurations	1
1.5	Quality software characteristics	2
1.6	Description of the Object	1
1.7	Oriented Analysis process vs. the Structure Analysis Model	2
2.0	**Introduction to the UML Language**	
2.1	Analysis of system requirements	1
2.2	Actor Definitions	1
2.3	Writing a case goal	1
2.4	Use Case Diagram	2
2.5	Use Case Relationships	2
2.6	Requirements Analysis Using Case Modeling	2
3.0	**Transfer from Analysis to Design in the Characterization Stage**	
3.1	Interaction Diagrams	1
3.2	Description of goal Defining UML Method	1
3.3	Operation, Object Interface, Class	1
3.4	Sequence Diagram	1
3.5	Finding objects from Flow of Events	2
3.6	Describing the process of finding objects using a Sequence Diagram	1
3.7	Describing the process of finding objects using a Collaboration Diagram	2
4.0	**The Logical View Design Stage**	
4.1	The Static Structure Diagrams	1
4.2	The Class Diagram Model	2
4.3	Attributes descriptions	2
4.4	Operations descriptions	1
4.5	Connections descriptions in the Static Model	1
4.6	Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity.	2
5.0	**Package Diagram Model**	
5.1	Description of the model-White box, black box	1
5.2	Connections between packagers. - Interfaces. -Create Package Diagram	2
5.3	Drill Down. Dynamic Model: State Diagram / Activity Diagram	2
5.4	Description of the State Diagram. -Events Handling	1
5.5	Description of the Activity Diagram. - Exercise in State Machines. Component Diagram Model	1
5.6	Physical Aspect. -Logical Aspect. -Connections and Dependencies. -User face. - Initial DB design in a UML environment	1
5.7	Deployment Model-Processors-Connections -Components-Tasks. -Threads. - Signals and Events	1

Course Designer(s)

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

1. Mr.K.Karthikeyan – karthikeyank@ksrct.ac.in

60 CB 404	MERN Stack	Category	L	T	P	Credit
		PC	1	0	4	3

Objectives

- To understand the various components of full stack development and front end basics
- To design the web page using JavaScript
- To develop simple web applications with React
- To learn Node.js and Express.js features and applications
- To develop applications with MongoDB

Pre-requisites

- Basic knowledge of HTML, Java script, CSS, Database Management Systems

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the various stacks available for web application development.	Apply
CO2	Develop practical, real-world web applications using JavaScript.	Apply
CO3	Build and deploy React applications.	Apply
CO4	Use Node.js and Express.js for application development.	Apply
CO5	Develop applications with Mongo DB.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	2	-	-	-	2	2	2	2	3	-	-
CO2	3	3	3	3	2	-	-	-	2	2	2	2	3	-	-
CO3	3	3	3	3	2	-	-	-	2	2	2	2	3	-	-
CO4	3	3	3	3	2	-	-	-	2	2	2	2	3	-	-
CO5	3	3	3	3	2	-	-	-	2	2	2	2	3	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	-	-	-	-
Understand(Un)	-	-	-	-
Apply(Ap)	60	60	100	100
Analyse(An)	-	-	-	-
Evaluate(Ev)	-	-	-	-
Create(Cr)	-	-	-	-
Total	60	60	100	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech - Computer Science and Business Systems								
60 CB 404 – MERN Stack								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	1	0	4	75	3	50	50	100

Basics of Full Stack* Introduction To Web Development Framework -Single Page Application-Model-View-Controller (MVC)-Structure Of Web Page-HTML: Basic Tags, Links, Lists, Tables, Images, Videos, Audios, Forms - CSS: Internal And External Styling, Bootstrap: Containers, Tables, Images, Colors, Alerts, Buttons, Cards, Pagination, Drop Down, Carousel	[3+12]
Java Script* Introduction To Javascript - Datatypes - Variables - Arrays - Strings-Operators And Expressions - Looping - Functions - Dialog Box – Event Handling-Working With DOM - Callback Functions Promises-Arrow Functions-Fetch API	[3+12]
React* Introduction To React-Virtual DOM-Create An App Using Create-React-App - React JSX - React Lifecycle - Hooks -Props-States-Event Handling-Class Components - Functional Components- React Router - Building Forms Using React Routes-Conditional Rendering - Fetch API Key In React To Populate Data	[3+12]
Node JS and Express JS* Introduction To Node.Js-Installation Of Node.Js-Node Package Manager - Node.Js Core Modules - Routing In Node.Js- -Create Simple API In Node.Js-Introduction To Express.Js-Routing In Express.Js Create A Simple API Using Express.Js	[3+12]
Mongo DB* Understanding Nosql And Mongodb – Managing Collections--CRUD Operations: Create, Read, Update And Delete - Restful Apis – Connecting To Mongodb From Node.Js/Express.Js–Simple Applications	[3+12]
Total Hours:	**75**

Text Book(s):	
1.	Vasan Subramanian,"Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node", Second Edition, Apress, 2020.
2.	Shama Hoque,"Full-Stack React Projects", Second Edition,Packt Publishing Ltd, 2020.
Reference(s):	
1.	Shama Hoque,"Full-Stack React Projects", Second Edition, Packt Publishing Ltd, 2020
2.	Kirupa Chinnathambi, "Learning React: A Hands-On Guide to Building Web Applications using React and Redux", Addison-Wesley Professional, Second Edition, 2018.
3.	https://www.udemy.com/course/master-full-stack-web-development-novice-to-expert/
4.	https://www.udemy.com/course/fullstack-web-development-course-projects-base/

*SDG 4:-Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Basics of Full Stack**	
1.1	Introduction To Web Development Framework	1
1.2	Single Page Application	1
1.3	Model View Controller (Mvc)	1
1.4	Structure Of Web Page-HTML: Basic Tags, Lists, Images	1
1.5	Videos, Iframe Forms, Tables, Links, Div Tags	1
1.6	CSS: Internal Vs External Styling	1
1.7	Box Model, Flex Box And Responsive Design	1
1.8	Bootstrap: Bootstrap Containers, Tables, Images, Colors, Alerts	1
1.9	Buttons, Cards, Pagination, Drop Down, Carousel	1
2	**Java Script**	
2.1	Introduction To Javascript	1
2.2	Advantages Of Java Script - Syntax	1
2.3	Datatypes, Variables, Arrays	1
2.4	Strings-Operators And Expressions	1
2.5	Looping - Functions - Dialog Box – Events	1
2.6	Understanding And Working With DOM-AJAX	1
2.7	Callback Functions-Promises-Arrow Functions	1
2.8	Fetch API-Jquery	1
3	**React**	
3.1	Introduction To React Virtual DOM	1
3.2	Create An App Using Create-React-App-React JSX-React Lifecycle	1
3.3	Props-States-Event Handling	1
3.4	React Router-Class Components	1
3.5	Functional Components-Building Forms Using React-Routes	1
3.6	Conditional Rendering-Server-Side Rendering	1
3.7	Fetch API Key In React To Populate Data-React Hooks	1
4	**Node JS and Express JS**	
4.1	Introduction To Node.Js	1
4.2	Installation Of Node.Js-Node Package Manager-Node.Js REPL Commands Node.Js Core Modules	1
4.3	Routing In Node.Js-JSON In Node.Js-Create Simple API In Node.Js	1
4.4	Introduction To Express.Js-Routing In Express.Js-Sending HTML & JSON Data Using Express.Js	1
4.5	Serving Static Website Using Express.Js	1
4.6	Express.Js And API	1
5	**Mongo DB**	
5.1	Understanding Nosql And Mongo DB	1
5.2	Building Mongo DB Environment -User Accounts – Access Control	1
5.3	Administering Databases – Managing Collections	1

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Approved in Academic Council Meeting held on 25/05/2024

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5.4	CRUD Operations:Connecting And Inserting Data, Updating And Deleting Data	1
5.5	Restful Apis	1
5.6	Connecting To Mongodb From Node.Js	1
5.7	Simple Applications	1
6	**Project**	
6.1	Problem Identification	5
6.2	Solution For Problem	10
6.3	Implementation	10
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Dr. M.Tamilarasi – tamilarasi@ksrct.ac.in

60 MY 002	Universal Human Values	Category	L	T	P	Credit
		MC	3	0	0	3

Objectives

- To identify the essential complementarily between 'values' and 'skills'
- To ensure core aspirations of all human beings
- To acquire ethical human conduct, trustful and mutually fulfilling human behaviour
- To enrich interaction with Nature
- To achieve holistic perspective towards life and profession

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the significance of value inputs in formal education and start applying them in their life and profession.	Understand
CO2	Evaluate coexistence of the "I" with the body.	Analyse
CO3	Identify and evaluate the role of harmony in family, society and universal order.	Remember
CO4	Classify and associate the holistic perception of harmony at all levels ofexistence and Nature.	Analyse
CO5	Develop appropriate human conduct and management patterns to create harmony in professional and personal lives.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	3	2	-	2	3	-	-	-
CO2	-	-	-	-	-	3	-	3	3	-	-	3	-	-	-
CO3	-	-	-	-	-	3	3	3	3	-	-	3	-	-	-
CO4	-	-	-	-	-	3	3	3	3	-	-	3	-	2	-
CO5	-	-	-	-	-	3	3	3	3	3	-	3	-	2	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	No End Semester Examination
Understand	10	10	
Apply	20	20	
Analyse	20	20	
Evaluate	-	-	
Create	-	-	
Total	60	60	

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 MY 002 - Universal Human Values								
Common to all Branches								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	100	0	100

Introduction to value Education * Understanding Value Education-Self Exploration as The Process For Value Education-Continuous Happiness and Prosperity-The Basic Human Aspirations-Right Understanding-Relationship and Physical Facility – Happiness and Prosperity - Current Scenario – Method to Fulfill the Basic Human Aspirations**.	[9]
Harmony in the Human Being * Understanding Human Being as The Co-Existence of The Self and The Body-Distinguishing Between The Needs of The Self and The Body-The Body as an Instrument of The Self-Understanding Harmony in the Self-Harmony of The Self With The Body **–Programme to Ensure Self-Regulation and Health.	[9]
Harmony in the Family and Society * Harmony In The Family –The Basic Unit of Human Interaction-Values In Human- to -Human Relationship –'Trust' The Foundation Value In Relationship –'Respect'- As The Right Evaluation-Understanding Harmony in the Society –Vision For the Universal Human Order.	[9]
Harmony in the Nature/Existence * Understanding Harmony in the Nature-Interconnectedness, Self-Regulation And Mutual Fulfillment Among the Four Orders of Nature – Realizing Existence As Co-Existence at All Levels –The Holistic Perception Of Harmony in Existence.	[9]
Implications of the Holistic Understanding * Natural Acceptance of Human Values- Definitiveness of Human Conduct- A Basis For Humanistic Education, Humanistic Constitution And Universal Human Order- Competence In Professional Ethics –Holistic Technologies, Production Systems And Management Models-Typical Case Studies – Strategies For Transition Towards Value Base Life and Profession.	[9]
Total Hours:	**45**

Text Book(s):	
1.	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2.	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
Reference(s):	
1.	Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2.	Human Values, A.N. Tripathi, New Age International. Publishers, New Delhi, 2004.

*SDG:3 – Good Health and Well-Being
**SDG:4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Value Education**	
1.1	Discussion On Present Education System And Skill Based Education	1
1.2	Understanding Value Education	1
1.3	Self-Exploration As The Process For Value Education	1
1.4	Basic Human Aspirations - Continuous Happiness And Prosperity	1
1.5	Basic Requirements To Fulfill Human Aspirations - Right Understanding, Relationship And Physical Facility	1
1.6	Transformation From Animal Consciousness To Human Consciousness	1
1.7	Sources Of Happiness And Prosperity – Harmony And Disharmony	1
1.8	Current Scenario And Role Of Education	1
1.9	Outcome Of Human Education And Method To Fulfill The Basic Human Aspirations	1
2.0	**Harmony in the Human Being**	
2.1	Understanding Human Being - As Co-Existence Of The Self And The Body - The Needs Of The Self And The Body	1
2.2	Understanding Human Being - As Co-Existence Of The Self And The Body – The Activities And Response Of The Self And The Body	2
2.3	The Body As An Instrument Of The Self	1
2.4	Understanding Harmony In The Self	1
2.5	Harmony Of The Self With The Body	2
2.6	Programme To Ensure Self-Regulation And Health	1
2.6	My Participation (Value) Regarding Self And My Body - Correct Appraisal Of Our Physical Needs	1
3.0	**Harmony in the Family and Society**	
3.1	Harmony In The Family - Understanding Values In Human Relationships	1
3.2	Family As The Basic Unit Of Human Interaction	1
3.3	Values In Human Relationships	1
3.4	Trust - The Foundation Value In Relationship	1
3.5	Respect As The Right Evaluation, The Basis For Respect, Assumed Basesfor Respect Today	1
3.6	Harmony From Family To World Family: Undivided Society	1
3.7	Extending Relationship From Family To Society , Identification Of The Comprehensive Human Goal	1
3.8	Programs Needed To Achieve The Comprehensive Human Goal: The Five Dimensions Of Human Endeavour	1
3.9	Harmony From Family Order To World Family Order – Universal Human Order	1
4.0	**Harmony in the Nature / Existence**	
4.1	The Four Orders In Nature	1
4.2	Participation Of Human Being In Entire Nature	1
4.3	Natural Characteristics - Tendency Of Human Living With Animal Consciousness / The Holistic Perception Of Harmony In Existence	1
4.4	Present Day Problems	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.5	Recyclability And Self-Regulation In Nature	1
4.6	Relationship Of Mutual Fulfillment	1
4.7	An Introduction To Space, Co-Existence Of Units In Space	1
4.8	Harmony In Existence – Understanding Existence As Co- Existence	1
4.9	Natural Characteristic Of Human Living With Human Consciousness	1
5.0	**Implications of the Holistic Understanding**	
5.1	Natural Acceptance Of Human Values	1
5.2	Definitiveness Of Ethical Human Conduct - Development Of Human Consciousness	1
5.3	Identification Of Comprehensive Human Goal	1
5.4	Basis For Humanistic Education And Humanistic Constitution	1
5.5	Ensuring Competence In Professional Ethics	1
5.6	Issues In Professional Ethics-The Current Scenario	1
5.7	Holistic Technologies And Production Systems And Management Models – Typical Case Studies	2
5.8	Strategies For Transition Towards Value Based Life And Profession	1

Course Designer(s)

1. Dr.G.Vennila - vennila@ksrct.ac.in
2. Dr.K.Raja - rajak@ksrct.ac.in

60 CB 4P1	Operating Systems Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To recognize the fundamentals of operating systems.
- To describe the mechanisms of OS to handle processes and threads and their communication.
- To discuss the principles of concurrency and Deadlocks.
- To identify the mechanisms involved in memory management and its schemes.
- To identify I/O management, File systems and security issues.

Pre-requisites

- Basic knowledge of Computer Fundamentals

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the basic concepts and design issues of operating systems.	Apply
CO2	Apply Process management concepts including scheduling, Inter process communication, deadlocks and multithreading in real world problems.	Apply
CO3	Apply concepts of memory management including Virtual Memory and Page Replacement to the issues that occur in Real time applications**.**	Apply
CO4	Identify issues related to IO hardware	Analyse
CO5	Identify basic concepts of file system and disk management	Apply

Mapping with Programme Outcomes

COs	POs												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2	-	-	-	-	-	-	-	-	3	3	-	-
CO2	3	3	3	3	-	-	3	-	-	2	-	2	3	-	-
CO3	3	3	3	3	-	-	3	-	-	2	-	2	3	-	-
CO4	3	2	3	-	-	-	-	-	-	-	-	2	3	-	-
CO5	3	3	3	3	-	-	3	-	-	-	-	2	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2018								
B.Tech – Computer Science and Business Systems								
60 CB 4P1 – Operating Systems Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	0	0	4	60	2	60	40	100

List of Experiments:

1. Analysis And Synthesis Of Basic Linux Commands
2. Programs Using Shell Programming
3. Implementation Of UNIX System Calls
4. Installation Of Linux Operating System
5. Implementation Of POSIX Thread Functions For Create, Join And Exit
6. Simulation And Analysis Of Non Pre-Emptive And Pre-Emptive CPU Scheduling Algorithms
7. Simulation Of Producer – Consumer Problem Using Semaphores And Implementation Of Dining Philosopher's Problem To Demonstrate Process Synchronization
8. Simulation Of Banker's Algorithm For Deadlock Avoidance
9. Analysis And Simulation Of Memory Allocation And Management Techniques
10. Implementation Of Page Replacement Techniques
11. Simulation Of Disk Scheduling Algorithms

Design Experiments:

12. Implementation Of File Organization Techniques
13. Design An Efficient Traffic Control System To Avoid Traffic Congestion In Metro Cities. Use Process Synchronization, Scheduling, Deadlock And Memory Management Concepts To Implement The System

Lab Manual :

1.	"Operating Systems Lab Manual", Department of Computer Science and Business Systems, KSRCT.

Course Designer(s)

1. Manimaran P - manimaran@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 4P2	Design and Analysis of Algorithms Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To design algorithms in both the science and practice of computing.
- To choose the appropriate data structure and algorithm design method for a specified Application.
- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To solve NP-hard and NP-complete problems.

Pre-requisites

- Basic knowledge of Data Structures

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop programs for sorting a given set of elements and analyze its time complexity.	Analyze
CO2	Solve and analyze the problems using greedy methods.	Analyze
CO3	Solve and analyze the problems using dynamic programming.	Analyze
CO4	Apply backtracking method to solve various problems.	Apply
CO5	Apply branch and bound method to solve 0/1 knapsack problem	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	2	3	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	2	3	-	-	-	-	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Low															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech. Computer Science and Business Systems								
60 CB 4P2-Design and Analysis of Algorithms Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	0	0	4	60	2	60	40	100

List of Experiments:

1. Implement Minimum Cost Spanning Tree Of A Given Undirected Graph Using Kruskal's Algorithm And Prim's Algorithm.
2. Implement The Sorting Algorithm To Sort A Given Set Of Elements And Determine The Time Required To Sort The Element.
3. Implement 0/1 Knapsack Problem Using Dynamic Programming.
4. Implement Branch And Bound To Find The Optimal Solution For The Travelling Salesperson Problem.
5. Implement N Queen's Problem Using Backtracking.
6. Display All The Nodes Reachable From A Given Starting Node In A Digraph Using BFS Method.
7. Implement DFS Method To Check Whether A Given Graph Is Connected Or Not.
8. Demonstrate Dijkstra's Algorithm To Find Shortest Paths From A Given Vertex In A Weighted Connected Graph To Other Vertices.

Design Experiments:

1. Compute The Transitive Closure Of A Given Directed Graph By Implementing Warshall's Algorithm.
2. Implement The Topological Ordering Of Vertices In A Given Digraph.

Lab Manual	
1.	"Design and Analysis of Algorithms Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4:- Quality Education

Course Designer(s)

1. Manimaran P - manimaran@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
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60 CG 0P3	Career Skill Development III	Category	L	T	P	Credit
		CGC	0	0	2	1

Objectives

- To help learners improve their logical reasoning skills at different academic and professional contexts.
- To help learners relate basic quantitative problems and solve them.
- To help learners Infer critically the statements with optimal conclusions and assumptions.
- To Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively
- To compute quantitative problems related to time and work, speed and distance, and simple and compound interest

Pre-requisites

- Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Deduce the topics in logical reasoning at the preliminary and intermediate level.	Understand
CO2	Relate basic quantitative problems and solve them effectively at the preliminary level	Apply
CO3	Infer critically the statements with optimal conclusions and assumptions with the data and information given.	Analyze
CO4	Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively at the pre-intermediate level.	Apply
CO5	Compute quantitative problems related to time and work, speed and distance, and simple and compound interest at intermediate level.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	2	2	-	3	-	-	-	2	3	3	2	3	-
CO2	3	3	3	3	-	2	-	-	-	2	3	3	2	3	-
CO3	2	2	2	2	-	3	-	-	-	2	3	3	2	3	-
CO4	3	3	3	3	-	2	-	-	-	2	3	3	2	3	-
CO5	3	3	3	3	-	2	-	-	-	2	3	3	2	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	40	-
Apply	-	-	20	-
Analyse	-	-	40	-
Evaluate	-	-	-	-

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Create	-	-	-	-
Total	-	-	100	-

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P3 - Career Skill Development III								
Common to All Branches								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	0	0	2	30	1	100	00	100

Logical Reasoning Analogies - Alpha And Numeric Series - Number Series - Coding And Decoding - Blood Relations - Coded Relations - Order And Ranking – Odd Man Out - Direction And Distance.	[6]
Quantitative Aptitude – Part 1 Number System - Squares & Cubes - Divisibility - Unit Digits - Remainder Theorem - HCF & LCM - Geometric And Arithmetic Progression - Surds & Indices.	[6]
Critical Reasoning Syllogism - Statements And Conclusions, Cause And Effect, Statements And Assumptions - Identifying Strong Arguments And Weak Arguments – Cause And Action -Data Sufficiency	[6]
Quantitative Aptitude – Part 2 Average - Ratio And Proportion – Ages – Partnership– Percentage - Profit & Loss – Discount - Mixture And Allegation.	[6]
Quantitative Aptitude – Part 3 Time & Work - Pipes And Cistern – Time, Speed & Distance - Trains - Boats And Streams – Simple And Compound Interest.	[6]
Total Hours:	**30**

Reference(s):	
1.	Aggarwal, R.S. 'A Modern Approach to Verbal and Non-verbal Reasoning', Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2.	Abhijit Guha, 'Quantitative Aptitude', McGraw Hill Education, 6th edition,2016
3.	Dinesh Khattar, 'Quantitative Aptitude For Competitive Examinations', Pearson Education 2020
4.	Anne Thomson, 'Critical Reasoning: A Practical Introduction' Lexicon Books, 3rd edition, 2022. Warzsaw

*SDG 4: Quality Education
**SDG 8: Decent work and Economic growth
***SDG 9: Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule		
S. No.	**Topics**	**No. of hours**
1	**Logical Reasoning**	
1.1	Analogies - Alpha And Numeric Series	1
1.2	Number Series - Coding And Decoding	1
1.3	Blood Relations - Coded Relations	1
1.4	Order And Ranking – Odd Man Out	2
1.5	Direction And Distance	1
2.0	**Quantitative Aptitude – Part 1**	
2.1	Number System	1
2.2	Squares & Cubes - Divisibility	1
2.3	Unit Digits - Remainder Theorem	1
2.4	HCF & LCM- Geometric And Arithmetic Progression	2
2.5	Surds & Indices	1
3.0	**Critical Reasoning**	
3.1	Syllogism	1
3.2	Statements And Conclusions, Cause And Effect	1
3.3	Statements And Assumptions	1
3.4	Identifying Strong Arguments And Weak Arguments	2
3.5	Cause And Action -Data Sufficiency	1
4.0	**Quantitative Aptitude – Part 2**	
4.1	Average - Ratio And Proportion	1
4.2	Ages – Partnership	1
4.3	Percentage	1
4.4	Profit & Loss	2
4.5	Discount - Mixture And Allegation	1
5.0	**Quantitative Aptitude – Part 3**	
5.1	Time & Work	1
5.2	Pipes And Cistern	1
5.3	Time, Speed & Distance - Trains	1
5.4	Boats And Streams	2
5.5	Simple Interest And Compound Interest	1

Course Designer(s)

1. R. Poovarasan - poovarasan@ksrct.ac.in

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FIFTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 CB 501	Computer Networks	2	40	60	100	45	100
2	60 CB 502	C# and .NET Programming	2	40	60	100	45	100
3	60 CB 503	Artificial Intelligence	2	40	60	100	45	100
4	60 IT 003	Design Thinking	2	50	50	100	45	100
5	60 CB E1*	Professional Elective I	2	50	50	100	45	100
6	60 OE L*	Open elective-II	2	40	60	100	45	100
7	60 MY 003	Startups and Entrepreneurship	2	100	-	100	-	-
PRACTICALS								
8	60 CB 5P1	Computer Networks Laboratory	2	60	40	100	45	100
9	60 CB 5P2	C# and .NET Programming Laboratory	2	60	40	100	45	100
10	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
11	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to

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60 marks for the award of terminal examination marks

60 CB 501	Computer Networks	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the computer networking basics and concepts of data communications, functions of different layers. IEEE
- To know the standards employed in computer networking
- To make the students to get familiarized with different protocols and network components
- To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications
- To understand the application layer and its applications

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the concept of components, categories and ISO/OSI model of networks.	Remember
CO2	Describe the Concept of various error detection techniques and Flow, Error control.	Understand
CO3	Compare the concept of Circuit switching and Packet switching.	Apply
CO4	Gain the knowledge of Congestion control and QoS Techniques.	Remember
CO5	Identify the Purpose of Domain Name Space, Email and FTP.	Remember

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	-	-	-	-	-	-	-	-	-	2	2	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	2	2	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	3	2	-	-
CO4	-	3	-	-	2	-	-	-	-	-	-	3	2	-	-
CO5	-	3	-	-	2	-	-	-	-	-	-	3	2	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 501 - Computer Networks								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Data Communications* Networks – Components And Categories – Line Configuration – Topologies –Protocols And Standards – ISO / OSI Model – Transmission Media – Coaxial Cable – Fiber Optics – Interfaces (RS232 Standard) And Modems.	[9]
Data Link Layer* Error – Detection And Correction – Parity – LRC – CRC – Hamming Code – Flow Control And Error Control– Stop And Wait – Go Back-N ARQ – Selective Repeat ARQ- Sliding Window – HDLC – LAN - Ethernet IEEE 802.3– Connecting Devices -Repeaters – Hubs - Bridges.	[9]
Network Layer* Internetworks – Circuit Switching – Packet Switching – IP Addressing Methods – Sub Netting – Super Netting – Routers- Routing Algorithms – Distance Vector Routing – Link State Routing- ICMP/ Frame Format, Query Messages.	[9]
Transport Layer* Duties Of Transport Layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality Of Services (QOS)-Techniques.	[9]
Application Layer* Domain Name Space (DNS) – Email (SMTP)-File Transfer Protocol (FTP) – HTTP – HTTPS-World Wide Web. Case Study: Structural Health Monitoring, Traffic Control, Health Care, Pipeline Monitoring, Precision Agriculture.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Behrouz A. Forouzan, “Data communication and Networking Update”, Tata McGraw-Hill, Third Edition, 2006.
2.	Sudakshina Kundu, “Fundamentals of Computer Networks”, PHI, Second Edition.
Reference(s):	
1.	James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003
2.	Larry L.Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
3.	Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
4.	William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000

*SDG4 – Quality Education

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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Data Communications**	
1.1	Networks	1
1.2	Components And Categories	1
1.3	Line Configuration	1
1.4	Topologies	1
1.5	Protocol And Standards	1
1.6	ISO / OSI Model	1
1.7	Transmission Media – Coaxial Cable	1
1.8	Fiber Optics	1
1.9	Interfaces(RS232 Standard) And	1
2.0	**Data Link Layer**	
2.1	Error – Detection And Correction	1
2.2	Parity – LRC	1
2.3	CRC – Hamming Code	1
2.4	Flow Control And Error Control-– Stop And Wait	1
2.5	Go Back-N ARQ	1
2.6	Selective Repeat ARQ- Sliding Window	1
2.7	Hdlc - Lan	1
2.8	Ethernet IEEE 802.3, Connecting Devices	1
2.9	Repeaters-Hubs-Bridges	1
3.0	**Network Layer**	
3.1	Internetworks – Circuit Switching	1
3.2	Packet Switching	1
3.3	IP Addressing Methods	1
3.4	Sub Netting –Super Netting	1
3.5	Routers- Routing Algorithms	1
3.6	Distance Vector Routing	1
3.7	Link State Routing	1
3.8	ICMP / Frame Format,	1
3.9	Query Messages	1
4.0	**Transport Layer**	
4.1	Duties Of Transport Layer	1
4.2	Multiplexing	1
4.3	Demultiplexing	1
4.4	Sockets	1
4.5	User Datagram Protocol (Udp	1
4.6	Transmission Control Protocol (Tcp)	1
4.7	Congestion Control	1

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.8	Quality Of Services (QOS)	1
4.9	Quality of services (QOS Techniques)	1
5.0	**Application Layer**	
5.1	Domain Name Space (Dns)	1
5.2	Email (SMTP)-File Transfer Protocol (FTP)	1
5.3	Http – Https	1
5.4	World Wide Web	2
5.5	Case Study: Structural Health Monitoring	1
5.6	Traffic Control	1
5.7	Test The Prototype	1
5.8	Health Care	1
5.9	Pipeline Monitoring, Precision Agriculture	1

Course Designer(s)

1. Dr. P.Manimaran - manimaran@ksrct.ac.in

60 CB 502	C# and.NET Programming	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To gain the fundamental skills in C# programming Language
- To understand object-oriented concepts in C#
- To develop cross-platform web-pages using ASP.NET Core platform
- To implement data access and manipulation using EF Core and Razor pages
- To develop cross-platform web-apps using MVC architecture in ASP.NET Core platform

Pre-requisites

- Basic knowledge of C or C++ or any programming language or programming fundamentals.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the basic programming concepts of C#	Remember
CO2	Understand the Object-Oriented concepts in C#.	Understand
CO3	Develop cross-platform web pages using Razor pages in ASP.NET Core platform.	Apply
CO4	Implement the data manipulation concept using EF Core and Razor Pages.	Apply
CO5	Implement the MVC based web-apps using ASP.NET Core platform.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	-	3	2	2	1	-	1	3	-	-	1	3	-	-
CO2	2	-	3	2	2	1	-	1	3	-	-	1	3	-	-
CO3	2	-	3	2	2	1	-	1	3	-	-	1	3	-	-
CO4	2	-	3	2	3	1	-	1	3	-	-	1	3	-	-
CO5	2	-	3	2	3	1	-	1	3	-	-	1	3	-	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	15	10	20
Understand	25	20	45
Apply	20	30	35
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 502- C# and.NET Programming								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Introduction to C# ** Introducing C# - Overview Of C# - Literals, Variables And Data Types - Operators And Expressions - Branching And Looping - Methods - Arrays - Strings - Structures And Enumerations.	[9]
Object Oriented Aspects of C# ** Classes And Objects - Inheritance And Polymorphism - Interfaces - Operator Overloading - Delegates And Events - Errors And Exceptions. - Collections – Managing Filesystem.	[9]
ASP.NET Core Web Application using Razor Pages: * Introduction To ASP.NET Core Web Application – Environment Setup – Project Layout – Static And Default Files - Enabling And Defining Razor Pages – Shared Layouts – Using Code-Behind Files.	[9]
Using Entity Framework Core: ** Setting Up EF Core: Defining And Building EF Core Models - Defining The Entity And Context Classes - Manipulating Data With EF Core - Transactions. Manipulating Data Using Razor Pages: Onget –Onpost – Onpostdelete – Onpostedit – Onpostview. REST API – Model And Controller For REST API.	[9]
Model-View-Controller (MVC) in ASP.NET Core: * Introduction To MVC – Setting Up An ASP.NET Core MVC Website – MVC Routing – Controllers And Actions – Model – Views – Parameters Passing – View Helpers – Model Validation.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Mark J. Price, “C# 8.0 and .NET Core 3.0 – Modern Cross-Platform Development”, 4th Edition, Packt Publishing Limited, 2019.
2.	Dino Esposito, “Programming ASP.NET Core”, 1st Edition, Pearson Education Inc., 2018.
Reference(s):	
1.	E. Balagurusamy, “Programming in C#”, 4th Edition, Tata McGraw-Hill, 2017.
2.	Andrew Troelsen Phil Japikse, “Pro C# 8 with .NET Core 3: Foundational Principles and Practices in Programming”, Apress, 2020.
3.	Jon Skeet, “C# in Depth”,Fourth Edition, Manning Publications Co. 2019.
4.	Christian Nagel, “Professional C# 7 and .NET Core 2.0”, 1st Edition, Wiley Publication, 2018.

*SDG 9 – Industry Innovation and Infrastructure

**SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to C#**	
1.1	Introducing C# - Overview Of C# - Literals, Variables	1
1.2	Data Types, Operators And Expressions	1
1.3	Branching And Looping	3
1.4	Methods - Arrays - Strings	3
1.5	Structures And Enumerations	1
2.0	**Object Oriented Aspects of C#**	
2.1	Classes And Objects	1
2.2	Inheritance And Polymorphism	2
2.3	Interfaces , Operator Overloading	
2.4	Delegates And Events Errors And Exceptions	2
2.5	Collections , Managing File System	2
3.0	**ASP.NET Core Web Application using Razor Pages:**	
3.1	Introduction To ASP.NET Core Web Application	1
3.2	Environment Setup , Project Layout	1
3.3	Static And Default Files	1
3.4	Enabling And Defining Razor Pages	1
3.5	Shared Layouts	2
3.6	Using Code-Behind Files	3
4.0	**Using Entity Framework Core:**	
4.1	Defining And Building EF Core Models	1
4.2	Defining The Entity And Context Classes	2
4.2	Manipulating Data With EF Core - Transactions	3
4.3	Onget –Onpost – Onpostdelete – Onpostedit – Onpostview	1
4.4	REST API – Model And Controller For REST API	3
5.0	**Model-View-Controller (MVC) in ASP.NET Core:**	
5.1	Introduction To MVC	.5
5.2	Setting Up An ASP.NET Core MVC Website	.5
5.3	Mvc Routing	1
5.4	Controllers And Actions	2
5.5	Model – Views	1
5.6	Parameters Passing	1.5
5.7	View Helpers	1.5
5.8	Model Validation	1

Course Designer(s)

1. Venkatesh P - venkateshp@ksrct.ac.in

60 CB 503	Artificial Intelligence	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To learn the basic AI approaches.
- To develop problem solving agents
- To implement game playing and CSP techniques
- To perform logical reasoning
- To develop systems with probabilistic reasoning

Pre-requisites

- Basic knowledge of Statistics and modeling and programming languages

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the concepts of intelligent agents and problem solving aspects	Understand
CO2	Apply problem solving techniques	Apply
CO3	Apply game playing and CSP techniques	Apply
CO4	Perform logical reasoning	Remember
CO5	Perform probabilistic reasoning under uncertainty	Remember

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	-	-	2	2	-	2	-	1	2	-	-
CO2	3	2	3	-	-	-	2	2	-	2	-	1	2	2	-
CO3	3	2	2	-	-	-	2	1	-	2	-	1	2	-	-
CO4	3	2	2	-	-	-	2	1	-	2	-	1	2	-	-
CO5	3	2	2	-	-	-	2	1	-	2	-	1	2	2	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	20
Understand (Un)	20	20	30
Apply (Ap)	20	20	40
Analyse (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	10	10	10
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB 503– Artificial Intelligence

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Intelligent Agents * Introduction to AI – Agents and Environments – Concept of Rationality – Nature of Environments – Structure of Agents. Problem Solving Agents – Search Algorithms – Uninformed Search Strategies. Lab Exercise: Implement Basic Search Strategies – 8-Puzzle, 8 - Queens Problem, Cryptarithmetic.	[9]
Problem Solving * Heuristic Search Strategies – Heuristic Functions. Local Search and Optimization Problems – Local Search in Continuous Space – Search with Non-Deterministic Actions – Search in Partially Observable Environments – Online Search Agents and Unknown Environments Lab Exercise : Implement A* and Memory Bounded A* Algorithms	[9]
Game Playing and CSP * Game Theory – Optimal Decisions in Games – Alpha-Beta Search – Monte-Carlo Tree Search – Stochastic Games – Partially Observable Games. Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search For CSP – Local Search For CSP – Structure of CSP. Lab Exercise : Implement Minimax Algorithm For Game Playing (Alpha-Beta Pruning)	[9]
Logical Reasoning * Knowledge-Based Agents – Propositional Logic – Propositional Theorem Proving – Propositional Model Checking – Agents Based on Propositional Logic. First-Order Logic – Syntax And Semantics – Knowledge Representation and Engineering – Inferences in First-Order Logic – Forward Chaining – Backward Chaining – Resolution. Lab Exercise: Implement Propositional Model Checking Algorithms.	[9]
Probabilistic Reasoning * Acting Under Uncertainty – Bayesian Inference – Naïve Bayes Models. Probabilistic Reasoning – Bayesian Networks – Exact Inference in BN – Approximate Inference In BN – Causal Networks. Lab Exercise : Implement Bayesian Networks and Perform Inferences	[9]
Total Hours:	45

Textbook(s):

1.	Stuart Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2021
2.	Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013.

Reference(s):

1.	Dan W. Patterson, “Introduction to AI and ES”, Pearson Education,2007
2.	Kevin Night, Elaine Rich, and Nair B., “Artificial Intelligence”, McGraw Hill, 2008
3.	Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006
4.	http://nptel.ac.in/

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Intelligent Agents**	
1.1	Introduction To AI	1
1.2	Agents And Environments	1
1.3	Concept Of Rationality	1
1.4	Nature Of Environments	1
1.5	Structure Of Agents	1
1.6	Problem Solving Agents – Search Algorithms	2
1.7	Uninformed Search Strategies	2
2.0	**Problem Solving**	
2.1	Heuristic Search Strategies	2
2.2	Heuristic Functions	1
2.3	Local Search And Optimization Problems	1
2.4	Local Search In Continuous Space	1
2.5	Search With Non-Deterministic Actions	1
2.6	Search In Partially Observable Environments	1
2.7	Online Search Agents And Unknown Environments	2
3.0	**Game Playing and CSP**	
3.1	Game Theory	1
3.2	Optimal Decisions In Games	2
3.3	Alpha-Beta Search - Monte- Carlo Tree Search	1
3.4	Stochastic Games - Partially Observable Games	1
3.5	Constraint Satisfaction Problems – Constraint Propagation	1
3.6	Backtracking Search For CSP	2
3.7	Local Search For CSP – Structure Of CSP	1
4.0	**Logical Reasoning**	
4.1	Knowledge-Based Agents	1
4.2	Propositional Logic – Propositional Theorem Proving	1
4.3	Propositional Model Checking	1
4.4	Agents Based On Propositional Logic	1
4.5	First-Order Logic – Syntax And Semantics	1
4.6	Knowledge Representation And Engineering	1
4.7	Inferences In First-Order Logic	1
4.8	Forward Chaining – Backward Chaining	1
4.9	Resolution	1
5.0	**Probabilistic Reasoning**	
5.1	Acting Under Uncertainty	1
5.2	Bayesian Inference	1
5.3	Naïve Bayes Models	2
5.4	Probabilistic Reasoning	2
5.5	Bayesian Networks	1
5.6	Exact Inference In BN – Approximate Inference In BN	1
5.7	Causal Networks	1

Course Designer(s)

1. R.Loga priya – logapriyar@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 IT 003	Design Thinking	Category	L	T	P	Credit
		PC	2	0	2	3

Objectives

- To learn design thinking concepts and principles.
- To design thinking methods in every stage of the problem.
- To learn the different phases of design thinking.
- To learn the application of design thinking for the IT industry
- To apply various methods in design thinking to different problems.

Pre-requisites

- Basic knowledge of mathematics and programming.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply design thinking for product development	Understand
CO2	Use design thinking tools	Understand
CO3	Identify need for products and disruption	Apply
CO4	Design innovative products	Analyze
CO5	Apply design thinking to improve on existing products in IT	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	3	3	3	3	3	3	-	-	3	2	-
CO2	3	2	3	2	3	3	3	2	3	3	-	-	2	3	-
CO3	3	3	3	2	3	3	2	3	-	-	-	-	3	3	-
CO4	3	3	3	3	3	3	3	-	3	-	-	-	2	2	-
CO5	3	3	3	3	3	-	3	-	-	-	-	-	3	3	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	-	-	-	-	-	-	-	-
Understand	40	-	40	-	60	-	60	-
Apply	20	50	20	50	40	50	40	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 IT 003 – Design Thinking								
Common to IT,AI&DS,CSBS Branch								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	2	0	2	60	3	50	50	100

Introduction to Design Thinking * Why Design? - Four Questions, Ten Tools - Principles Of Design Thinking - The Process of Design Thinking - How To Plan A Design Thinking Project.	**[6]**
Understand, Observe and Define the Problem Search Field Determination - Problem Clarification - Understanding of the Problem – Problem Analysis - Reformulation of The Problem - Observation Phase - Empathetic Design - Tips For Observing - Methods For Empathetic Design - Description of Customer Needs.	**[6]**
Ideation and Prototyping ** Ideate Phase - The Creative Process and Creative Principles - Creativity Techniques - Evaluation of Ideas - Prototype Phase – Learn Startup Method For Prototype Development - Visualization and Presentation Techniques.	**[6]**
Testing and Implementation *** Test Phase - Tips For Interviews - Tips For Surveys - Kano Model - Desirability Testing - How to Conduct Workshops - Requirements for the Space - Material Requirements - Agility for Design Thinking.	**[6]**
Future Design Thinking Meets the Corporation – The New Social Contract – Design Activism – Designing Tomorrow.	**[6]**
Practical: 1. 2030 Schools Challenge: Concept: Design thinking is often presented without teaching content. This is very different. Learners get 30 minutes to choose a UN 2030 Goal (there are 17) that is relevant and meaningful to them, then they get into small groups. The group researches the goal quickly, by answering the questions: What does the world need to know about this goal and what can we do about it? The group then creates a short PSA (Public Service Announcement) and shares it widely with an authentic audience. It is fun, fast, and shows the power of design sprints to teach content and skills. 2. THE GIFT-GIVING PROJECT VIA STANFORD D-SCHOOL Concept: The Gift-Giving Project is 90-minute (plus debrief) fast-paced project through a full design cycle. Students pair up to interview each other, come to a point-of-view of how they might design for their partner, ideate, and prototype a new solution to “redesign the gift giving experience” for their partner. 3. THE WALLET PROJECT VIA STANFORD D-SCHOOL Concept: Very similar to the Gift-Giving Project, the Wallet Project is 90-minute (plus Tentative 48 debrief) fast-paced project through a full design cycle. Students pair up, show and tell each other about their wallets, ideate, and make a new solution that is “useful and meaningful” to their partner. 4. INVENT A SPORT (WITH JUST THESE ITEMS) Concept: We’ve all played sports at some point in our life. Who came up with the rules? Who created the game? Who made the constraints? And who decided the objects to play with? Now, with limited time and resources, your group will create and invent a new sport, and a set of directions for people to actually play the game. 5. “BOOK IN AN HOUR” ACTIVITY (VIA ALL WHO WONDER) Concept: Give a group a book (fiction or non-fiction). Then you break them up into smaller groups (or individuals) to	**30**

read different parts of the book. Each group (or person) has to read and then create an overview/trailer of their part of the book to share chronologically with the rest of the class. Here the design really starts with the creative process driving how you share the information, plot, characters etc. Perfect use for professional development when you want to introduce a topic in a fun, engaging way. 6. CHILDREN'S STORY DESIGN ACTIVITIES Concept: The University of Arkansas created a series of STEM Challenges that work as great design activities with groups old and young! For example after reading "The Three Billy Goat's Gruff" they set up a challenge like this: You decide to help the billy goats reach the opposite side of the creek so they can eat. You must create a model structure to help the billy goats get from one side to the other while using the design loop and only the materials provided. Your teacher will also provide you with model billy goats, with specific weights, that your bridge must be able to withstand. 7. New Product Development Activity: Student teams were given products ranging from toys to air fresheners. In 2 days, they had to create pitches on how to improve these products. The idea was to give them a clear sense of the scope of what they would do in a product development.	
Total Hours:(Theory – 30 + Practical – 30)	60
Text Book(s):	
1. Christian Mueller-Roterberg, Handbook of Design Thinking - Tips & Tools for how to design thinking. [Unit 1, 2, 3, 4]	
2. Designing for Growth: a design thinking tool kit for managers By Jeanne Liedtka and Tim Ogilvie. [Unit 1]	
3. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation by Tim Brown. [Unit 5]	
Reference(s):	
1. Johnny Schneider, "Understanding Design Thinking, Lean and Agile", O'Reilly Media, 2017.	
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.	
3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011.	
4. Alistair Cockburn, "Agile Software Development", 2nd ed, Pearson Education, 2007.	
5. http://ajjuliani.com/design-thinking-activities	
6. https://venturewell.org/class-exercises	

***** SDG-4 – Quality Education
*** *** SDG-8 – Employment and decent work for all
*** * *** SDG-9 – Industrialization and foster innovation

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Design Thinking**	
1.1	Why Design? - Four Questions	1
1.2	Ten Tools	1
1.3	Principles Of Design Thinking	2
1.4	The Process Of Design Thinking	1
1.5	How To Plan A Design Thinking Project.	1
2.0	**Understand, Observe and Define The Problem**	
2.1	Search Field Determination	1

2.2	Problem Clarification - Understanding Of The Problem	1
2.3	Problem Analysis - Reformulation Of The Problem	1
2.4	Observation Phase - Empathetic Design	1
2.5	Tips For Observing, Methods For Empathetic Design	1
2.6	Description Of Customer Needs	1
3.0	**Ideation and Prototyping**	
3.1	Ideate Phase	1
3.2	The Creative Process And Creative Principles	1
3.3	Creativity Techniques	1
3.4	Evaluation Of Ideas, Prototype Phase	1
3.5	Learn Startup Method For Prototype Development	1
3.6	Visualization And Presentation Techniques.	1
4.0	**Testing and Implementation**	
4.1	Test Phase - Tips For Interviews	1
4.2	Tips For Surveys - Kano Model	1
4.3	Desirability Testing - How To Conduct Workshops	1
4.4	Requirements For The Space	1
4.5	Material Requirements	1
4.6	Agility For Design Thinking	1
5.0	**Future**	
5.1	Design Thinking Meets The Corporation	2
5.2	The New Social Contract	2
5.3	Design Activism	1
5.4	Designing Tomorrow	1
Practical:		
1	2030 Schools Challenge: Concept: Design thinking is often presented without teaching content. This is very different. Learners get 30 minutes to choose a UN 2030 Goal (there are 17) that is relevant and meaningful to them, then they get into small groups. The group researches the goal quickly, by answering the questions: What does the world need to know about this goal and what can we do about it? The group then creates a short PSA (Public Service Announcement) and shares it widely with an authentic audience. It is fun, fast, and shows the power of design sprints to teach content and skills.	4
2	THE GIFT-GIVING PROJECT VIA STANFORD D-SCHOOL Concept: The Gift-Giving Project is 90-minute (plus debrief) fast-paced project through a full design cycle. Students pair up to interview each other, come to a point-of-view of how they might design for their partner, ideate, and prototype a new solution to “redesign the gift giving experience” for their partner.	4
3	THE WALLET PROJECT VIA STANFORD D-SCHOOL Concept: Very similar to the Gift- Giving Project, the Wallet Project is 90-minute (plus Tentative 48 debrief) fast-paced project through a full design cycle. Students pair up, show and tell each other about their wallets, ideate, and make a new solution that is “useful and meaningful” to their partner.	4
4	INVENT A SPORT (WITH JUST THESE ITEMS) Concept: We’ve all played sports at some point in our life. Who came up with the rules? Who created the game? Who made the constraints? And who decided the objects to play with? Now, with limited time and resources, your group will create and invent a new	4

	sport, and a set of directions for people to actually play the game.	
5	"BOOK IN AN HOUR" ACTIVITY (VIA ALL WHO WONDER) Concept: Give a group a book (fiction or non-fiction). Then you break them up into smaller groups (or individuals) to read different parts of the book. Each group (or person) has to read and then create an overview/trailer of their part of the book to share chronologically with the rest of the class. Here the design really starts with the creative process driving how you share the information, plot, characters etc. Perfect use for professional development when you want to introduce a topic in a fun, engaging way.	4
6	CHILDREN'S STORY DESIGN ACTIVITIES Concept: The University of Arkansas created a series of STEM Challenges that work as great design activities with groups old and young! For example after reading "The Three Billy Goat's Gruff" they set up a challenge like this: You decide to help the billy goats reach the opposite side of the creek so they can eat. You must create a model structure to help the billy goats get from one side to the other while using the design loop and only the materials provided. Your teacher will also provide you with model billy goats, with specific weights, that your bridge must be able to withstand.	5
7	New Product Development Activity: Student teams were given products ranging from toys to air fresheners. In 2 days, they had to create pitches on how to improve these products. The idea was to give them a clear sense of the scope of what they would do in a product development.	5
	Total	60

Course Designer(s)

1. Mr.R. Arunkumar - rarunkumar@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60MY003	Startups and Entrepreneurship	Category	L	T	P	Credit
		MY	2	0	0	2*

Objectives

- To Learn basic concepts in entrepreneurship, develop mind-set and skills necessary to explore entrepreneurship
- To provide practical proven tools for transforming an idea into a product or service that creates value for others.
- To Comprehend the process of opportunity identification through design thinking, identify market potential and customers while developing a compelling value proposition solution and prototypes
- To create business plan, conduct financial analysis and feasibility analysis to assess the financial viability of a venture ideas & solutions built with domain expertise
- To Prepare and present an investible pitch deck of their practice venture to attract stakeholders

Pre-requisites

- Basic knowledge of reading and writing in English

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop an entrepreneurial mindset and appreciate the concepts of design thinking, entrepreneurship and innovation	Understand
CO2	Apply process of problem -opportunity identification and validation through human centred approach to design thinking in building solutions	Apply
CO3	Understand market types, conduct market estimation, identify customers, create customer persona, develop the skills to create a compelling value proposition and build a Minimum Viable Product	Apply
CO4	Create business plan, conduct financial analysis and feasibility analysis to assess the financial viability of a venture	Apply
CO5	Prepare and deliver an investible pitch deck of their practice venture to attract stakeholders	Create

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	1	3	1	2	1	-	2	2	3	3	-
CO2	2	3	3	2	2	-	2	2	2	-	2	2	2	3	-
CO3	3	2	3	1	2	-	-	-	1	3	1	3	3	2	-
CO4	3	3	3	3	3	2	2	1	-	1	3	3	3	3	-
CO5	3	2	3	3	3	-	-	2	-	-	3	2	3	2	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Pitch Deck final submission & Viva voce
	Milestone 1 (25 Marks)	Milestone 2 & 3 (25 Marks)	
Remember	10	-	50
Understand	05	10	
Apply	10	15	
Analyse	-	-	
Evaluate	-	-	
Create	-	-	

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Total	25	25	

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

Common to ALL Branches

60 MY 003 – Startups and Entrepreneurship

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	0	30	2*	100	-	100

Introduction to Entrepreneurship & Entrepreneur Meaning and concept of Entrepreneurship, the history of Entrepreneurship development, Myths of Entrepreneurship, role of Entrepreneurship in Economic Development, Agencies in Entrepreneurship Management and Future of Entrepreneurship. The Entrepreneur: Meaning, the skills required to be an entrepreneur, the entrepreneurial decision process, Role models, Mentors and Support system. Innovation and Creativity, types of innovations, Innovations in current scenario	[6]
Problem-Opportunity Identification, Customers Discovery and competitive advantage Understanding the Problem and opportunity, define problem using Design thinking principles and validate problem. Exploring market types and estimating the market size, knowing your customer and consumer, Customer segmentation and creating customer personas. Importance of Value Proposition, Value Proposition Canvas, Developing Problem-solution fit, Competition analysis, Blue ocean strategy, Competitive positioning and understanding unique selling points.	[6]
Business model and build your MVP Introduction to Business model and types, Lean approach, 9 block lean canvas model, riskiest assumptions to Business models. Prototyping, building a Minimum viable product, Hypothesis testing and MVP Validation, MVP Iteration-Importance of Build - Measure – Learn approach	[6]
Business Plan, Financial feasibility and Managing growth Business planning: components of Business plan- Sales plan, People plan and financial plan, Preparing a business plan. Financial Planning: Types of costs, preparing the financial plan using financial template, understanding basics of Unit economics and analyzing Growth and the financial performance	[6]
Go To Market Strategies and Funding Introduction to Go to market strategies, start-up branding and its elements, Selecting the Right Channel, creating digital presence, building customer acquisition strategy. Choosing a form of business organization specific to your venture, identifying sources of funds: Debt & Equity, Map the Start-up Lifecycle to Funding Options, Build an Investor ready pitch deck.	[6]
Total Hours:	**30**

Text Book(s):

1.	Stephen Key, “One Simple Idea for Startups and Entrepreneurs: Live Your Dreams and Create Your Own Profitable Company” 1st Edition, Tata Mc Grawhill Company, New Delhi, 2013.
2.	Charles Bamford and Garry Bruton, “Entrepreneurship: The Art, Science, and Process for Success”, 2nd Edition, Tata Mc Grawhill Company, New Delhi, 2016.

Reference(s):

1.	Philip Auerswald, “The Coming Prosperity: How Entrepreneurs Are Transforming the Global Economy”, Oxford University Press, 2012.
2.	Janet Kiholm Smith; Richard L. Smith Richard T. Bliss, “Entrepreneurial Finance: Strategy, Valuation and Deal Structure, Stanford Economics and Finance”, 2011.
3.	Edward D. Hess, “Growing an Entrepreneurial Business: Concepts and Cases”, Stanford Business Books, 2011.
4.	Ignite program, wadhwani platform, Entrepreneurship, NPTEL online course By Prof. C Bhaktavatsala Rao | IIT Madras

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Entrepreneurship & Entrepreneur**	
1.1	Meaning and concept of Entrepreneurship and the history of Entrepreneurship development	1
1.2	The Entrepreneur: Meaning, the skills required to be an entrepreneur, the entrepreneurial decision process,	1
1.3	Myths of Entrepreneurship, How to Become a Successful Entrepreneur - Dr Romesh Wadhwani (Platform on boarding)	1
1.4	Role models, Mentors and Support system- Masterclass on My Story - Joshua Salins	1
1.5	Role of Entrepreneurship in Economic Development, Agencies in Entrepreneurship Management and Future of Entrepreneurship	1
1.6	Innovation and Creativity, types of innovations, Innovations in current scenario, Concepts of Entrepreneurial Thinking, General Enterprising tendency test	1
2.0	**Problem-Opportunity Identification, Customers Discovery and competitive advantage**	
2.1	Understanding the Problem and opportunity, define problem using Design thinking principles and validate problem. Case study and Fireside chat – Desi Hangover	1
2.2	Identifying a problem for practice venture and filling Problem statement canvas (Handout week 1 - class activity)	1
2.3	Customer and markets discovery , knowing your customer and consumer, Customer segmentation and Exploring market types and estimating the market size. Case study and Fireside chat – Verloop	1
2.4	Creating customer personas & Market estimation (Handout week 2 - class activity)	1
2.5	Importance of Value Proposition, Introduce Value Proposition Canvas, Developing Problem-solution fit. Case study and Fireside chat – Honey Twigs	1
2.6	Competition analysis, Blue ocean strategy, Competitive positioning and understanding unique selling points. Case study and Fireside chat on Inzpira Fill Value Proposition Canvas (Handout week 3 - class activity) and Competition analysis framework (Handout week 5 - class activity) **Briefing on Assignment 1 - Milestone 1**	1
3.0	**Business model and Build your MVP**	
3.1	Introduction to Business model and types. Case study and Fireside chat – NUOS	1
3.2	Lean approach, 9 block lean canvas model, riskiest assumptions to Business models	1
3.3	Class Activity- Fill Lean canvas for you idea and understand revenue model (Handout week 6)	1
3.4	Prototyping, Meaning of MLP , Difference between MLP and MVP, How to build an MLP? Different types MLP that you can build. Case study and Fireside chat – KNORISH	1
3.5	Hypothesis testing and MVP Validation, MVP Iteration-Importance of Build - Measure – Learn approach	1
3.6	Class Activity- Fill MVP framework (Handout week 7) and learn validation	1
4.0	**Business Plan, Financial feasibility and Manging growth**	
4.1	Business planning: components of Business plan- Sales plan, People plan and financial plan, Preparing a business plan. Case study and Fireside chat – Bodh Gems	1

4.2	Financial Planning: Types of costs, preparing the financial plan using financial template (Handout week 9)	1
4.3	Class activity - starting up costs, COGS, Sales plan and people plan template.	1
4.4	Class activity - One year P&L projection, Breakeven Analysis, Five year projection	1
4.5	Understanding basics of Unit economics and analyzing Growth and the financial performance	1
4.6	Class activity - Financial template - Unit economics (Handout week 12)	1
5.0	**Go To Market Strategies and Funding**	
5.1	Introduction to Go to market strategies, start-up branding and its elements, Selecting the Right Channel	1
5.2	Creating digital presence, building customer acquisition strategy.	1
5.3	Class activity: Handout week 10 - create your GTM strategy	1
5.4	Choosing a form of business organization specific to your venture	1
5.5	Identifying sources of funds: Debt & Equity, Map the Start-up Lifecycle to Funding Options	1
5.6	Class activity - Visit relevant GOI websites, other sites to help students explore funding opportunities and **briefing on final submission of the pitch deck** Build an Investor ready pitch deck, What Should You Cover in Your Pitch Deck? Art of pitching and storytelling	1

Course Designer(s)

1. Dr.N.Tiruvenkadam - tiruvenkadam@ksrct.ac.in

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Entrepreneurship & Entrepreneur**	
1.1	Meaning And Concept Of Entrepreneurship, The History Of Entrepreneurship Development,	1
1.2	Myths Of Entrepreneurship, Role Of Entrepreneurship In Economic Development,	1
1.3	Agencies In Entrepreneurship Management And Future Of Entrepreneurship.	1
1.4	The Entrepreneur: Meaning, The Skills Required To Be An Entrepreneur,	1
1.5	The Entrepreneurial Decision Process	1
1.6	Role Models	1
1.7	Mentors And Support System.	1
2.0	**Business Opportunity Identification and Preparing a Business Plan**	
2.1	Business Ideas, Methods Of Generating Ideas	1
2.2	Opportunity Recognition	1

2.3	Idea Generation Process	1
2.4	Feasibility Study	1
2.5	Preparing A Business Plan	1
2.6	Meaning And Significance Of A Business Plan	1
2.7	Components Of A Business Plan	1
3.0	**Innovations**	
3.1	Innovation And Creativity - Introduction, Innovation In Current. Environment	1
3.2	Types Of Innovation, School Of Innovation, Analyzing The Current Business Scenario	1
3.3	Challenges Of Innovation, Steps Of Innovation Management	1
3.4	Experimentation In Innovation Management, Participation For Innovation	1
3.5	Co-Creation For Innovation, Proto Typing To Incubation.	1
3.6	Blue Ocean Strategy-I, Blue Ocean Strategy-Ii.	1
3.7	Marketing Of Innovation, Technology Innovation Process	1
4.0	**Financing and Launching the New Venture**	
4.1	Importance Of New Venture Financing, Types Of Ownership,	1
4.2	Venture Capital, Types Of Debt Securities,	1
4.3	Determining Ideal Debt-Equity Mix, And Financial Institutions And Banks.	1
4.4	Launching The New Venture	1
4.5	Choosing The Legal Form Of New Venture,	1
4.6	Protection Of Intellectual Property	1
4.7	Formation Of The New Venture	1
5.0	**Managing Growth and Rewards in New Venture**	
5.1	Characteristics Of High Growth New Ventures	1
5.2	Strategies For Growth	1
5.3	Building The New Ventures	1
5.4	Managing Rewards	1
5.5	Exit Strategies For Entrepreneurs,	1
5.6	Mergers And Acquisition, Succession And Exit Strategy	1
5.7	Managing Failures– Bankruptcy.	1
	Total Hours	**30**

Course Designer(s)

1. Dr.N.Tiruvenkadam - tiruvenkadam@ksrct.ac.in

60 CB 5P1	Computer Networks Laboratory	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To understand the computer networking basics and concepts of data communications functions of different layers
- To know the standards employed in computer networking
- To make the students to get familiarized with different protocols and network components
- To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications
- To understand the application layer and its applications

Pre-requisites

Nil

Course Outcomes

On the successful completion of the course, students will be able to		
CO1	Know the concept of components, categories and ISO/OSI model of networks	Apply
CO2	Describe the Concept of various error detection techniques and Flow, Error control.	Apply
CO3	Compare the concept of Circuit switching and Packet switching.	Apply
CO4	Gain the knowledge of Congestion control and QoS Techniques.	Analyze
CO5	Identify the Purpose of Domain Name Space, Email and FTP.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	-	-	-	-	-	-	-	-	-	2	3	-	-
CO2	2	3	-	-	-	-	-	-	-	-	-	2	3	-	-
CO3	2	3	-	-	-	-	-	-	-	-	-	3	3	-	-
CO4	-	3	-	-	2	-	-	-	-	-	-	3	3	-	-
CO5	-	3	-	-	2	-	-	-	-	-	-	3	3	-	-
3 - Strong; 2 - Medium; 1 – Low															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB 5P1– Computer Networks Laboratory								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	0	0	4	60	2	60	40	100

List of Experiments:

1. Learn To Use Commands Like Tcp Dump ,Netstat, Ifconfig, Nslookup And Trace Route Capture Ping And Trace Route PDU Using A Network Protocol Analyze Rand Examine.*
2. Write A HTTP Web Client Program To Download A Webpage Using TCP Sockets.*
3. Applications Using TCP Sockets Like:
4. Echo Client And Echo Server
5. Chat
6. File Transfer
7. Simulation of DNS Using UDP Sockets.
8. Write A Code Simulating ARP /RARP Protocols.*
9. Study Of Network Simulator(NS)And Simulation Of Congestion Control Algorithms Using NS2
10. Study Of TCP/UDP Performance Using Simulation Tool.*
11. Simulation Of Distance Vector/Link State Routing Algorithm

Design Experiments:

1. Performance Evaluation of Routing Protocols Using Simulation Tool.
2. Simulation of Error Correction Code (Like CRC).*

Lab Manual	
1.	"Computer Networks Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4 – Quality Education

Course Designer(s)

1. Dr.P.Manimaran manimaran@ksrct.ac.in

60 CB 5P2	C# and .NET Programming Laboratory	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To demonstrate the basic concepts of C#
- To demonstrate object oriented aspects of C#.
- To illustrate the page-focused applications developed with ASP.NET Core Razor pages
- To demonstrate data access and data handling using EF Core
- To demonstrate foundational knowledge for building web-applications using MVC architecture

Pre-requisites

Basic knowledge of C or C++ or any programming language

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the basic programming constructs of C#.	Apply
CO2	Demonstrate the Object-Oriented concepts in C#	Apply
CO3	Build lightweight page-focussed applications developed with ASP.NET Core Razor pages	Apply
CO4	Handle data from traditional data bases using EF Core	Analyse
CO5	Create a simple ASP.NET Core MVC website	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	-	3	2	2	1	-	1	3	-	-	1	2	-	-
CO2	2	-	3	2	2	1	-	1	3	-	-	1	2	-	-
CO3	2	-	3	2	2	1	-	1	3	-	-	1	2	-	-
CO4	2	-	3	2	2	1	-	1	3	-	-	2	2	-	-
CO5	2	-	3	2	2	1	-	1	3	-	-	3	2	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 5P2 – C# and .NET Programming Laboratory								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	0	0	4	60	2	60	40	100

List of Experiments:

1. Write a program in C# to identify all 3-digit numbers from an array of alphanumeric strings and print the sum of all the 3-digit numbers as words. *
2. Write a C# application to implement OOPS concepts such as Polymorphism, Inheritance (a) Single Inheritance (b) Multilevel Inheritance (c) Multiple Inheritance (d) Hierarchical inheritance and Access Modifiers.
3. Write a C# program to demonstrate the concepts of Delegates, Events and Collections such as Lists, Dictionaries and Sets.
4. Write a C# program to read and write to a flat file, use exceptions to handle negative scenarios during file access and to implement OOPS concepts such as Overloading, Abstraction using Abstract Classes and Abstract Methods.
5. Create Razor pages with shared layout. The shared layout should use RenderBody, RenderPage, RenderSection and nested layouts to display content.
6. Create a razor page form to
   a) Pass parameters to handler methods ‘OnGet’, ‘OnPost’.
   b) Pass parameters to Custom handler methods OnPostDelete, OnPostEdit, OnPostView.
   c) Perform EF Core CRUD operation on database.
7. Use REST API to access details from database and display them on Razor Page.
8. Use MVC, to route to a controller 'StudentController' and create actions methods to display student details on the view.
9. Use MVC to demonstrate passing parameters via the URL, query string, request header, request body and display the values in the view. **
10. For ASP.NET Core, create a form, perform Model validation and display the errors on the page.

Design Experiments:

1. Design Razor pages using various directives.
2. Design ASP.NET Core MVC application for model validation, accessing database through REST API and displaying the resulting data in the View. *

Lab Manual	
1.	“C# and .NET Programming Lab Manual”, Department of Computer Science and Business Systems, KSRCT.

*SDG 4 – Quality Education

**SDG 9 – Industry, Innovation and Infrastructure.

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BoS Chairman

Course Designer(s)

1. Venkatesh P – venkateshp@ksrct.ac.in

60 CG 0P4	Career Skill Development IV	Category	L	T	P	Credit
		CS	0	0	2	1

Objectives

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Pre-requisites

- Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	2	3	3	2	3	2	3	-
CO2	-	-	-	-	-	-	-	2	3	3	2	3	2	3	-
CO3	-	-	-	-	-	-	-	2	3	3	2	3	2	2	-
CO4	-	-	-	-	-	-	-	2	3	3	2	3	2	3	-
CO5	-	-	-	-	-	-	-	2	3	3	2	3	2	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	40	-
Apply	-	-	20	-
Analyse	-	-	40	-
Evaluate	-	-	-	-
Create	-	-	-	-
Total	-	-	100	-

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P4 - Career Skill Development IV								
Common to All Branches								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	0	0	2	30	1	100	00	100

Verbal & Analytical Reasoning Seating Arrangements – Analytical Reasoning (PUZZELS) – Machin Input And Output - Coded Inequality – Eligibility Test	[6]
Quantitative Aptitude - Part – 4 Permutation And Combination - Probability - Quadratic Equation - Geometry – Clock – Calendar – Logarithmic.	[6]
Non-Verbal Reasoning Series Completion Of Figures – Classification – Courting Of Figure – Figure Matrix – Embedded Figure – Complete Figure – Paper Cutting And Folding – Mirror Images And Water Images.	[6]
Quantitative Aptitude - Part – 5 Mensuration Of Area, Volume And Surface Area In 2D And 3D Shapes – 2D Shapes – Square, Rectangle, Triangle, Circle, Etc. - 3D Shapes – Cube, Cuboid , Sphere , Cone , Etc.	[6]
Data Interpretation and Analysis Data Interpretation Based On Text - Data Interpretation Based On Tabulation, Pie Chart, Bar Graph, And Line Graph – Venn Diagram - Data Sufficiency.	[6]
Total Hours:	**30**

Text Book(s):	
1.	Data Interpretation and Analysis Data interpretation Based on text - Data interpretation Based on Tabulation, Pie chart, Bar graph, And Line graph – Venn Diagram - Data sufficiency.
2.	Crouse W. H., and Anglin D. L., “Automotive Mechanics”, 10th Edition, McGraw Hill Education Private Limited, New Delhi, 2017.
Reference(s):	
1.	Martin W, Stockel and Martin T Stockle, “Automotive Mechanics Fundamentals”, The Good Heart – Will Cox Company Inc, USA, 2012.
2.	Abhijit Guha, ‘Quantitative Aptitude’, McGraw Hill Education, 6th edition, 2016
3.	Dinesh Khattar, ‘Quantitative Aptitude For Competitive Examinations’, Pearson Education (2020)
4.	Anne Thomson, ‘Critical Reasoning: A Practical Introduction’ Lexicon Books, 3rd edition, 2022. Warszaw

*SDG 9 – Industry Innovation and Infrastructure
**SDG 3 – Good Health and Well Being
***SDG 7 – Affordable and Clean Energy

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.**0**	**Verbal & Analytical Reasoning**	
1.1	Seating Arrangements 1 1.2 Analytical Reasoning (Puzzels)	1
1.2	Machine Input And Output	1
1.3	Coded Inequality	1
1.4	Eligibility Test	1
1.5	Vehicle Aerodynamics	2
2.0	**Quantitative Aptitude - Part – 4**	
2.1	Permutation And Combination	1
2.2	Probability	1
2.3	Quadratic Equation - Geometry	1
2.4	Clock – Calendar	1
2.5	Logarithmic	2
3.0	**Non-Verbal Reasoning**	
3.1	Series Completion Of Figures – Classification	1
3.2	Courting Of Figure – Figure Matrix	1
3.3	Embedded Figure – Complete Figure	1
3.4	Paper Cutting And Folding	1
3.5	Mirror Images And Water Images	2
4.0	**Quantitative Aptitude - Part – 5**	
4.1	Mensuration Of Area, Volume	1
4.2	Mensuration Of Volume	1
4.3	Surface Area In 2D And 3D Shapes	1
4.4	2D Shapes – Square, Rectangle, Triangle, Circle, Etc.	1
4.5	3D Shapes – Cube, Cuboid , Sphere , Cone , Etc	2
5.**0**	**Data Interpretation and Analysis**	
5.1	Data Interpretation Based On Text	1
5.2	Data Interpretation Based On Tabulation, Pie Chart	1
5.3	Bar Graph , And Line Graph	1
5.4	Venn Diagram	1
5.5	Data Sufficiency	2
	Total	30

Course Designer(s)

1. R. Poovarasan - poovarasan@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

SIXTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 HS 005	Business Strategy	2	40	60	100	45	100
2	60 HS 006	Financial and Cost Accounting	2	40	60	100	45	100
3	60 CB 601	Machine Learning	2	40	60	100	45	100
4	60 CB 602	Usability Design of Software Applications	2	40	60	100	45	100
5	60 CB E2*	Professional Elective II	2	40	60	100	45	100
6	60 OE L*	Open elective-III	2	40	60	100	45	100
PRACTICALS								
7	60 CB 6P1	Machine Learning Laboratory	2	60	40	100	45	100
8	60 CB 6P2	Usability Design of Software Applications Laboratory	2	60	40	100	45	100
9	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
10	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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BoS Chairman

60 HS 005	Business Strategy	Category	L	T	P	Credit
		HS	3	0	0	3

Objectives

- Learn the process of strategic management
- Identify internal environment with the help of appropriate tools
- Identify external environment with the various strategies
- Understand the strategic decision making
- To enable the students to have an insight into strategic implementation and control

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the fundamental concepts of strategic management	Understand
CO2	Apply holistic approach by integrating various perspectives to develop appropriate organizational policies and strategies	Remember
CO3	Understand and make decisions in through various tools and techniques	Understand
CO4	Identify the growth avenues against the back drop of the opportunities	Apply
CO5	Develop the skills on implementation of strategy through organizational structure and control system	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	3	3	3	-	2	2	2	3	3	3	3	2	3	-
CO2	2	3	3	3	2	2	3	-	3	2	3	2	2	3	-
CO3	2	2	3	3	3	2	-	-	3	3	3	3	-	3	-
CO4	-	-	3	3	2	2	3	2	3	-	3	3	2	3	-
CO5	-	3	3	3	3	-	2	2	2	2	3	2	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	30
Understand	20	20	40
Apply	20	20	30
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 HS 005 - Business Strategy								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction to Strategic Management* Importance Of Strategic Management-Vision And Objectives-Schools Of Thought In Strategic Management-Strategy Content, Process, And Practice-Fit Concept And Configuration Perspective In Strategic Management.	[9]
Internal Environment of Firm* Recognizing A Firms Intellectual Assets-Core Competence As The Root Of Competitive Advantage Sources Of Sustained Competitive Advantage-Business Processes And Capabilities-Based Approach To Strategy.	[9]
External Environments of Firm* Competitive Strategy -Five Forces Of Industry Attractiveness That Shape Strategy -The Concept Of Strategic Groups, And Industry Life Cycle-Generic Strategies-Generic Strategies And The Value Chain	[9]
Corporate Strategy, and Growth Strategies* The Motive For Diversification-Related And Unrelated Diversification-Business Portfolio Analysis Expansion, Integration And Diversification-Strategic Alliances, Joint Ventures, And Mergers & Acquisitions	[9]
Strategy Implementation* Structure And Systems - Designing Organizational Structure Matching - Structure And Control To Strategy- The 7S Framework -Strategic Control And Corporate Governance	[9]
Total Hours:	**45**

Text Book(s):	
1.	Charles W.L.Hill, Melissa A Schilling & Gareth R.Jones, “Strategic Management: An Integrated Approach”, Cengage Learning, 12th Edition, 2016
2.	John Pearce, Richard Robinson, Amita Mital, “Strategic Management: Formulation, Implementation and Control”, McGraw Hill, 12th Edition, 2017.
Reference(s):	
1.	Robert M. Grant, Contemporary Strategic Management, 7th Edition Blackwell, 2012
2.	Azhar Kazmi and Adela Kazmi, “Strategic Management”, McGraw Hill Education, 4th Edition, 2015.
3.	R.Srinivasan, “Strategic Management: The Indian contest”, PHI Learning, 2014
4.	Richard Rumelt, Good Strategy Bad Strategy: The Difference and Why It Matters, ProfileBooks, 2011.

*SDG 9 – Industry Innovation and Infrastructure
**SDG 3 – Good Health and Well Being
***SDG 7 – Affordable and Clean Energy

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Strategic Management**	
1.1	Importance Of Strategic Management	1
1.2	Vision And Objectives	1
1.3	Schools Of Thought In Strategic Management	2
1.4	Strategy Content, Process, And Practice	2
1.5	Fit Concept	1
1.6	Configuration Perspective In Strategic Management	2
2.0	**Internal Environment of Firm**	
2.1	Recognizing A Firms Intellectual Assets	2
2.2	Core Competence As The Root Of Competitive Advantage	2
2.3	Sources Of Sustained Competitive Advantage	2
2.4	Business Processes	1
2.5	Capabilities-Based Approach To Strategy	2
3.0	**External Environments of Firm**	
3.1	Competitive Strategy	1
3.2	Five Forces Of Industry Attractiveness That Shape Strategy	2
3.3	The Concept Of Strategic Groups	2
3.4	Industry Life Cycle	1
3.5	Generic Strategies	1
3.6	Generic Strategies And The Value Chain	2
4.0	**Corporate Strategy, and Growth Strategies**	
4.1	The Motive For Diversification	1
4.2	Related And Unrelated Diversification	2
4.3	Business Portfolio Analysis	1
4.4	Expansion, Integration And Diversification-	2
4.5	Strategic Alliances, Joint Ventures,	2
4.6	Mergers & Acquisitions	1
5.0	**Strategy Implementation**	
5.1	Structure And Systems	2
5.2	Designing Organizational Structure Matching	1
5.3	Structure And Control To Strategy	1
5.4	The 7s Framework	1
5.5	Strategic Control	2
5.6	Corporate Governance	2

Course Designer(s)

1. Dr.M.Mohanraj – mohanrajm@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 HS 006	Financial & Cost Accounting	Category	L	T	P	Credit
		HS	3	0	0	3

Objectives

- To understand the basic concepts of accounting.
- To understand the concepts of Financial Management and its application for managerial decision making
- To know about the preparation of financial statements
- To understand the basic concepts of cost accounting of a firm.
- To learn about the company accounts and audit report.

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the basic concepts in Accounting	Understand
CO2	Summarize the basic concepts and processes in determination of products and services cost	Understand
CO3	Apply the concepts of Financial Management	Apply
CO4	Apply the cost and classification of components in cost system	Apply
CO5	Understand the concepts of statutory requirements	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	3	2	2	-	-	-	-	3	2	2	3	-
CO2	3	2	2	3	3	2	-	3	-	2	3	2	3	3	-
CO3	3	3	2	3	2	2	-	2	-	2	2	-	-	3	-
CO4	-	2	-	3	2	3	2	3	-	-	3	2	2	3	-
CO5	2	3	3	3	-	-	-	3	2	3	3	3	2	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	50	50	60
Apply	10	10	40
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech. – Computer Science and Business Systems								
60 HS 006 – Financial and Cost Accounting								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Accounting Concept* Introduction- Accounting Cycle- Techniques and Conventions- Financial Statements- Understanding Financial Statements.	[9]
Accounting Process * Book Keeping and Record Maintenance - Fundamental Principles and Double Entry - Journal, Ledger, Trial Balance, Balance Sheet, Final Accounts - Cash Book and Subsidiary Books - Rectification of Errors	[9]
Financial Statements* Form and Contents of Financial Statements- Analysing and Interpreting Financial Statements, Accounting Standards.	[9]
Costing Systems * Elements of Cost, Cost Allocation, OH Allocation, Unit Costing, Process Costing, Job Costing, Absorption Costing, Marginal Costing, Cost Volume Profit Analysis, Budgets, ABC Analysis.	[10]
Company Accounts and Annual Reports * Audit Reports and Statutory Requirements-Directors Report-Notes to Accounts-Pitfalls.	[8]
Total Hours:	**45**

Text Book(s):	
1.	Robert N Anthony, David Hawkins, Kenneth Marchant, Accounting Texts and Cases, McGrawHill.2017
2.	Saravanvel P. “Management Accounting” Principles and Practices.
Reference(s):	
1.	Bhattacharya S.K. and Dearden John, “Accounting for Management”, Vani Educational Books, Mumbai (Latest Edition).
2.	Prof. K.S. Nagapathi, “Management Accounting” R. Chand and Co., New Delhi
3.	N. Ramachandran and Ram Kumar Kakani, “Financial Accounting for Management”, Mc Graw Higher Ed, 2017.
4.	S.P.Jain K.L. Narang, and Simmi Agrawal “Cost Accounting Principles and Practice”, Kalaiyani Publishers, 2016.

*SDG 8:- Sustainable Economic Growth

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Accounting Concept**	
1.1	Introduction	2
1.2	Accounting Cycle	1
1.3	Techniques and Conventions	2
1.4	Financial Statements	2
1.5	Understanding Financial Statements	3
2.0	**Accounting Process**	
2.1	Book Keeping and Record Maintenance	2
2.2	Fundamental Principles and Double Entry	2
2.3	Journal, Ledger, Trial Balance, Balance Sheet, Final Accounts	3
2.4	Cash Book and Subsidiary Books	1
2.5	Rectification of Errors	1
3.0	**Financial Statements**	
3.1	Form and Contents of Financial Statements	3
3.2	Analysing and Interpreting Financial Statements	3
3.3	Accounting Standards	2
4.0	**Costing Systems**	
4.1	Elements of Cost	1
4.2	Cost Allocation	1
4.3	OH Allocation, Unit Costing & Process Costing	2
4.4	Job Costing, Absorption Costing & Marginal Costing	2
4.5	Cost Volume Profit Analysis	2
4.6	Budgets & ABC Analysis	2
5.0	**Company Accounts and Annual Reports**	
5.1	Audit Reports and Statutory Requirements	2
5.2	Directors Report	2
5.3	Notes to Accounts	2
5.4	Pitfalls	2
	Total	45

Course Designer(s)

1. Mr.P.Sabareesh – sabareesh@ksrct.ac.in

60 CB 601	Machine Learning	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the basic concepts of 445
- To have a thorough understanding of the Tree learning learning and Neural Networks
- To understand the principles of instance based learning and Cluster Analysis
- To understand the concepts of Ensemble techniques
- To have a thorough understanding of the Learning sets of rules

Pre-requisites

- Basic knowledge of Artificial intelligence

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the perspectives of machine learning	Remember
CO2	Apply decision tree and Artificial neural networks for real world problems	Apply
CO3	Illustrate the principles of instance based learning and Cluster Analysis	Understand
CO4	Understanding of ensemble techniques and their practical applications	Understand
CO5	Describe the algorithms for rule and reinforcement learning	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	3	3	2	2	2	2	-	3	3	2	3	2	3	-
CO3	3	3	3	2	2	-	-	-	3	3	2	3	2	3	-
CO4	3	3	3	2	2	2	2	-	3	3	2	3	2	3	-
CO5	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	40
Understand	40	40	60
Apply	-	-	-
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science And Business Systems

60 CB 601 – Machine Learning

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction: * Learning Problems - Designing a Learning System - Perspectives and Issues in Machine Learning – Concept Learning –Task – Search – Finding Maximally Specific Hypotheses – Version Spaces and Candidate Elimination Algorithm - Inductive Bias.	[9]
Decision Tree Learning and Artificial Neural Networks: * Decision Tree Representation – Problems – Basic Decision Tree Learning Algorithms – Hypotheses Search – Issues – Artificial Neural Networks: Introduction – Representations – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithm – Example.	[9]
Instance Based Learning and Cluster Analysis: * Introduction – k-Nearest Neighbour Learning – Locally Weighted Regression - Radial Basis Functions - Case-Based Reasoning. Cluster Analysis- Introduction – Types - A Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density-Based Methods.	[9]
Ensemble Techniques:* Combining Multiple Learners: Model Combination Schemes, Voting, Ensemble Learning – Boosting: AdaBoost – Stumping – Bagging: Subagging – Random Forests: Comparison with Boosting.	[9]
Learning Sets of Rules: * Learning Sets of Rules: Introduction – Sequential Covering Algorithms – Learning Rule Sets-First Order Rules – FOIL – Induction as Inverted Deduction – Inverting Resolution – Rough Set Theory: Concepts-of Rough Sets - Feature Selection and Rule Induction-Theory and its Applications – Reinforcement Learning – Introduction – Learning Task – Q Learning - Nondeterministic Rewards and Action, Temporal Difference Learning-Generalizing from Examples.	[9]
Total Hours:	**45**

Text Book(s):

1. Tom M. Mitchell, —Machine Learning, Indian Edition, McGraw-Hill Education (India), 2022.
2. K. P. Murphy, “Machine Learning: A probabilistic perspective”, MIT Press, 2012.

Reference(s):

1. Simon Rogeres and Mark Girolami, —A First Course in Machine Learning‖, CRC Press, 2016
2. EthemAlpaydin, —Introduction to Machine Learning‖, 3rd Edition, Prentice Hall India, 2015.
3. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, 3 rd Edition, 2011 Morgan Kaufman Publications.
4. D. Barber, “Bayesian Reasoning and Machine Learning”, Cambridge University Press,2012

* SDG 4: - Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Learning Problems	1
1.2	Designing a Learning System	1
1.3	Perspectives and Issues in Machine Learning	1
1.4	Concept Learning - Task	2
1.5	Search - Finding Maximally Specific Hypotheses	2
1.6	Version Spaces and Candidate Elimination Algorithm	1
1.7	Inductive Bias	1
2.0	**Decision Tree Learning and Artificial Neural Networks**	
2.1	Decision Tree Representation	1
2.2	Problems	1
2.3	Basic Decision Tree Learning Algorithms	1
2.4	Hypotheses Search	1
2.5	Issues	1
2.6	Introduction – Representations	1
2.7	Problems – Perceptrons	1
2.8	Multilayer Networks and Back Propagation Algorithm – Example	2
3.0	**Instance Based Learning and Cluster Analysis**	
3.1	Introduction	1
3.2	k-Nearest Neighbour Learning	1
3.3	Locally Weighted Regression	1
3.4	Radial Basis Functions	1
3.5	Case-Based Reasoning	1
3.6	Cluster Analysis- Introduction	1
3.7	Types - A Categorization of Major Clustering Methods	1
3.8	Partitioning Methods - Hierarchical Methods	1
3.9	Density-Based Methods	1
4.0	**Ensemble Techniques**	
4.1	Model Combination Schemes	1
4.2	Voting	1
4.3	Ensemble Learning	2
4.4	AdaBoost	1
4.5	Stumping	1
4.6	Subagging	1
4.7	Comparison with Boosting	2
5.0	**Learning Sets of Rules**	
5.1	Introduction – Sequential Covering Algorithms	1
5.2	Learning Rule Sets	1
5.3	First Order Rules – FOIL	1
5.4	Induction as Inverted Deduction - Inverting Resolution	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

5.5	Concepts-of Rough Sets - Feature Selection and Rule Induction	1
5.6	Theory and its Applications - Reinforcement Learning	1
5.7	Introduction – Learning task	1
5.8	Q learning-Nondeterministic Rewards and Action	1
5.9	Temporal Difference Learning-Generalizing from Examples	1

Course Designer(s)

1. R.Karthik - karthikr@ksrct.ac.in

60 CB 602	Usability Design of Software Applications	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To learn the fundamentals of User Centered Design, their relevance and contribution to businesses
- To study the principles of heuristic evaluation for interactive design
- To understand the appreciation of user research, solution conceptualization and validation as interwoven activities in the design and development lifecycle
- To familiarize the facets of User Experience (UX) Design, particularly as applied to the digital artefacts
- To utilize scenarios and persona technique to enhance understanding, usability, and user-centred design in various contexts

Pre-requisites

- Basic Knowledge of Software Development and User Experience (UX) Fundamentals

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Summarize the fundamentals and importance of User-Centred design.	Understand
CO2	Analyse the design evaluation by applying the heuristic principles.	Analyse
CO3	Illustrate an application focusing on the design aspects.	Apply
CO4	Remember the UX research techniques for analysing the application.	Remember
CO5	Analyse the personal technique for different projects.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	3	2	2	2	-	-	-	-	-	-	-	-	2	-
CO2	3	2	2	1	1	-	-	-	-	-	-	-	-	3	-
CO3	2	3	3	3	3	-	-	-	-	-	-	-	2	3	-
CO4	2	1	2	3	2	-	-	-	-	-	-	-	1	2	-
CO5	2	2	1	2	1	-	-	-	-	-	-	-	2	2	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	20	06
Understand	40	-	14
Apply	-	40	40
Analyse	20	-	40
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB 602 - Usability Design of Software Applications

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction to User Centred Design* Aspects of User Centred Design, Elements - Models and Approaches – User Centred Design Principles - UCD Process - Analysis Tools: Personas, Scenarios, and Essential Use Cases with Examples - Agile Aspects of User Centred Design.	[9]
Interactive Design Evaluation* Introduction to Interactive Design Process – Interactive Design in Practice – Introducing Evaluation – Evaluation: Inspection, Analysis and Models – Inspection - Heuristic Evaluation: 10 Heuristic Principles, Examples – Case Study.	[9]
Development of Application* Case Study: Development of any Application like Mobile or Web Based on User Centred Design – Design Lifecycle: Establishing Requirements, Design, Prototyping and Construction.	[9]
UX Research* Understanding Users: Their Goals - Context of Use - Environment of Use - Research Techniques - Contextual Enquiry - User Interviews - Competitive Analysis for UX.	[9]
Scenarios and Persona Technique* Presentation of Personas for the Group Project - Design Thinking Technique - Discovery and Brainstorming - Concept Development - Task Flow Detailing for the Project - Prototyping Techniques - Paper-Electronic - Prototyping Tools. Tools used: Sketch/Figma	[9]
Total Hours:	**45**

Text Book(s):

1.	Jenny Preece, Helen Sharp and Yvonne Rogers, “Interaction Design: Beyond Human-Computer Interaction”, 5th Edition, John Wiley & Sons, Inc, USA, 2019.
2.	Jonny Schneider, “Understanding Design Thinking, Lean, and Agile”, 1st Edition, Apress, USA, 2020.

Reference(s):

1.	Thomas Tullis and Bill Albert, “Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics”, 3rd Edition, Elsevier, Netherlands, 2022.
2.	Jesse James Garrett,”The Elements of User Experience User-Centered Design for the Web and Beyond”, 2nd Edition, New Riders, USA, 2021.
3.	Alan Cooper and Robert Reimann, “About Face”, 4th Edition, John Wiley, USA, 2014.
4.	Elizabeth Goodman, Mike Kuniavsky, Andrea Moed, ”Observing the User Experience”, 2nd Edition, Morgan Kaufmann, USA, 2012.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction To User Centred Design**	
1.1	Aspects of User Centred Design	1
1.2	Elements - Models and approaches	1
1.3	User Centred Design Principles	2
1.4	UCD Process	1
1.5	Analysis Tools: Personas, Scenarios	1
1.6	Essential Use Cases with Examples	2
1.7	Agile Aspects of User Centred Design	1
2.0	**Interactive Design Evaluation**	
2.1	Introduction to Interactive Design Process	1
2.2	Interactive Design in Practice	1
2.3	Introducing Evaluation	1
2.4	Evaluation: Inspection, Analysis and Models	2
2.5	Inspection - Heuristic Evaluation	1
2.6	10 Heuristic Principles	1
2.7	Examples – Case Study	2
3.0	**Development of Application**	
3.1	Case Study: Development of any Application like Mobile or Web Based on User Centred Design	3
3.2	Design Lifecyle	1
3.3	Lifecyle: Establishing Requirements	2
3.4	Lifecyle: Design	1
3.5	Prototyping and Construction	2
4.0	**UX Research**	
4.1	Understanding users – their goals	1
4.2	Context of use and environment of use	2
4.3	Research Techniques	2
4.4	Contextual Enquiry	2
4.5	User Interviews	1
4.6	Competitive Analysis for UX	1
5.0	**Scenarios and Persona Technique**	
5.1	Presentation of Personas for the group project	1
5.2	Design Thinking Technique	1
5.3	Discovery and Brainstorming	2
5.4	Concept Development	2
5.5	Task flow detailing for the Project	1
5.6	Prototyping Techniques	1
5.7	Paper-Electronic -Prototyping Tools	1

Course Designer(s)

1. Mr. S. Vignesh - vigneshs@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 6P1	Machine Learning Laboratory	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To understand the need for machine learning for solving problem
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the machine learning theory and implement linear and non-linear learning models
- To implement distance-based clustering techniques, build tree and rule based models
- To apply reinforcement learning techniques for solving real-time applications

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply suitable algorithms for selecting the appropriate features for analysis	Apply
CO2	Apply the Decision tree and back Propagation for any given problem	Apply
CO3	Suggest supervised, unsupervised or semi-supervised learning algorithms for assessing the distance-based analysis	Apply
CO4	Implement clustering techniques to solve real world problems	Apply
CO5	Design systems that use the appropriate tree and rule models of machine learning	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	3	3	2	2	2	2	-	3	3	2	3	2	3	-
CO3	3	3	3	2	2	-	-	-	3	3	2	3	2	3	-
CO4	3	3	3	2	2	2	2	-	3	3	2	3	2	3	-
CO5	3	3	-	-	-	-	-	-	-	-	-	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50	-	50
Analyse	25	13	50	-	50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 6P1 – Machine Learning Laboratory								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	0	0	4	60	2	60	40	100

List of Experiments:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a set of training data samples. Read the training data from a CSV file.*
2. Implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training example.*
3. Implement and demonstrate the Decision tree algorithm for finding the most based on a set of training data samples. Read the training data from a CSV file.*
4. Implement the Backpropagation algorithm Write the code to compute the gradients of the loss with respect to the weights and biases. Use these gradients to update the weights and biases during training. *
5. Implementing the Naïve Bayes Classifier Write the code to classify new documents using the probabilities computed in the previous step. Ensure that your implementation handles unseen words gracefully.*
6. Implementing the k-NN Algorithm Write the code to classify new instances using the k-NN algorithm. Ensure that your implementation allows for varying values of k and handles ties if necessary.*
7. Implementing the Weighted Regression Algorithm Write the code to perform Weighted Regression. Ensure that your implementation allows for different weighting schemes and handles the adjustment of weights during the training process. *
8. Implement to create a basic Support Vector Machine (SVM) classifier using the linear kernel and demonstrate its usage on a sample dataset. *

Design Experiments:

1. Design an experiment to systematically evaluate and compare the performance of different clustering algorithms on both synthetic and real-world datasets. The experiment aims to understand how various factors such as dataset characteristics, algorithm parameters, and evaluation metrics influence the clustering results.
2. Designing an experiment to evaluate rule-based classification methods involves creating a controlled environment to assess the performance of these methods on different datasets.

Lab Manual	
1.	"Machine Learning Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4 – Quality Education

Course Designer(s)

1. R.Karthik – karthikr@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 6P2	Usability Design of Software Applications Laboratory	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To develop the ability to critically evaluate existing websites or apps and identify opportunities for improvement
- To understand and apply the principles of the design life cycle, including research, analysis, design, implementation, and evaluation
- To create user personas and scenarios that represent the target audience and their needs effectively
- To generate creative design concepts and effectively map out task flows to improve user experience
- To learn the iterative design process, including prototyping and refinement, and justify design decisions based on user feedback and usability principles

Pre-requisites

- Basic Knowledge about the Principles and Theories of HCI

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply UX principles to redesign websites and app, improving its usability and user satisfaction.	Apply
CO2	Analyse user perceptions and preferences for improvement.	Analyse
CO3	Demonstrate the ability to empathize with users by understanding their motivations, goals, and challenges through the creation of detailed and realistic user personas.	Apply
CO4	Apply interactive prototypes and iterate based on user feedback to refine the design.	Apply
CO5	Apply usability principles to evaluate and refine designs, ensuring that the final product aligns with established usability standards.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	-	-	-	3	-	-	-	2	-	-
CO2	3	3	3	2	3	-	-	-	3	-	-	-	2	-	-
CO3	3	3	3	2	3	-	-	-	3	-	1	-	2	-	-
CO4	3	3	3	2	3	-	-	-	3	-	2	-	2	-	-
CO5	3	3	3	2	3	-	-	-	3	-	2	-	2	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	30	15	50		50
Analyse	20	10	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
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BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 6P2 – Usability Design of Software Applications Laboratory								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	4	60	2	60	40	100

List of Experiments:

1. **Identify a website or an App to redesign, with justification**

   You've been hired as a UX designer by a start-up company that provides a meal delivery service. The current website lacks user engagement and has a high bounce rate. Your task is to identify which areas of the website need redesigning and provide justification for your choices

2. **Analysis of the App or the website through the design life cycle**

   You've joined an established e-commerce company as a UX analyst. The company is experiencing a decrease in sales and wants to understand why. Your role is to analyse the website's design and user experience throughout its life cycle, from conception to current state, to pinpoint potential issues

3. **Identifying Personas and Scenarios for the App or the website**

   A travel agency is revamping its online booking platform. As a UX researcher, you're tasked with identifying the personas of potential customers (such as business travellers, families, solo adventurers) and scenarios they may encounter (booking a last-minute flight, searching for accommodations, planning a vacation itinerary)

4. **Concept development for a specific feature or page of an App or the website**

   Scenario: You're part of a design team working on a social media platform. The team wants to introduce a new feature to enhance user engagement. Your role is to brainstorm and develop concepts for this feature, considering factors like user needs, technical feasibility, and alignment with the platform's overall goals

5. **Map out task flows for a selected set of actions within a software application**

   A banking app wants to streamline its account opening process. As a UX designer, you're tasked with mapping out the task flow for users who want to open a new account. This involves identifying each step the user must take, from accessing the app to completing the account setup

6. **Prototype development with Iterations and justification**

   A healthcare start-up is developing a mobile app to help users track their fitness goals. You're responsible for creating a prototype of the app's user interface and iterating based on feedback from stakeholders and usability testing sessions. Justify design decisions to ensure the prototype meets user needs effectively

7. **Usability testing and demonstration**

   A software company has developed a productivity app for remote teams. As the UX lead, you

organize usability testing sessions with potential users to evaluate the app's effectiveness and identify areas for improvement. You then demonstrate the findings to the development team for implementation

8. **Evaluate the accessibility of a website or app with users**

   A government agency is updating its website to comply with accessibility standards. You conduct usability tests with users of varying abilities (such as visual impairments or motor disabilities) to assess the website's accessibility features and provide recommendations for improvement

Design Experiments:

1. **Cross-Platform Design Challenge**

   A streaming service wants to expand its platform to smart TVs and gaming consoles. As a UX designer, you're tasked with ensuring a seamless user experience across all devices. Develop design solutions that accommodate different screen sizes, input methods, and user behaviours

2. **Usability Heuristic Evaluation**

   An educational app has been receiving complaints about its user interface being confusing. As a UX expert, you conduct a heuristic evaluation of the app, using recognized usability principles to identify and prioritize usability issues. Present your findings to the development team for action

Lab Manual	
1.	“Usability Design of Software Applications Lab Manual”, Department of Computer Science and Business Systems, KSRCT.

* SDG 4:- Quality Education

Course Designer(s)

1. S.Vignesh – vigneshs@ksrct.ac.in

60 CB 6P3	Mini Project	Category	L	T	P	Credit
		PC	0	0	2	1

Objectives

- To develop their own innovative prototype of ideas
- To find solution by formulating proper methodology
- To inculcate innovative thinking and thereby preparing students for main project

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyze a problem in the domain of interest.	Analyse
CO2	Perform Literature survey and identify the existing issues.	Apply
CO3	Rank the possible solutions.	Apply
CO4	Implement the project by Identify tools and techniques.	Analyse
CO5	Prepare technical report.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	3	1	2	-	-	1	2	3	1	3	2	-
CO2	1	3	1	2	3	2	-	-	1	2	3	3	3	2	-
CO3	2	3	1	2	3	2	-	-	1	2	3	2	3	2	-
CO4	2	3	2	2	3	2	-	-	1	2	3	3	3	2	-
CO5	2	3	3	2	3	2	-	-	1	2	3	1	3	2	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	-	50	-	-
Analyse	25	-	50	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	-

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 6P3 – Mini Project								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	0	0	2	30	1	100	-	100

List of Experiments:

1. Three reviews have to be conducted by the committee of minimum of three members one of which should be guide*
2. Problem should be Identified and Selected *
3. Students have to collect about 20 papers related to their work *
4. Application can be developed *
5. Reports has to be Prepared by the Students as per the format in Annexure-1 and suggested for various conference Publication*
6. Internal evaluation has to be done for 100 Marks

*SDG 4 – Quality Education

Course Designer(s)

1. Dr.K.Sakthivel – sakthivelk@ksrct.ac.in

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BoS Chairman

SEVENTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 HS 007	Human Resource Management	2	40	60	100	45	100
2	60 CB 701	Cloud Application Development	2	40	60	100	45	100
3	60 CB 702	Data Analytics	2	40	60	100	45	100
4	60 CB 703	Software Testing and Automation	2	40	60	100	45	100
5	60 CB E3*	Professional Elective III	2	50	50	100	45	100
6	60 CB E4*	Professional Elective IV	2	40	60	100	45	100
7	60 AB 00*	NCC/NSS/NSO/YRC/RRC/ Fine Arts*	2	100	-	100	-	-
8	60 AC 001	Research Methodology	2	100	-	100	-	-
PRACTICALS								
9	60 CB 7P1	Data Analytics Laboratory	2	60	40	100	45	100
10	60 CB 7P2	Project Work Phase-I	2	100	-	100	-	100
11	60 CG 0P1	Career Skill Development -I	1	100	-	100	-	100
12	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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BoS Chairman

60 HS 007	Human Resource Management	Category	L	T	P	Credit
		HS	3	0	0	3

Objectives

- To enable the students to understand the basics of HRM
- To gain the knowledge about strategies required to select and manage manpower resources
- To understand the role of training and development in the organisation
- To understand job-based compensation scheme and career management
- To give an insights about performance evaluation and grievance redressal methods

Pre-requisites

- Basic Knowledge of Human Resource Management

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the various aspects of HRM and its relevance in the organization.	Understand
CO2	Identify the knowledge of plan, recruit, select and manage the job candidate	Understand
CO3	Develop the training needs and able to train using various methods of Training	Apply
CO4	Interpret the implement of Employee benefits and Welfare measures, Employee safety and Health Measures	Apply
CO5	Examine the Performance of the employees and able to devise the strategies to handle the employee issues.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	2	-	-	3	2	3	3	-	-	-	-
CO2	3	2	3	2	-	-	-	3	2	3	2	-	-	-	-
CO3	3	2	2	-	-	-	-	3	3	3	2	-	-	-	-
CO4	3	3	3	-	-	-	-	3	3	3	3	3	-	3	-
CO5	3	3		-	-	-	-	3	3	3	3	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	20
Understand	20	20	20
Apply	20	20	30
Analyse	-	-	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 HS 007- Human Resource Management

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Perspectives in Human Resource Management Evolution of human resource management- importance of the human capital-Role of human resource manager - Challenges for human resource managers - Functions and trends in Human resource.	[9]
Human Resource Planning and Recruitment Importance of Human Resource Planning-Forecasting human resource requirement-matching supply and demand-- Internal and External sources - Organizational Attraction-Recruitment, Selection, Induction and Socialization.	[9]
Training and Development Types of training methods-purpose-benefits-resistance. Executive development programme-Common practices - Benefits-Self Development-Knowledge management	[9]
Employee Engagement Compensation plan - Reward-Motivation - Application of theories of motivation -Career management- Mentoring - Development of mentor- Protege relationships - Job Satisfaction, Employee Engagement, Organizational Citizenship Behaviour - Theories, Models	[9]
Performance Evaluation and Control Method of performance evaluation – Feedback - Industry practices. Promotion, Demotion, Transfer and Separation - Implication of job change. The control process – Importance – Methods - Requirement of effective control systems grievances – causes – implications - Redressal methods.	[9]
Total Hours:	**45**

Text Book(s):

1.	Wayne F Cascio, “Managing Human Resources: Productivity, Quality of Work Life, Profits”, McGraw-Hill Education, 12th Edition 2021.
2.	Gary Dessler, “Human Resource Management”, Pearson, 16th Edition2020

Reference(s):

1.	Human Resource Management, 8th Edition, K. Aswathappa, Tata McGraw Hill, 2017
2.	Seema Sanghi, “Human Resource Management”, Vikas Publishing House, 2nd Edition 2017.
3.	Aswathappa K ,“Human Resource Management”, TMH ,8th Edition ,2017.
4.	Dessler Human Resource Management, Pearson Education Limited, 14th Edition,2015.

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Perspectives in Human Resource Management**	
1.1	Evolution of human resource management	1
1.2	importance of the human capital	1
1.3	Role of human resource manager	1
1.4	Challenges for human resource managers	1
1.5	Functions	1
1.6	Trends in Human resource	1
2.0	**Human Resource Planning and Recruitment**	
2.1	Importance of Human Resource Planning	1
2.2	Forecasting human resource requirement	1
2.3	Matching supply and demand	1
2.4	Internal and External sources	1
2.5	Organizational Attraction	1
2.6	Recruitment, Selection	1
2.7	Induction and Socialization	1
3.0	**Training and Development**	
3.1	Types of training methods	1
3.2	Purpose, benefits, resistance	1
3.3	Executive development programme	2
3.4	Common practices	1
3.5	Benefits, Self Development	2
3.6	Knowledge management	1
4.0	**Employee Engagement**	
4.1	Compensation, Reward, Motivation	1
4.2	Application of theories of motivation	2
4.3	Career management	1
4.4	Mentoring, Development of mentor	2
4.5	Protege relationships, Job Satisfaction	1
4.6	Employee Engagement, Organizational	1
4.7	Citizenship Behaviour, Theories, Models	1
5.0	**Performance Evaluation and Control**	
5.1	Method of performance evaluation	1
5.2	Feedback, Industry practices	1
5.3	Promotion, Demotion, Transfer and Separation	2
5.4	Implication of job change	1
5.5	The control process, Importance, Methods	1
5.6	Requirement of effective control systems grievances	1
5.7	Causes, implications, Redressal methods	2

Course Designer(s)

1. Dr.M.Mohanraj – mohanrajm@ksrct.ac.in

60 CB 701	Cloud Application Development	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To provide a comprehensive understanding of the strategic, technical, and operational aspects of cloud computing
- To compare and contrast web applications with cloud applications, explore popular frameworks
- To understand the principles of cloud-native application development, including micro services architecture and containerization with Docker
- To understand and address security challenges in cloud computing
- To emphasize the significance of monitoring in cloud environments

Pre-requisites

- Proficiency in Languages like Python / Java / Java Script

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply knowledge and skills necessary to effectively leverage cloud technologies to drive innovation, agility, and efficiency in organizations.	Apply
CO2	Discuss the prominent cloud platforms used across industries, facilitating their readiness for cloud application development roles in the workforce.	Understand
CO3	Design, develop, and deploy scalable cloud-native applications using appropriate database and storage solutions.	Apply
CO4	Recognize the best practices to enhance the security of cloud applications, ensuring data confidentiality, integrity, and availability.	Remember
CO5	Analyse the robust monitoring solutions for cloud applications, utilizing leading cloud monitoring tools.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	1	3	-	-	-	-	-	-	-	2	-	2
CO2	3	2	2	2	3	-	-	-	-	-	-	-	2	-	2
CO3	3	3	3	3	3	-	-	-	-	-	-	-	3	-	2
CO4	3	2	3	2	3	-	-	-	-	-	-	-	2	-	2
CO5	3	3	2	2	3	-	-	-	-	-	-	-	2	-	2

3 - Strong; 2 - Medium; 1 – Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	20	10
Understand	20	40	16
Apply	40	-	60
Analyse	-	-	14
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 701 – Cloud Application Development								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Basic Concepts and Techniques* Business Case for Implementing Cloud Application: Requirements Collection for Cloud Application Development, Cloud Service Models and Deployment Models - Open Challenges in Cloud Computing: Cloud Inter-Operability and Standards, Scalability and Fault Tolerance, Security, Trust and Privacy.	[9]
Application Development Framework* Accessing the Clouds: Web Application vs Cloud Application, Frameworks: Model View Controller (MVC), Struts, Spring - Cloud platforms in industry: Google Appengine, Microsoft Azure, Openshift, Cloudfoundry.	[9]
Cloud-Native Application Development and Databases* Principles of Cloud - Native Application Development - Microservices Architecture: Containerization with Docker - Database Options in the Cloud (Sql, Nosql, Newsql) - Overview of Cloud Storage Services.	[10]
Cloud Security and Compliance* Security Challenges in the Cloud-Identity - Access Management (IAM) – Encryption - Key Management - Compliance Frameworks – GDPR – HIPAA - SOC 2 - Best Practices for Securing Cloud Applications.	[8]
Cloud Application Monitoring and Management* Importance of Monitoring in the Cloud - Cloud Monitoring Tools (AWS CloudWatch, Azure Monitor, Google Cloud Monitoring) - Application Performance Monitoring (APM) - Logging and Debugging in the Cloud Environment	[9]
Total Hours:	**45**

Text Book(s):	
1.	Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi , “Mastering Cloud Computing”, 2nd Edition, TataMcGraw Hill Education Private Limited, New Delhi, 2024.
2.	Boris Scholl, Trent Swanson, and Peter Jausovec, "Cloud Native: Using Containers, Functions, and Data to Build Next-Generation Applications", 1st Edition, Oreilly,Boston, 2019.
Reference(s):	
1.	Jez Humble and David Farley,"Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation", 2nd Edition, Addison-Wesley Professional,UK, 2022.
2.	Tinu Philips and Lakshmanan Ganesan, "Hands-On Machine Learning on Google Cloud Platform: Implementing End-to-End Real-Time Predictive Analytics", 1st Edition, Packt Publishing, 2018.
3.	Zaigham Mahmood, Ricardo Puttini, Thomas Erl,” Cloud Computing: Concepts, Technology & Architecture”, 2nd Edition, Pearson, 2023.
4.	Anthony T .Velte, Toby J. Velte, Robert Elsenpeter, “Cloud Computing a Practical Approach”, 1st Edition, Tata McGraw-HILL, New Delhi, 2010 Edition.

*SDG 4 Business Case for Implementing Cloud Application

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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Basic Concepts & Techniques**	
1.1	Business Case for Implementing Cloud Application	1
1.2	Requirements Collection For Cloud Application Development	1
1.3	Cloud Service Models and Deployment Models	1
1.4	Open Challenges in Cloud Computing	1
1.5	Cloud Inter-operability and Standards	1
1.6	Scalability and Fault Tolerance	2
1.7	Security	1
1.8	Trust and Privacy	1
2.0	**Application Development Framework**	
2.1	Accessing the Clouds	1
2.2	Web Application vs Cloud Application	1
2.3	Frameworks: Model View Controller (MVC)	1
2.4	Struts, Spring.	1
2.5	Cloud Platforms in Industry	1
2.6	Google AppEngine	1
2.7	Microsoft Azure	1
2.8	Openshift	1
2.9	CloudFoundry	1
3.0	**Cloud-Native Application Development and Databases**	
3.1	Principles of cloud	1
3.2	Native application development	1
3.3	Microservices architecture.	1
3.4	Containerization with Docker	2
3.5	Database options in the cloud	2
3.6	SQL, NoSQL, NewSQL	1
3.7	Overview of Cloud Storage Services	1
4.0	**Cloud Security and Compliance**	
4.1	Security Challenges in the Cloud-Identity	1
4.2	Access Management (IAM)	1
4.3	Encryption	1
4.4	Key Management	1
4.5	Compliance Frameworks	1
4.6	GDPR	1
4.7	HIPAA	1
4.8	SOC 2	1
4.9	Best Practices for Securing Cloud Applications	1
5.0	**Cloud Application Monitoring and Management**	
5.1	Importance of Monitoring in the Cloud	1

5.2	Cloud Monitoring Tools	1
5.3	AWS CloudWatch	1
5.4	Azure Monitor	2
5.5	Google Cloud Monitoring	1
5.6	Application Performance Monitoring (APM)	2
5.7	Logging and Debugging in the Cloud Environment	1

Course Designer(s)

1. S.Vignesh - vigneshs@ksrct.ac.in

60 CB 702	Data Analytics	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the data science fundamentals and process
- To learn to describe the data for the data science process
- To learn to describe the relationship between data
- To utilize the Python libraries for Data Wrangling
- To present and interpret data using visualization libraries in Python

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Define the data science process	Remember
CO2	Understand different types of data description for data science process	Understand
CO3	Gain knowledge on relationships between data	Understand
CO4	Use the Python Libraries for Data Wrangling	Apply
CO5	Apply visualization Libraries in Python to interpret and explore data	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	1	2	2	-	-	-	1	1	1	2	2	2	2
CO2	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
CO3	2	2	1	2	2	1	1	-	1	2	1	3	2	2	3
CO4	3	2	2	1	2	-	-	-	1	1	2	2	3	3	2
CO5	2	2	1	2	2	-	-	-	1	1	1	2	2	2	2
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	34
Understand	40	40	66
Apply	-	-	-
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science And Business Systems								
60 CB 702 – Data Analytics								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction:* Data Science**:** Benefits and Uses – Facets of Data – Data Science Process: Overview – Defining Research Goals – Retrieving Data – Data Preparation - Exploratory Data Analysis – Build the Model – Presenting Findings and Building Applications – Data Mining – Data Warehousing – Basic Statistical Descriptions of Data	[9]
Describing Data:* Types of Data – Types of Variables – Describing Data with Tables and Graphs – Describing Data with Averages – Describing Variability – Normal Distributions and Standard (z) Scores	[9]
Describing Relationships:* Correlation – Scatter Plots – Correlation Coefficient for Quantitative Data – Computational Formula for Correlation Coefficient – Regression – Regression Line – Least Squares Regression Line – Standard Error of Estimate – Interpretation of r2 – Multiple Regression Equations – Regression Towards the Mean	[9]
Python Libraries for Data Wrangling: Basics of Numpy Arrays – Aggregations – Computations on Arrays – Comparisons, Masks, Boolean Logic – Fancy Indexing – Structured Arrays – Data Manipulation with Pandas – Data Indexing and Selection – Operating on Data – Missing Data – Hierarchical Indexing – Combining Data Sets – Aggregation and Grouping – Pivot Tables	[9]
Data Visualization: Importing Matplotlib – Line Plots – Scatter Plots – Visualizing Errors – Density and Contour Plots – Histograms – Legends – Colors – Subplots – Text and Annotation – Customization – Three Dimensional Plotting - Geographic Data with Basemap - Visualization with Seaborn.	[9]
Total Hours:	**45**

Text Book(s):	
1.	David Cielen, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016.
2.	Robert S. Witte and John S. Witte, “Statistics”, Eleventh Edition, Wiley Publications, 2017.
Reference(s):	
1.	Allen B. Downey, “Think Stats: Exploratory Data Analysis in Python”, Green Tea Press,2014.
2.	Jake VanderPlas, “Python Data Science Handbook”, O’Reilly, 2016.
3.	Wes McKinney "Python for Data Analysis” O’Reilly Media,02017.
4.	Jiawei Han, Micheline Kamber, and Jian Pei “Data Mining: Concepts and Techniques**"** Morgan Kaufmann, 2011.

* SDG 4: - Quality Education

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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Benefits and uses – Facets of Data	1
1.2	Overview – Defining Research Goals	1
1.3	Retrieving Data	1
1.4	Data Preparation	1
1.5	Exploratory Data Analysis	1
1.6	Build the Model	1
1.7	Presenting Findings and Building Applications	1
1.8	Data Mining - Data Warehousing	1
1.9	Basic Statistical Descriptions of Data	1
2.0	**Describing Data**	
2.1	Types of Data	1
2.2	Types of Variables	1
2.3	Describing Data with Tables and Graphs	2
2.4	Describing Data with Averages	2
2.5	Describing Variability	1
2.6	Normal Distributions and Standard (z) Scores	2
3.0	**Describing Relationships**	
3.1	Correlation – Scatter Plots	1
3.2	Correlation Coefficient for Quantitative Data	1
3.3	Computational Formula for Correlation Coefficient	1
3.4	Regression - Regression Line	1
3.5	Least Squares Regression Line	1
3.6	Standard Error of Estimate	1
3.7	Interpretation of r2	1
3.8	Multiple Regression Equations	1
3.9	Regression Towards the Mean	1
4.0	**Python Libraries for Data Wrangling**	
4.1	Basics of Numpy Arrays – Aggregations	1
4.2	Computations on Arrays – Comparisons	1
4.3	Masks - Boolean Logic	1
4.4	Fancy Indexing - Structured Arrays	1
4.5	Data Manipulation with Pandas	1
4.6	Data Indexing and Selection	1
4.7	Operating on Data – Missing Data	1
4.8	Hierarchical Indexing - Combining Data Sets	1
4.9	Aggregation and Grouping - Pivot Tables	1
5.0	**Data Visualization**	
5.1	Importing Matplotlib – Line Plots	1

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Approved in Academic Council Meeting held on 25/05/2024

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5.2	Scatter Plots – Visualizing Errors	1
5.3	Density and Contour Plots	1
5.4	Histograms – Legends	1
5.5	Colors – Subplots	1
5.6	Text and Annotation – Customization	1
5.7	Three Dimensional Plotting	1
5.8	Geographic Data with Basemap	1
5.9	Visualization with Seaborn.	1

Course Designer(s)

1. R.Karthik - karthikr@ksrct.ac.in

60 CB 703	Software Testing and Automation	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To study the basics of software testing
- To learn about white box and black box testing techniques
- To explain about test planning and review of test activities
- To learn test design and execution of test cases
- To learn about test automation and the tools used for test automation

Pre-requisites

- Programming languages, Software Engineering.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the fundamentals of software testing.	Remember
CO2	Understand the techniques of white box and black box testing.	Understand
CO3	Know the process and procedures involved in test planning and test review.	Remember
CO4	Understand the design, execution and test reporting.	Understand
CO5	Implement the basic tools used in web automation.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1
CO2	3	3	1	-	-	-	-	-	-	-	-	-	3	1
CO3	3	-	-	1	-	-	-	-	-	-	-	-	1	3
CO4	3	-	-	2	-	-	-	-	-	-	-	-	1	3
CO5	3	1	2	-	3	-	-	-	-	-	-	-	3	1
3 - Strong; 2 - Medium; 1 – Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	30	10	50
Understand	20	30	30
Apply	10	20	20
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 703 – Software Testing and Automation								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction to Software Testing* Definition, Objective and Limits of Testing - Roles and Responsibilities of a Software Tester - Software Testing Life Cycle - V model of Software Testing - Program Correctness and Verification - Reliability versus Safety - Failures, Errors, Faults, Defects - Origins and Cost of Defects - Software Testing Principles - Verification and Validation - Types of Functional Testing - Types of Non Functional Testing.	[9]
Testing Techniques* White Box Testing Techniques - Statement Coverage, Decision Coverage, Basic Path Testing, Control Flow Graph Coverage, Branch Coverage, Conditional Coverage - McCabe's Cyclomatic Complexity - Mutation Testing. Black Box Test Techniques - Boundary Value Analysis, Equivalent Class Partition, Error Guessing, Decision Table, State Transition Table, Pair Wise Testing, Use Case Testing.	[9]
Test Planning and Review Process* Software Test Planning: The Goal of Test Planning - High Level Expectations - Intergroup Responsibilities - Test Phases - Test Strategy - Resource Requirements - Tester Assignments - Test Schedule - Test Cases - Metrics and Statistics. Software Testing Review: Objectives - Types of Reviews - Peer Review - Walkthrough - Inspection - Checklists of Review Process - Review Log.	[9]
Test Design and Execution * Test Objective - Test Design Factors - Test Requirements - Identification, Analyzing the Requirements, Classifying the Functional and Non Functional Requirements with their types, Testable Requirements - Model-Driven Test Design - Test Design Preparedness Metrics - Test Case Design - Standards, Guidelines and Naming Conventions - Characteristics of Good Test Cases - Templates - Traceability Matrix - Test Case Review - Test Case Organization and Tracking - Test Execution - Test Log - Bug Reporting - Bug Life Cycle.	[9]
Test Automation and Tools* Automated Software Testing - Automate Testing of Web Applications. Selenium: Architecture, Web Driver and Web Elements, Locating Web Elements, Actions on Web Elements, Understanding Web Driver Events. TestNG: Why TestNG?, Understanding Testng.xml, TestSuite.xml, Annotations, Grouping the Testcases, Exclusion of Groups, TestNG Reports.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", 4th Edition, CRC Press, 2014.
2.	Unmesh Gundecha, Satya Avasarala, "Selenium WebDriver 3 Practical Guide", 2nd Edition, Packt Publishing, 2018.
Reference(s):	
1.	Yogesh Singh, "Software Testing", Cambridge University Press, 2012.
2.	Ron Patton, "Software testing", 2nd Edition, Sams Publishing, 2006.
3.	Glenford J. Myers, Corey Sandler, Tom Badgett, "The Art of Software Testing, 3rd Edition, Wiley Publishers, 2015.
4.	Varun Menon, "Testng Beginner's Guide", Packt Publishing, 2013.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Software Testing**	
1.1	Definition, Objective and Limits of Testing, Roles and Responsibilities of a Software Tester, Software Testing Life Cycle	1
1.2	V model of Software Testing - Program Correctness and Verification - Reliability versus Safety - Failures, Errors, Faults, Defects	1
1.3	Origins ,Cost of Defects, Software Testing Principles, Verification & Validation	1
1.4	Types of Functional Testing	3
1.5	Types of Non Functional Testing	3
2.0	**Testing Techniques**	
2.1	Statement Coverage, Decision Coverage	1
2.2	Basic Path Testing, Control Flow Graph Coverage	1
2.3	Branch Coverage, Conditional Coverage	1
2.4	McCabe's Cyclomatic Complexity	1
2.5	Boundary Value Analysis, Mutation Testing	1
2.6	Equivalent Class Partition, Error Guessing	1
2.7	Decision Table	1
2.8	State Transition Table, Pair Wise Testing	1
2.9	Use Case Testing	1
3.0	**Test Planning and Review Process**	
3.1	Goal of Test Planning, High Level Expectations, Intergroup Responsibilities	1
3.2	Test Phases - Test Strategy	1
3.3	Resource Requirements, Tester Assignments, Test Schedule	1
3.4	Test Cases	2
3.5	Metrics and Statistics, Software Testing Review: Objectives	2
3.6	Peer Review, Walkthrough, Inspection	1
3.7	Checklists of Review Process, Review Log.	1
4.0	**Test Design and Execution**	
4.1	Test Objective - Test Design Factors - Test Requirements	1
4.2	Identification, Analyzing the Requirements	1
4.3	Classifying the Functional and Non Functional Requirements with their types., Testable Requirements	1
4.4	Model-Driven Test Design	1
4.5	Test Design Preparedness Metrics - Test Case Design	1
4.6	Standards, Guidelines and Naming Conventions, Characteristics of Good Test Cases, Templates	1
4.7	Traceability Matrix, Test Case Review	1
4.8	Test Case Organization and Tracking, Test Execution, Test Log	1
4.9	Bug Reporting - Bug Life Cycle	1
5.0	**Test Automation and Tools**	

5.1	Automated Software Testing - Automate Testing of Web Applications. Selenium: Architecture	1
5.2	Web Driver and Web Elements, Locating Web Elements	3
5.3	Actions on Web Elements, Understanding Web Driver Events	1
5.4	TestNG: Why TestNG?, Understanding Testng.xml	1
5.5	TestSuite.xml, Annotations	1
5.6	Grouping the testcases, Exclusion of groups	1
5.7	TestNG Reports	1

Course Designer(s)

1. P. Venkatesh – venkateshp@ksrct.ac.in

60 AB 001	National Cadet Corps - AIR WING	Category	L	T	P	Credit
		PC	2	0	2	3

Objectives

- To designed especially for NCC Cadets
- To develop character, camaraderie, discipline, secular outlook
- To inculcate spirit of adventure, sportsman spirit
- To teach selfless service amongst cadets by working in teams
- To learning military subjects including weapon training and motivate them to join in tri-services

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion.	Remember
CO2	Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling.	Remember
CO3	Illustrate various forces and moments acting on aircraft.	Understand
CO4	Outline the concepts of aircraft engine and rocket propulsion.	Understand
CO5	Design, build and fly chuck gliders/model airplanes and display static models.	Create

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	3	3	3	3	3	-	-	-	-	-
CO2	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			End Sem Examination (Marks)
	DST(20)	AM(20)	SBM(10)	
Remember	10	-	-	40
Understand	10	-	10	60
Apply	-	-	-	-
Analyse	-	-	-	-
Evaluate	-	-	-	-
Create	-	20	-	-
Total	20	-	-	40

DST – Drill Square Test | AM – Aero Modeling | SBM- Swachh Bharat Mission

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 AB 001- National Cadet Corps - AIR WING								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

NCC Organisation and National Integration * NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCC cadets – Aim and advantages of NCC Training- NCC badges of Rank- Honors" and Awards – Incentives for NCC cadets by central and state govt. History and Organization of IAF- Indo-Pak War-1971- Operation Safed Sagar. National Integration- Unity in diversity- Contribution of youth in nation building- National integration council- Images and Slogans on National Integration.	[12]
Drill and Weapon Training* Basic physical Training- Various exercises for fitness (with Demonstration)- Food- Hygiene and Cleanliness. Drill- Words of commands- Position and commands- Sizing and forming- Saluting- Marching- Turning on the march and wheeling- Saluting on the march- Side pace, Pace forward and to the rear- Marking time- Drill with arms- Ceremonial drill- Guard mounting (WITH DEMONSTRATION).	[12]
Principles of Flight * Laws of motion- Forces acting on aircraft- Bernoulli"s theorem- Stalling-Primary control surfaces-Secondary control surfaces- Aircraft recognition.	[12]
Aero Engines * Introduction of Aero engine- Types of engine- Piston engine- Jet engines- Turboprop engines- Basic Flight Instruments- Modern trends.	[12]
Aero Modeling * History of Aero modeling- Materials used in Aero modeling- Types of Aero models – Static Models- Gliders- Control line models- Radio Control Models- Building and Flying of Aero models.	[12]
Total Hours:	**60**

Text Book(s):	
1.	"National Cadet Corps- A Concise handbook of NCC Cadets", Ramesh Publishing House, New Delhi, 2014.
Reference(s):	
1.	"Cadets Handbook – Common Subjects SD/SW", published by DG NCC, New Delhi.
2.	"Cadets Handbook- Specialized Subjects SD/SW", published by DG NCC, New Delhi
3.	"NCC OTA Precise", published by DG NCC, New Delhi

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

ASSESSMENT PATTERN - THEORY					
Test / Bloom'sCategory*	**Knowledge (K1) %**	**Apply (K2) %**	**Analyzing(K3) %**	**Creating(K4) %**	**Total %**
CAT1	-	-	-	-	-
CAT2	-	-	-	-	-
CAT3	-	-	-	-	-
ESE	The examination and award of marks will be done by the Ministry of Defence, Government of India which includes all K1 to K4 knowledge levels. The maximum marks for the End Semester Examination is 500 marks. It will be converted to 100 marks.				

Course Designer(s)

1. Flt Lt V.R.SADASIVAM - sadasivam@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 AB 002	National Cadet Corps - Army Wing Common to all Branches	Category	L	T	P	Credit
		HS	2	0	2	3

Objectives

- Develop character, camaraderie
- Inculcate discipline, secular outlook
- Enrich the spirit of adventure, sportsman spirit
- Ideals of selfless service amongst cadets by working in teams
- Improve qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion.	Understand
CO2	Demonstrate Health Exercises, the sense of discipline, improve bearing, smartness, turn out, and develop the quality of immediate and implicit obedience of orders.	Apply
CO3	Basic knowledge of weapons and their use and handling.	Understand
CO4	Aware about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils.	Analyze
CO5	Acquaint, expose & provide knowledge about Army/Navy/ Air force and to acquire information about expansion of Armed Forces, service subjects and important battles.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	1	-	3	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO3	-	-	-	-	-	1	-	3	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	10	-	40	40
Understand	10	-	60	60
Apply	-	-	-	-
Analyse	-	-	-	-
Evaluate	-	-	-	-
Create	-	20	-	-
Total	20	20	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
Common to all Branches								
60 AB 002 – National Cadet Corps (Army Wing)								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
II	2	0	2	60	3	50	50	100

NCC Organization & National Integration NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCCcadets –Aim and advantages of NCC Training- NCC badges of Rank- Honors' and Awards – Incentives for NCC cadets by central and state govt. National Integration - Unity in diversity- contribution of youth in nation building- national integration council- Images and Slogans on National Integration.	[12]
Basic Physical Training & Drill Basic physical Training – various exercises for fitness (with Demonstration)-Food – Hygiene and Cleanliness. Drill- Words of commands- position and commands- sizing and forming- saluting- marching- turning on the march and wheeling- saluting on the march- side pace, pace forward and to the rear- marking time- Drill with armsceremonial drill- guard mounting. (WITH DEMONSTRATION).	[12]
Weapon Training Main Parts of a Rifle Characteristics of .303 rifle- Characteristics of .22 rifle- loading and unloading – position and holding safety precautions range procedure- MPI and Elevation- Group and Snap shooting- Long/Short range firing(WITH PRACTICE SESSION) - Characteristics of 5.56mm rifle- Characteristics of 7.62mm SLR- LMG- carbine machine gun pistol.	[12]
Social Awareness and Community Development Aims of Social service-Various Means and ways of social services- family planning – HIV and AIDS- Cancer its causes and preventive measures- NGO and their activities- Drug trafficking- Rural development programmes-MGNREGASGSYJGSY-NSAP-PMGSY- Terrorism and counter terrorism- Corruption – female foeticide dowry – child abuse-RTI Act- RTE Act- Protection of children from sexual offences act- civic sense and responsibility.	[12]
Specialized Subject (ARMY) Basic structure of Armed Forces- Military History – War heroes- battles of Indo-Pak war- Param Vir Chakra- Career inthe Defence forces- Service tests and interviews.	[12]
Total Hours:	**60**

Text Book(s):	
1.	National Cadet Corps- A Concise handbook of NCC Cadets by Ramesh Publishing House, New Delhi, 2014.
2.	Cadets Handbook- Specialized Subjects SD/SW published by DG NCC, New Delhi,2014.
Reference(s):	
1.	"Cadets Handbook – Common Subjects SD/SW" by DG NCC, New Delhi,2019
2.	"Cadets Handbook – Specialised Subjects SD/SW" by DG NCC, New Delhi,2017

*SDG 9 – Industry Innovation and Infrastructure

Course Designer(s)

1. CT E CHANDRA KUMAR - chandrakumar@ksrct.ac.in

60 AC 001	Research Methodology	Category	L	T	P	Credit
		AC	1	0	0	0

Objectives

- To identify research problems, formulate hypotheses, collect data and test hypotheses
- To prepare and submit quality manuscripts and understand peer review process
- To utilize software tools for effective manuscript preparation and visualization of research data
- To familiarize different journal metrics and author-level quality indicators
- To protect creative works, inventions, and branding elements using IPR

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop structured scientific approach to plan and execute research work	Apply
CO2	Comply with the journal requirements to publish research findings effectively	Understand
CO3	Apply various software tools during the manuscript preparation	Apply
CO4	Select suitable journals to publish the work using different publication metrics	Analyse
CO5	Apply the appropriate form of IP protection to a specific invention or creation	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	2	2	-	2	2	3	3	3	-	3	-	-	-
CO2	-	-	-	-	-	-	-	3	3	3	-	3	-	-	-
CO3	-	-	-	-	3	-	-	3	3	3	-	3	-	-	-
CO4	-	-	-	-	-	-	-	3	3	-	-	3	-	-	-
CO5	-	-	2	2	-	-	-	3	3	3	-	3	-	-	-

3 - Strong; 2 - Medium; 1 – Some

Assessment Pattern

One review at end of the semester

Parameters	Weightage (Marks)
Research Problem Identification (Research gap, SDG, Objectives)	10
Literature Review preparation (Clarity, Number and quality of sources)	20
Patent Draft/ Manuscript Preparation (Structure, Content)	20
Use of software tools (Plagiarism, Reference Management, etc.,)	10
Journal Identification (Aim & scope of the journal, journal metrics)	10
Presentation & Viva voce	30
Total	**100**

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

60 AC 001 – Research Methodology

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	1	0	0	15	0	100	-	100

Research - Scientific Approach* Types of Research - Identification and Clarification of the problem – Formulating hypothesis, Selection of sample and tools of data collection - Testing the hypothesis - Conclusion	[3]
Manuscript Preparation* Structure of a manuscript - Types of manuscript - Graphical abstract - Highlights - Literature Review - Citation - Reference style - Plagiarism – Journal selection - Peer review process	[3]
Research Toolkit* Software Tools for Writing enhancement - Literature review - Reference management - Data analysis and visualization - Drawing - Plagiarism	[3]
Research Publication Metrics* Journal Index: Scopus - Web of Science - SCI - UGC Care - Q Journal; Journal Metrics: Impact Factor, Cite Score; Quality Indicators: h-index - i-10 index - citations	[3]
Intellectual Property Rights* Patents - Industrial Designs - Copyright - Trademarks - Geographical Indications - Trade Secrets	[3]
Total Hours:	**15**

Reference(s):

1.	Kothari, C.R. and Gaurav Garg, “Research Methodology: Methods and Techniques”, New Age International Publishers, 2023
2.	Chawla H S., “Introduction to Intellectual Property Rights”, CBS Publishers and Distributors Private Limited, 2019

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Research - Scientific Approach**	
1.1	Types of Research - Identification and Clarification of the problem - Formulating hypothesis	2
1.2	Selection of sample and tools of data collection - Testing the hypothesis - Conclusion	1
2	**Manuscript Preparation**	
2.1	Structure of a manuscript - Types of manuscript - Graphical abstract - Highlights	1
2.2	Literature Review	1
2.3	Citation - Reference style – Plagiarism, Journal selection - Peer review process	1
3	**Research Toolkit**	
3.1	Software Tools for Writing enhancement	1
3.2	Literature review, Reference management	1
3.3	Data analysis and visualization – Drawing, Plagiarism	1
4	**Research Publication Metrics**	
4.1	Journal Index: Scopus - Web of Science - SCI - UGC Care - Q Journal;	1
4.2	Journal Metrics: Impact Factor, Cite Score	1
4.3	Quality Indicators: h-index - i-10 index - citations	1
5	**Intellectual Property Rights**	
5.1	Patents	1
5.2	Industrial Designs - Copyright	1
5.3	Trademarks - Geographical Indications - Trade Secrets	1

Course Designer

1. Dr.M.Kathirselvam - mkathirselvam@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB 7P1	Data Analytics Lab	Category	L	T	P	Credit
		PC	0	0	4	2

Objectives

- To understand the python libraries for data science
- To understand the basic Statistical and Probability measures for data science
- To learn descriptive analytics on the benchmark data sets
- To apply correlation and regression analytics on standard data sets
- To present and interpret data using visualization packages in Python

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Make use of the python libraries for data science.	Apply
CO2	Make use of the basic Statistical and Probability measures for data science.	Apply
CO3	Perform descriptive analytics on the benchmark data sets.	Analyze
CO4	Perform correlation and regression analytics on standard data sets.	Analyze
CO5	Present and interpret data using visualization packages in Python.	Analyze

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1	1	-	-	-	-	1	3	3	3	1	3	-
CO2	3	2	2	3	1	-	-	-	3	1	3	2	1	3	-
CO3	3	2	1	3	1	-	-	-	2	1	1	1	3	2	-
CO4	2	3	1	3	-	-	-	-	2	3	2	3	3	3	-
CO5	1	2	3	1	1	-	-	-	2	1	3	1	1	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Lab Experiments Assessment (Marks)		Model Examination (Marks)	End Sem Examination (Marks)	
	Lab	Activity			
Remember	-	-	-	-	-
Understand	-	-	-	-	-
Apply	25	12	50		50
Analyse	25	13	50		50
Evaluate	-	-	-	-	-
Create	-	-	-	-	-
Total	50	25	100	-	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB 7P1 – Data Analytics Lab								
Semester	**Hours/Week**			**Total Hrs**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	0	0	4	60	2	60	40	100

List of Experiments:

1. Download, install and explore the features of NumPy, SciPy, Jupyter, Statsmodels and Pandas packages.
2. Create a 2D NumPy array with dimensions 3x4 filled with random integers between 1 and 10. Calculate the sum of all elements in the array.
3. Create a Pandas DataFrame from a dictionary with columns 'Name', 'Age', and 'City' containing sample data.
4. Reading data from text files, Excel and the web and exploring various commands for doing descriptive analytics on the Iris data set.
5. Use the diabetes data set from UCI and Pima Indians Diabetes data set for performing the following: *
    a. Univariate analysis: Frequency, Mean, Median, Mode, Variance, Standard Deviation, Skewness and Kurtosis.
    b. Bivariate analysis: Linear and logistic regression modeling
6. Apply and explore various plotting functions on UCI data sets. *
    a. Normal curves
    b. Density and contour plots
    c. Correlation and scatter plots
7. Create a basic map using Basemap centered at a specific latitude and longitude with a given width and height.
8. Generate a line plot of a mathematical function and annotate a specific point on the curve with text.

Design Experiments:

9. Design an experiment to investigate the impact of varying bin sizes on the visual appearance of a histogram.

10.	Design and perform aggregation operations such as sum, mean, count, min, max on numeric columns to understand data summarization.

Lab Manual	
1.	"Data Science Lab Manual", Department of Computer Science and Business Systems, KSRCT.

*SDG 4 – Quality Education

Course Designer(s)

1. R.Karthik – karthikr@ksrct.ac.in

60 CB 7P2	Project Work Phase- I	Category	L	T	P	Credit
		CG	0	0	4	2

Objectives

- To impart practical knowledge to the students
- To apply the gained engineering concepts in their project work
- To provide an exposure to the students to collect and review the research articles, journals, conference proceedings relevant to their project work
- To design an innovative project work
- To implement the project with the recent IT tools

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify engineering problems relevant to the domain and perform related literature survey.	Apply
CO2	Analyze and identify an appropriate methodology to solve the problem.	Analyse
CO3	Do experimentation / simulation / programming / fabrication, collect and interpret data.	Apply
CO4	Prepare and present their technical report with relevant project work details	Analyse
CO5	Demonstrate their responsibility as an individual and as a leader in a team.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	3	2	3	3	3	3	3	3	2	2	2
CO2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO4	3	2	2	3	2	2	2	3	3	3	3	3	2	2	2
CO5	3	-	3	-	-	-	2	3	3	3	3	3	2	2	3

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Review I (R1)			Review II (R2)		Review III (R3)			Total (R1+R2+R3)	Internal
Literature Survey	Topic Identification & Justification	Work Plan	Approach	Conclusion	Demo-Existing System	Presentation	Report	Total	
10	10	10	20	20	10	10	10	100	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB 7P2 - Project Work - Phase I								
CSBS								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	0	0	4	60	2	100	00	100

Methodology:

1. Project Work Phase-I shall be evaluated by the project review committee (Project coordinator, Project Guide and HOD/Subject experts in the department)
2. Three reviews shall be conducted with subject expert and the student(s) shall make a presentation on the progress made by him / her / them during the reviews
3. Student(s) shall submit a project technical report comprising of title, problem statement, importance of work, modifications, proof of concept, methodology and review of literature during the 3rd review
4. The total marks obtained in the three reviews shall be reduced to 100 marks and rounded to the nearest integer
5. The schedule will be announced by the Project Coordinator and Head of the Department

Course Designer(s)

1. R.Logapriya – logapriyar@ksrct.ac.in

EIGHTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 CB E5*	Professional Elective V	2	50	50	100	45	100
PRACTICALS								
2	60 CB 8P1	Project Work Phase-II	2	60	40	100	45	100
3	60 CG 0P6	Internship	-	100	-	100	-	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 CB 8P1	Project Work Phase- II	Category	L	T	P	Credit
		CG	0	0	16	8

Objectives

- To impart practical knowledge to the students
- To apply the gained engineering concepts in their project work
- To provide an exposure to the students to collect and review the research articles, journals, conference proceedings relevant to their project work
- To design an innovative project work
- To implement the project with the recent IT tools

Pre-requisites

- **Project Work - Phase I**

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify engineering problems relevant to the domain and carry out a literature survey for its support.	Apply
CO2	Apply algorithm and design techniques in the project and experience their outcome in their own real time project scenario.	Apply
CO3	Do experiment / simulate / program / fabricate, collect and interpret data.	Apply
CO4	Document the results in the form of technical report / presentation.	Analyse
CO5	Develop the management skills to achieve the project goal by working as a team and demonstrate the technical skills acquire to provide feasible solution for real-life problems.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	3	2	3	3	3	3	3	3	2	2	2
CO2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CO4	3	2	2	3	2	2	2	3	3	3	3	3	2	2	2
CO5	3	-	3	-	-	-	2	3	3	3	3	3	2	2	3
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Internal Assessment (60)					End Semester (40)
Items	**Review 1**	**Review 2**	**Review 3**	**Publication***	
Marks	**5**	**10**	**15**	**30**	**40**
	Total internal marks 60				

Note:

***Publication marks shall be awarded based on the following criteria**

1. SCI / WoS Journal = 30 Marks
2. Scopus Indexed Journal / Scopus Indexed Book Chapters/ IEEE Conference = 27 Marks
3. Journals listed in UGC Care = 25 Marks

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Approved in Academic Council Meeting held on 25/05/2024

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB 8P1 - Project Work - Phase II								
CB								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	0	0	16	240	8	60	40	100

Methodology:

The objective of Project Work & Dissertation is to enable the student to extend further investigative a study on the project

1. Three reviews shall be conducted by project review committee (Project coordinator, Project Guide and HOD/Subject experts in the department)
2. Student(s) shall make a presentation on the progress made by him / her / them during the reviews
3. Student(s) shall submit a project technical report comprising of title, problem statement, importance of work, methodology, experimental work and outcome of the work carried out during the 3rd review
4. The work carried out may be either under the guidance of a supervisor from the department or jointly with a supervisor drawn from other department / academic institution / R& D laboratory / Industry
5. The project reviews (R1+R2+R3+R4) shall carry a maximum of 60 marks
6. The project report shall be submitted as per the approved guidelines given by the college, the viva-voce examination shall carry 40 marks
7. Marks are awarded to each student of the project group based on the individual performance in the viva-voce examination

*SDG 4 – Quality Education

Course Designer(s)

1. Dr.K.Sakthivel – sakthivelk@ksrct.ac.in

Elective I

60 CB E11	Python Full Stack	Category	L	T	P	Credit
		PE	1	0	4	3

Objectives

- To apply the basic and advanced concepts in Python for real-time problems.
- To develop applications using ReactPy.
- To install Flask and develop applications using Flask Framework.
- To develop applications using Django with database integration.
- To integrate AI with applications using Django.

Pre-requisites

- Basic knowledge of HTML, CSS and Javascript programming languages

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the concepts of Python programming for real-time problems	Apply
CO2	Develop applications using ReactPy	Apply
CO3	Develop applications using Flask Framework	Apply
CO4	Develop applications using Django with database integration	Apply
CO5	Integration of AI with applications using Django	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	3	2	-	-	-	-	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	-	-
Apply	30	30	50	50
Analyse	-	-	-	-
Evaluate	-	-	-	-
Create	30	30	50	50
Total	60	60	100	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech - Computer Science and Business Systems								
60 CB E11– Python Full Stack								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	4	50	50	100

Introduction to Python* Basics: Variables, Strings, Python Data Structures, Control Flow and Looping statements - Functions - Exception Handling - Object Oriented Programming: Class, Attributes, Methods, Inheritance, Polymorphism, Modules and Packages - Regular Expressions - File Handling - Database Connectivity	[3+12]
ReactPy* Introduction to ReactPy - Creating User Interfaces - Components - States - Event Handling - Router	[3+12]
Flask* Installation - Basic Application Structure - Variable Rules – Routing - URL Building - Templates - Web Forms - File Uploading - Mail Extension - Database Integration	[3+12]
Django* Introduction to Django Framework - Views – Routing - Templates - Models - URL Mapping - Django Template Language - Sending E-mails - Forms - File Handling - Static Files - APIs - Databases using Django	[3+12]
AI Integration* Introduction to Data Science - Pre-Processing - Basic Visualization - Integrating the Machine Learning Models - Deep Learning Neural Nets	[3+12]
Total Hours:	**75**

Text Book(s):	
1.	Jeff Forcier, Paul Bissex, Wesley Chun, “Python Web Development with Django”, Pearson Education, First Edition, 2009.
2.	Miguel Grinberg, “Flask Web Development”, O’Reilly Publication, Second Edition, 2018.
Reference(s):	
1.	Gowrishankar S, Veena A, “Introduction to Python Programming”, Taylor and Francis, 2019.
2.	William S Vincent, “Django for Beginners: Build websites with Python and Django Paperback”, Independently Published, 2018.
3.	Kirupa Chinnathambi, “Learning React: A Hands-On Guide to Building Web Applications using React and Redux”, Addison-Wesley Professional, 2018.
4.	https://www.udemy.com/course/python-and-django-full-stack-web-developer-bootcamp/
5.	https://www.udemy.com/course/unaicorn/?couponCode=IND21PM

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Introduction to Python**	
1.1	Basics, Functions and Exception Handling	1
1.2	Object Oriented Programming	1
1.3	Regular Expressions, File Handling and Database Connectivity	1
2	**ReactPy**	
2.1	Introduction to ReactPy, Creating User Interfaces	1
2.2	Components, States, Event Handling	1
2.3	Router	1
3	**Flask**	
3.1	Installation, Basic Application Structure and Variable Rules	1
3.2	Routing, URL Building, Templates, Web Forms and File Uploading	1
3.3	Mail Extension and Database Integration	1
4	**Django**	
4.1	Introduction to Django Framework, Views, Routing, Templates and Models	1
4.2	URL Mapping, Django Template Language, Sending E-mails and Forms	1
4.3	File Handling, Static Files, APIs and Databases using Django	1
5	**AI Integration**	
5.1	Introduction to Data Science, Pre-Processing and Basic Visualization	1
5.2	Integrating the Machine Learning Models	1
5.3	Deep Learning Neural Nets	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Dr. M.Tamilarasi – tamilarasi@ksrct.ac.in

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E12	MEAN Stack	Category	L	T	P	Credit
		PE	1	0	4	3

Objectives

- To understand the various components of full stack development
- To learn Node.js features and applications
- To understand the use of Express .js
- To develop simple web applications with Angular
- To develop applications with MongoDB.

Pre-requisites

- Basic knowledge of HTML, CSS and JavaScript programming languages

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the various stacks available for web application development	Understand
CO2	Use Node.js for application development	Apply
CO3	Use Express.js for application development	Apply
CO4	Build and deploy Angular applications	Apply
CO5	Develop applications with MongoDB	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	2	-	-	-	2	2	2	2	-	-	-
CO2	3	3	3	3	2	-	-	-	2	2	2	2	-	-	-
CO3	3	3	3	3	2	-	-	-	2	2	2	2	-	-	-
CO4	3	3	3	3	2	-	-	-	2	2	2	2	-	-	-
CO5	3	3	3	3	2	-	-	-	2	2	2	2	-	-	-
3 - Strong; 2 - Medium; 1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	-	-
Apply	30	30	50	50
Analyse	30	30	50	50
Evaluate	-	-	-	-
Create	-	-	-	-
Total	60	60	100	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech - Computer Science and Business Systems								
60 CB E12– MEAN Stack								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	.3	50	50	100

Basics of Full Stack * Understanding the Basic Web Development Framework - User - Browser – Webserver - Backend Services – MVC Architecture - Understanding the different stacks –The role of Express – Angular – Node - Mongo DB - Basics of Typescript.	[3+12]
Node JS * Basics of Node JS – Installation – Working with Node packages – Using Node package manager – Creating a simple Node.js application – Using Events – Listeners –Timers - Callbacks – Handling Data I/O – Implementing HTTP services in Node.js.	[3+12]
Express JS * Introduction to Express.js-Routing in Express.js- Using Request and Response objects - Sending HTML & JSON data using Express.js-Serving static website using Express.jsExpress.js and API.	[3+12]
Angular * Introduction to Angular - Expressions -Components-Modules-Directives-Data Binding-ControllersScopes-Filters-Services-Http- Events-Forms -APl -Routing-Applications	[3+12]
Mongo DB * Understanding NoSQL and MongoDB–Building MongoDB Environment-User accounts – Access control – Administering databases – Managing collections--CRUD Operations: Connecting and inserting data, Updating and Deleting data-Restful APIs – Connecting to MongoDB from Node.js – simple applications	[3+12]
Total Hours	75

Text Book(s):	
1.	Brad Dayley, Brendan Dayley, Caleb Dayley, 'Node.js, MongoDB and Angular Web Development', Addison-Wesley, Second Edition, 2018
2.	"Adam Freeman", Pro AngularJS (Expert's Voice in Web Development) 1st ed. Edition, Kindle Edition, 2014.
Reference(s):	
1.	"Greg Lim", Beginning Angular with Typescript Kindle Edition, 2021.
2.	"Ari Lerner",ng-book - The Complete Book on AngularJS 1st Edition,2013.
3.	Chris Northwood, 'The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', Apress; 1st edition, 2018
4.	https://www.udemy.com/course/master-the-mean-stack/

*SDG 4:- Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Basics of Full Stack**	
1.1	Understanding the Basic Web Development Framework 1	1
1.2	User - Browser	1
1.3	Webserver	1
1.4	Backend Services	1
1.5	MVC Architecture	1
1.6	Understanding the different stacks	1
1.7	The role of Express	1
1.8	Angular – Node	1
1.9	Mongo DB	1
2.0	**Node JS**	
2.1	Basics of Node JS	1
2.2	Installation	1
2.3	Working with Node packages	1
2.4	Using Node package manager	1
2.5	Creating a simple Node.js application	1
2.6	Using Events- Listeners- Timers	1
2.7	Callbacks – Handling Data I/O	1
2.8	Implementing HTTP services in Node.js.	2
3.0	**Express JS**	
3.1	Introduction to Express.js	1
3.2	Routing in Express.js	2
3.3	Using Request and Response objects	1
3.4	Sending HTML & JSON data using Express.js	2
3.5	Serving static website using Express.js	1
3.6	Express.js and API.	2
4.0	**Angular**	
4.1	Introduction to Angular	1
4.2	Expressions- Components- Modules	2
4.3	Directives- Data Binding-Controllers	2
4.4	Scopes-Filters-Services	2
4.5	Http- Events-Forms	1
4.6	API -Routing-Applications	1
5.0	**Mongo DB**	
5.1	Understanding NoSQL and MongoDB	1
5.2	Building MongoDB Environmen	1
5.3	User accounts –Access control – Administering databases	2
5.4	Managing collections--CRUD Operations:Connecting and inserting data, Updating and Deleting data	2
5.5	Restful APIs	1

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Approved in Academic Council Meeting held on 25/05/2024

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5.6	Connecting to MongoDB from Node.js	1
5.7	Simple applications	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Dr. M.Tamilarasi – tamilarasi@ksrct.ac.in

60 CB E13	Android Application Development	Category	L	T	P	Credit
		PE	1	0	4	3

Objectives

- To provide overview of Android Application Development
- To develop basic UI Interface of android apps.
- To implement app services and explain notifications, broadcast receivers and access file-system and databases
- To explain Multimedia, Location awareness, Native hardware access, Telephony and SMS APIs
- To provide overview of testing, debugging and to packaging and publishing apps to market places.

Pre-requisites

- Object Oriented Programming in Java, SQL.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Familiarize and understand the ecosystem and the tools required for Android App development	Remember
CO2	Build apps using UI components, Intents and Activities.	Apply
CO3	Familiarize with Functionality beyond user interface such as Threads, Services, Notifications, Broadcast receivers, Databases.	Understand
CO4	Illustrate the working of Multimedia, Location awareness, Sensors, Telephony and SMS APIs.	Apply
CO5	Discuss testing, debugging and to packaging and publishing apps.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	-	3	2	2	1	-	1	3	-	-	1	3	-
CO2	2	-	3	2	2	1	-	1	3	-	-	1	3	-
CO3	2	-	3	2	2	1	-	1	3	-	-	1	3	-
CO4	2	-	3	2	3	1	-	1	3	-	-	1	3	-
CO5	2	-	3	2	3	1	-	1	3	-	-	1	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1			
Remember	-	-	-	-
Understand	30	-	50	50
Apply	30	50	50	50
Analyse	-	50	-	-
Evaluate	-	-	-	-
Create	-	-	-	-
Total	60	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E13- Android Application Development								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	3	50	50	100

Introduction to Android and Development Environment Setup Introduction to Android: Architecture and Stack, Activities, Services, Broadcast Receivers & Content providers, Views & Notifications, Intents & Intent Filters, Android API levels, Emulator. Android Studio: Overview, Android and File Structure, AVD Manager, DDMS, LogCat. Development environment Setup: Eclipse and SDK installation, AVD creation, Project Structure. Hello World - Creating a Project, Working with the AndroidManifest.xml, Using the log system Activities.	[3+12]
UI Design * Basic UI design: Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] versus px. Menu: Option menu, Context menu, Sub menu. Intents: Explicit Intents, Implicit intents. Activity states and life cycle. UI Design: Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup.	[3+12]
Functionality beyond user interface * Threads, Async task, Services –states and lifecycle, Notifications, Broadcast receivers, Nativedata handling –on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via internet/ Intranet).	[3+12]
Sprucing up mobile apps * Multimedia –audio/video playback and record, Location awareness & Google Maps, Native hardware access (Using Orientation and Accelerometer sensors), Telephony and SMS APIs.	[3+12]
Testing and Taking Apps to Market * Debugging mobile apps and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk. Versioning, signing and packaging mobile apps, distributing apps on mobile market place.	[3+12]
Total Hours:	**75**

Text Book(s):	
1.	Dawn Griffi & David Griffi, “Head First Android Development - A Brain Friendly Guide “, O’Reilly Media Inc, USA, 2017.
2.	Anubhav Pradhan,Anil V.Deshpande,“Composing Mobile Apps: Learn/Explore/Apply/ Using Android”, Wiley India Private Limited, 1st Edition, 2014.
Reference(s):	
1.	Frank Ableson W, Sen R ,Chrisking, “Android in Action”, Dream tech Press, New Delhi, 3rd Edition,2012.
2.	Rodger,” Beginning Mobile Application Development In The Cloud”, Wiley Publication,2011.
3.	Carmen Delessio,” Android Application Development In 24 Hours”, 4th Edition, Pearson Education.
4.	Erik Hellman, “Android Programming – Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd,2014.

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction to Android and Development Environment Setup**	
1.1	Introduction to Android: Architecture and Stack, Activities, Services	1
1.2	Introduction to Android: Broadcast Receivers & Content providers, Views & Notifications.	1
1.3	Introduction to Android: Intents & Intent Filters, Android API levels, Emulator.	1
1.4	Android Studio: Overview, Android and File Structure, AVD Manager, DDMS, LogCat.	1
1.5	Dev env Setup: Eclipse and SDK installation, AVD creation, Project Structure.	1
1.6	Hello World - Creating a Project, Working with AndroidManifest.xml, Using log system Activities.	1
2	**UI Design**	
2.1	Basic UI design: Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] vs px.	1
2.2	Menu: Option menu, Context menu, Sub menu - Intents: Explicit Intents, Implicit intents - Activity states and life cycle.	1
2.3	UI Design: Time and Date, Images and media, Composite, UI Design: Alert Dialogs & Toast, Popup.	1
3	**Functionality beyond user interface**	
3.1	Threads, Async task - Services –states and lifecycle, Notifications	1
3.2	Broadcast receivers, Nativedata handling –on-device file I/O - Shared preferences	1
3.3	Mobile databases: SQLite, Enterprise data access (via internet/ Intranet).	1
4	**Sprucing up mobile apps**	
4.1	Multimedia –audio/video playback and record.	1
4.2	Location Based Services and Google Maps	2
4.3	Native hardware access (Using Orientation and Accelerometer sensors)	1
4.4	Telephony and SMS APIs.	2
5	**Testing and Taking Apps to Market**	
5.1	Debugging mobile apps	1
5.2	White box testing, Black box testing, and test automation of mobile apps	1
5.3	JUnit for Android	1
5.4	Robotium	1
5.5	MonkeyTalk , Versioning, signing	1
5.6	Packaging mobile apps, distributing apps on mobile market place.	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. P. Venkatesh - venkateshp@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E14	Swift Coding and App Development	Category	L	T	P	Credit
		PE	1	0	4	3

Objectives

- To understand and apply fundamental of Go language and Swift programming concepts
- To enable students to design user-friendly and visually appealing user interfaces for software applications, utilizing fundamental design principles and the UIKit framework
- To develop the knowledge and skills required to manipulate and displaying data from APIs and using Core Data for local data storage in iOS app development
- To provide a solid foundation in networking principles, including HTTP and REST APIs
- To develop iOS applications that leverage advanced Swift concepts

Pre-requisites

- Basic knowledge of Machine Learning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop Swift code within the Swift Playground environment for real-time experimentation and learning.	Apply
CO2	Implement aesthetically pleasing user interfaces for software applications by leveraging Interface Builder.	Apply
CO3	Design and implement user interfaces with navigation and view controllers.	Apply
CO4	Design and develop iOS applications that seamlessly interact with RESTful APIs, perform JSON parsing, integrate data persistently using Core Data.	Apply
CO5	Apply app testing and debugging techniques effectively, ensuring the reliability and stability of their iOS applications before deployment.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	2	-	-	-	2	-	-	1	-	-	-
CO2	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO3	3	3	3	3	2	-	-	-	2	-	-	1	-	-	-
CO4	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO5	3	3	3	3	2	-	-	-	2	-		2	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	-	-
Apply	30	50	30	50
Analyse	30	50	30	50
Evaluate	-	-	-	-
Create	-	-	-	-
Total	60	100	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E14 - Swift Coding and App Development								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	3	50	50	100

Introduction to Swift* Introduction to Swift Programming Language - Variables, Constants and Data Types - Control Flow: if Statements, Loops - Functions and Basic Code Structure - Swift Playground for Experimentation.	[3+12]
User Interfaces and Design* Introduction to User Interfaces and Design Principles - Interface Builder and UIKit Framework - Creating UI Elements: Labels, Buttons, Text Fields, etc. - Layout Constraints - Handling User Interactions.	[3+12]
App Development Fundamentals* Navigation and View Controllers - Table Views and Collection Views - Data Management and Model – View - Controller (MVC) Architecture - Accessing and Displaying Data from APIs - Core Data for Local Data Storage.	[3+12]
Networking and Data Persistence* Networking Basics (HTTP, REST APIs) - URLSession and Alamofire - JSON Parsing and API Integration - Core Data for Data Persistence - User Defaults and Keychain.	[3+12]
Advanced Concepts and App Features* Advanced Swift Concepts: Optional, Closures, Protocols - Animations and Visual Effects – Integrating Multimedia: Images, Audio, Video – Location Based Services and Maps - App Testing and Debugging Techniques.	[3+12]
Tools used: Open Source - SWIFT / LLVM / CLANG	
Total Hours	**75**

Text Book(s):	
1.	Ahmad Sahar, "iOS 14 Programming for Beginners", 5th Edition, Packt Publishing, UK 2020
2.	Matthew Mathias and John Gallagher, "Swift Programming: The Big Nerd Ranch Guide", 2nd Edition, Big Nerd Ranch Guides, USA, 2015
Reference(s):	
1.	Christian Keur and Aaron Hillegass, “iOS Programming: The Big Nerd Ranch Guide”, 7th Edition, Big Nerd Ranch Guides, USA, 2020
2.	Matt Neuburg, “iOS 14 Programming Fundamentals with Swift: Swift, Xcode, and Cocoa Basics”
3.	Josh Berlin, Rene Cacheaux, et al, “Advanced iOS App Architecture: Real-World App Architecture in Swift”, 3rd Edition, Apress, UK, 2021.
4.	Apple Inc, ”App Development with Swift” 1st Edition, Apple Inc, USA, 2017.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction to Swift**	
1.1	Introduction To Swift Programming Language - Variables, Constants	1
1.2	Data Types - Control Flow , If Statements, Loops	1
1.3	Functions and Basic Code Structure - Swift Playground For Experimentation	1
2	**User Interfaces and Design**	
2.1	Introduction To User Interfaces And Design Principles - Interface Builder	1
2.2	Uikit Framework - Creating UI Elements: Labels, Buttons, Text Fields	1
2.3	Layout Constraints - Handling User Interactions	1
3	**App Development Fundamentals**	
3.1	Navigation And View Controllers - Table Views - Collection Views	1
3.2	Model-View-Controller Introduction	1
3.3	MVC Architecture - Local Data Storage Local Data Storage	1
4	**Networking and Data Persistence**	
4.1	Networking Basics (HTTP, REST APIs) - URLSession and Alamofire	1
4.2	JSON Parsing - API Integration	1
4.3	Core Data for Data Persistence - User Defaults and Keychain	1
5	**Electric and Autonomous Vehicles**	
5.1	Advanced Swift Concepts - Optional, Closures, Protocols	1
5.2	Animations and Visual Effects - Integrating Multimedia	1
5.3	Location-**B**ased Services and Maps - App Testing and Debugging Techniques	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Mr.S. Vignesh S - vigneshs@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E15	Robotic Process Automation	Category	L	T	P	Credit
		PC	1	0	4	3

Objectives

- To interpret the usage of tools and workflows in Robotic Process Automation framework
- To implement data scrapping and automation in UiPath Studio
- To implement different types of recording in UiPath Studio
- To implement the various document understanding activities for automation
- To implement a robot using UI automation

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Infer the tools and workflows used in Robotic Process Automation framework	Apply
CO2	Implement data scrapping and automation in real-time environment	Apply
CO3	Implement different types of recording in UiPath Studio	Apply
CO4	Implement the various document understanding activities for automation	Apply
CO5	Implement a robot using UI automation	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
CO2	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
CO3	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
CO4	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
CO5	3	2	3	2	3	-	-	-	-	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	-	-	-	-
Understand	-	-	-	-
Apply	30	30	50	50
Analyse	30	30	50	50
Evaluate	-	-	-	-
Create	-	-	-	-
Total	60	60	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech - Computer Science and Business Systems								
60 CB E15– Robotic Process Automation								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	3	50	50	100

Introduction Introduction to Robotic Process Automation - Introduction to UiPath - UiPath Tool Installation – Workflows: Sequences, Flowcharts and State Machines - Data Types – Variables - Control Flow - Error Handling	[3+12]
Automation* Data Tables - File and Folder Automation - Excel Automation - PDF Automation - Web Form Filling - Web Data Scrapping - Database Automation - Email Automation	[3+12]
Recording* Introduction to Recording - Recording Types: Automatic Recording, Manual Recording - Basic Recording - Desktop Recording - Web Recording - Input Methods - Screen Scraping - Data Scraping	[3+12]
User Events, Image and Text Automation* Introduction to Selectors - Selectors with Wildcards - Full versus Partial Selectors - Mouse and Keyboard Activities - Image and Text Automation - Image Activities - OCR Activities - Text Activities.	[3+12]
UI Automation* Introduction to Activities, Activity Properties and Input Methods - Output activities and Output Methods - Using App/Web Recorder - Table Extraction - Build and Run UI Automation Project.	[3+12]
Total Hours:	**75**

Text Book(s):	
1.	Alok Mani Tripathi, “Learning Robotic Process Automation, Packt Publishing, First Edition, 2018.
2.	Vaibhav Jain, “Crisper Learning: For UiPath”, Independently Published, Latest Edition, 2018.
Reference(s):	
1.	https://www.uipath.com/rpa/academy/training
2.	https://www.udemy.com/course/robotic-process-automation-for-developers
3.	https://www.udemy.com/course/rpa-uipath

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1	**Introduction**	
1.1	Introduction to Robotic Process Automation, Introduction to UiPath and UiPath Tool Installation	1
1.2	Workflows: Sequences, Flowcharts and State Machines	1
1.3	Data Types, Variables, Control Flow and Error Handling	1
2	**Automation**	
2.1	Data Tables, File and Folder Automation, Excel Automation, PDF Automation	1
2.2	Web Form Filling, Web Data Scrapping	1
2.3	Database Automation, Email Automation	1
3	**Recording**	
3.1	Introduction to Recording, Automatic Recording, Manual Recording	1
3.2	Basic Recording, Desktop Recording	1
3.3	Web Recording, Input Methods, Screen Scraping, Data Scraping	1
4	**User Events, Image and Text Automation**	
4.1	Introduction to Selectors, Selectors with Wildcards, Full versus Partial Selectors	1
4.2	Mouse and Keyboard Activities	1
4.3	Image Activities, OCR Activities, Text Activities.	1
5	**UI Automation**	
5.1	Introduction to Activities, Activity Properties, Input Methods, Output Methods	1
5.2	Using App/Web Recorder, Table Extraction	1
5.3	Build and Run UI Automation Project	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Dr. M.Tamilarasi – tamilarasi@ksrct.ac.in

60 CB E16	Game Development	Category	L	T	P	Credit
		PE	1	0	4	3

Objectives

- To understand the different types of games and navigations.
- To Apply creative and competent to work with 2D Character and vector graphics.
- To remember the basic concepts of computer graphics.
- To apply the necessary theoretical background and demonstrate the application of application of computer science to graphics.
- To Understand 3D Animation and its Importance.

Pre-requisites

- AI Technology and tools, Software Engineering, Programming Language C, C++ and Java

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply any Gaming Project with the different gaming components	Apply
CO2	Apply on the workflow of 2D game design	Apply
CO3	Remember the fundamental graphic system and models	Remember
CO4	Apply Programming with Two-Dimensional Applications and concepts	Apply
CO5	Understand digital imaging and video.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	-	-	-	2	-	-	-	-	-	-
CO2	3	3	3	2	3	-	-	-	2	-	-	-	-	-	-
CO3	3	3	3	2	3	-	-	-	2	-	-	-	-	-	-
CO4	3	3	3	2	3	-	-	-	2	-	-	-	-	-	-
CO5	3	3	3	2	3	-	-	-	2	-	-	-	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Examination (Marks)	End Sem Examination (Marks)
	1	2		
Remember	20	20	20	20
Understand	-	-	30	30
Apply	40	40	50	50
Analyse	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-
Total	60	60	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E16 - Game Development								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
V	1	0	4	75	3	50	50	100

Introduction To 2D Game Design Game development - Different types of game and use cases: FPS, RPG, Racing, Fighting, Casual, Money, Spinner, Real Time Strategy (RTS) - Puzzle, Action - Stealth Shooter, Combat - Customizing the UI – Navigation - Manipulating Objects - Position Game Objects - Place Light Probes.	[3+12]
Working 2D 2D characters - Characters from Different Countries and Styles - Asian characters vs. Western characters - Making sprites - Working with vector graphics.	[3+12]
Graphics Systems And Models Applications of Computer Graphics - A Graphics System-Images - Physical and Synthetic Imaging Systems -The Synthetic - Camera Model - The Programmer's Interface -Graphics Architectures - Programmable Pipelines - Performance Characteristics.	[3+12]
Graphics Programming The Sierpinski Gasket - Programming Two Dimensional Applications - The OpenGL Application Programming Interface - Primitives and Attributes – Color Viewing Control Functions- The Gasket Program - Polygons and Recursion - The Three-Dimensional Gasket - Adding Interaction – Menus.	[3+12]
3D Animation Defining 3D Animation - Exploring 3D animation Industry - Understanding the production pipeline components - Working on 3D animation production: Layout - Research and Development - Modeling - Texturing – Rigging / Setup - Animation - 3D Visual Effects - Lighting / Rendering - Postproduction	[3+12]
Total Hours:	**75**

Text Book(s):	
1.	Adams, "Fundamentals of Game Design", Third edition, New Riders Publication, 2015.
2.	Edward Angel, "Interactive Computer Graphics- A Top-Down Approach with Shader-Based OpenGL", Sixth Edition, Pearson Publication, 2012.
Reference(s):	
1.	Alan Thorn, "Game Development Principles", Cengage Learning PTR Publications, First Edition, 2014
2.	Chris Solarski, " Drawing Basics and Video Game Art: Classic to Cutting-Edge Art Techniques for Winning Video Game Design", First Edition, Watson – Guptill Publication, 2012.
3.	Andy Beane, " 3D Animation Essentials", 1 st Edition, John Wiley & Sons, 2012.
4.	Kelvin Sung, Peter Shirley, "Essentials of Interactive Computer Graphics Concepts and Implementation", First Edition, Steven Baer publication, 2008.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction To 2D Game Design**	
1.1	Game development	1
1.2	Different types of game and use cases - FPS, RPG, Racing, Fighting, Casual, Money, Spinner	1
1.3	Real Time Strategy (RTS) - Puzzle, Action - Stealth Shooter	1
1.4	Combat - Customizing the UI – Navigation - Manipulating Objects - Position Game Objects - Place Light Probes	1
2.0	**Working 2D**	
2.1	2D characters - Characters from Different Countries and Styles	1
2.2	Asian characters vs. Western characters	1
2.3	Making sprites - Working with vector graphics	1
3.0	**Graphics Systems And Models**	
3.1	Applications of Computer Graphics	1
3.2	A Graphics System-Images: Physical and Synthetic Imaging Systems	1
3.3	The SyntheticCamera Model - The Programmer's Interface - Graphics Architectures - Programmable Pipelines - Performance Characteristics	1
4.0	**Graphics Programming**	
4.1	The Sierpinski Gasket - Programming Two Dimensional Applications	1
4.2	The OpenGL Application Programming Interface - Primitives and Attributes	1
4.3	Color Viewing Control Functions - The Gasket Program - The Three-Dimensional Gasket - Adding Interaction ,Menus	1
5.0	**3D Animation**	
5.1	Defining 3D Animation - Exploring 3D animation Industry	1
5.2	Understanding the production pipeline components - Working on 3D animation production: Layout-Research and Development	1
5.3	Modeling - Texturing – Rigging / Setup – Animation -3D Visual Effects - Postproduction	1
6	**Project**	
6.1	Problem Identification	10
6.2	Solution for Problem	15
6.3	Implementation	20
6.4	Presentation	5
6.5	Report	5
6.6	Demo	5

Course Designer(s)

1. Mr.K. Karthikeyan - karthikeyank@ksrct.ac.in

ELECTIVE II

60 CB E21	Marketing Research & Marketing Management	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To understand the changing business environment in management.
- To examine the fundamental premise underlying market driven strategies.
- To identify the indicators of management thoughts and practices.
- To analyze the nature of consumer buying behaviour
- To understanding the marketing research and new trends in the arena of marketing

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand knowledge of contemporary marketing theories to the demands of business and management practice.	Understand
CO2	Identify knowledge of marketing strategies for consumer and industrial marketing	Remember
CO3	Acquire the choice of marketing mix elements and managing integrated marketing channels	Understand
CO4	Ability to analyze the nature of consumer buying behaviour	Apply
CO5	Apply the marketing research and new trends in the arena of marketing	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	3	2		2	3	3	3	2	3	
CO2	2	3		3		3	2	2	3	2	2			3	
CO3	3	3	2	2		3	3	2	3		2	3	2	3	
CO4	3	3	3	2		2	3		2	3		2		3	
CO5	3	2	3	2	3		2	3	3	3	2	3		3	

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	20
Understand	20	20	40
Apply	20	20	30
Analyse	-	-	10
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

60 CB E21 - Marketing Research & Marketing Management

CB

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction* Defining Marketing − Core concepts in Marketing – Evolution of Marketing − Marketing Planning Process − Scanning Business environment: Internal and External − – PESTEL − SWOT Analysis - Marketing in global environment – International Marketing − Rural Marketing − Prospects and Challenges.	[9]
Marketing Strategy* Marketing strategy formulations – Key Drivers of Marketing Strategies - Strategies for Industrial Marketing – Consumer Marketing − Services marketing – Competition Analysis − Analysis of consumer and industrial markets.	[9]
Marketing Mix Decisions* Product planning and development – Product life cycle – New product Development and Management – Defining Market Segmentation – Targeting and Positioning − Brand Positioning and Differentiation –Managing Retailing, Wholesaling and Logistics − Advertising and Sales Promotions – Pricing Objectives, Policies and Methods.	[9]
Buyer Behaviour* Understanding Industrial and Consumer Buyer Behaviour − Influencing factors – Buyer Behaviour Models – Customer relationships management – Customer acquisition, Retaining, Defection − Creating Long Term Loyalty Relationships	[9]
Marketing Research & Trends in Marketing* Marketing Information System – Marketing Research Process – Concepts and applications: Product – Advertising – Promotion – Consumer Behaviour – Retail - Ethics in marketing – Online marketing trends - social media and digital marketing.	[9]
Total Hours:	**45**

Text Book(s):

1.	Philip Kotler, Kevin Lane Keller, Alexander Chernev, Jagdish N. Sheth, Shainesh G. “Marketing Management”, Pearson Education, 16th Edition, 2022
2.	Philip T. Kotler and Kevin Lane Keller, Marketing Management, Prentice Hall India, 15th Edition, 2017.

Reference(s):

1.	Lamb, Hair, Sharma, Mc Daniel– Marketing – An Innovative approach to learning and teaching-A south Asian perspective, Cengage Learning, 2012.
2.	KS Chandrasekar, “Marketing management-Text and Cases”, Tata McGraw Hill Education, 2012
3.	Ramasamy, V.S, Namakumari, S, Marketing Management: Global Perspective Indian Context, Macmillan Education, New Delhi, 6 th edition, 2018.
4.	Paul Baines, Chris Fill, Kelly Page, Marketing, Asian edition, Oxford University Press, 5thedition, 2019.

*SDG 8:- Sustainable economic growth

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Defining Marketing ,Core concepts in Marketing	1
1.2	Evolution of Marketing , Marketing Planning Process	1
1.3	Scanning Business environment: Internal and External	2
1.4	PESTEL , SWOT Analysis ,Marketing in global environment	2
1.5	International Marketing, Rural Marketing.	1
1.6	Prospects and Challenges	2
2.0	**Marketing Strategy**	
2.1	Marketing strategy formulations	2
2.2	Key Drivers of Marketing Strategies ,Strategies for Industrial Marketing	2
2.3	Consumer Marketing, Services marketing	2
2.4	Competition Analysis	1
2.5	Analysis of consumer and industrial markets	2
3.0	**Marketing Mix Decisions**	
3.1	Product planning and development	1
3.2	Product life cycle ,New product Development and Management	2
3.3	Defining Market Segmentation , Targeting and Positioning	2
3.4	Brand Positioning and Differentiation , Managing Retailing,	1
3.5	Wholesaling and Logistics ,Advertising and Sales Promotions	1
3.6	Pricing Objectives, Policies and Methods.	2
4.0	**Buyer Behaviour**	
4.1	Understanding Industrial and Consumer Buyer Behaviour	1
4.2	Influencing factors – Buyer Behaviour Models	2
4.3	Customer relationships management	1
4.4	Customer acquisition	2
4.5	Retaining, Defection	2
4.6	Creating Long Term Loyalty Relationships	1
5.0	**Marketing Research & Trends in Marketing**	
5.1	Marketing Information System , Marketing Research Process	2
5.2	Marketing Information System , Marketing Research Process	1
5.3	Advertising , Promotion , Consumer Behaviour	2
5.4	Retail ,Ethics in marketing	2
5.5	Online marketing trends ,social media and digital marketing	2

Course Designer(s)

1. Dr.M.Mohanraj – mohanrajm@ksrct.ac.in

60 CB E22	Financial Analytics	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To understand modern analytical tools that specifically target finance applications
- To understand different management aspects
- To learn financial analysis for decision making
- To understand human resource management
- To learn different business strategy

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand different management techniques	Understand
CO2	Apply analytical tools that specifically target finance applications.	Understand
CO3	Describe financial analysis for decision making	Apply
CO4	Understand human resource management	Apply
CO5	Adopt different business strategy	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	2	3	-	3	-	3	-	-	-	-	3
CO3	2	-	3	2	-	-	-	-	-	-	-	-	-	2	-
CO4	-	3	-	-	-	-	-	2	2	2	-	-	-	3	
CO5	2	3	-	2	2	-	-	-	-	-	-	-	3	-	2
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	-	-	-
Understand(Un)	25	25	45
Apply (Ap)	25	25	35
Analyse (An)	10	10	20
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech-Computer Science and Business Systems								
60 CB E22 - Financial Analytics								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Foundations of Financial Analytics * Financial Analytics – Need - Data in Finance - Sources of Financial Data – Pre-processing of Financial Data - Applicability of Tools (Excel, SPSS, R, Python) for Exploratory Data Analysis.	[9]
Corporate Finance Analysis * Basic corporate financial predictive modelling- Project analysis- cash flow analysis- cost of capital, Financial Break even modelling, Capital Budget model-Payback, NPV, IRR.	[9]
Financial Market Analysis * Estimation and prediction of risk and return (bond investment and stock investment) –Time series examining nature of data, Value at risk, ARMA, ARCH and GARCH.	[9]
Portfolio Analysis * Portfolio Analysis – capital asset pricing model, Sharpe ratio, Option pricing models-binomial model for options, Black Scholes model and Option implied volatility.	[9]
Technical Analysis* Prediction using charts and fundamentals – RSI, ROC, MACD, moving average and candle charts, simulating trading strategies. Prediction of share prices.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Financial analytics with R by Mark J. Bennett, Dirk L. Hugen, Cambridge university press
2.	Haskell Financial Data Modeling and Predictive Analytics Paperback – Import, 25 Oct 2013 by Pavel Ryzhov
Reference(s):	
1.	Quantitative Financial Analytics: The Path To Investment Profits Paperback – Import, 11 Sep 2017 by Edward E Williams (Author), John A Dobelman 2018
2.	Python for Finance - Paperback – Import, 30 Jun 2017 by Yuxing Yan (Author)
3.	Mastering Python for Finance Paperback – Import, 29 Apr 2015 by James Ma Weiming. Concepts, Techniques and Applications", Wiley Publications, 2016
4.	James Evans, "Business Analytics", (2nd Edition) Pearson Publications, 2018.

*SDG 8:–Sustainable economic growth

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Foundations of Financial Analytics**	
1.1	Financial Analytics	2
1.2	Need - Data in Finance	1
1.3	Sources of Financial Data	2
1.4	Pre-processing of Financial Data	2
1.5	Applicability of Tools (Excel, SPSS, R, Python) for Exploratory Data Analysis	3
2.0	**Corporate Finance Analysis**	
2.1	Basic corporate financial predictive modelling	2
2.2	Project analysis- cash flow analysis	2
2.3	cost of capital, Financial Break even modelling	3
2.4	Capital Budget model	1
2.5	Payback, NPV, IRR	1
3.0	**Financial Market Analysis**	
3.1	Estimation and prediction of risk and return (bond investment and stock investment)	3
3.2	Time series examining nature of data	3
3.3	Value at risk	2
3.4	ARMA, ARCH and GARCH	1
4.0	**Portfolio Analysis**	
4.1	Portfolio Analysis	2
4.2	capital asset pricing model	1
4.3	Sharpe ratio	2
4.4	Option pricing models	2
4.5	binomial model for options	2
4.6	6 Black Scholes model and Option implied volatility	1
5.0	**Technical Analysis**	
5.1	Prediction using charts and fundamentals	2
5.2	RSI, ROC	2
5.3	MACD	1
5.4	moving average and candle charts	1
5.5	simulating trading strategies	1
5.6	Prediction of share prices	2

Course Designer(s)

1. Dr.H.Kalaiarasi - kalaiarasi@ksrct.ac.in

60 CB E23	Digital Marketing	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To examine and explore the role and importance of digital marketing in today's rapidly changing business environment
- It also focusses on how digital marketing can be utilized by organizations and how its effectiveness can measured
- To know the key elements of a digital marketing strategy
- To study how the effectiveness of a digital marketing campaign can be measured
- To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blog

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the core concepts and principles of Digital marketing	Understand
CO2	Implement SEO techniques to improve website visibility and manage PPC campaigns for targeted advertising.	Apply
CO3	Design and execute email marketing campaigns for lead nurturing.	Create
CO4	Utilize social media platforms for marketing and engagement.	Create
CO5	Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	3	3	2	-	2	3	3	3	2	3	-
CO2	2	3	-	3	-	3	2	2	3	2	2	-	-	3	-
CO3	3	3	2	2	-	3	3	2	3	-	2	3	2	3	-
CO4	3	3	3	2	-	2	3	-	2	3	-	2	-	3	-
CO5	3	2	3	2	3	-	2	3	3	3	2	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	20	20	40
Apply	20	20	30
Analyse	-	-	10
Evaluate	-	-	-
Create	20	20	20
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E23- Digital Marketing								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction to Online Market * Online Market space, Market Place- Digital Marketing Strategy- Components Opportunities for building Brand Website -Planning and Creation- Content Marketing.	[9]
Search Engine Optimisation * Search Engine optimization - Keyword Strategy- SEO Strategy - SEO success factors -On-Page Techniques - Off-Page Techniques. Search Engine Marketing- How Search Engine works- SEM components- PPC advertising -Display Advertisement.	[9]
E- Mail Marketing * E- Mail Marketing - Types of E- Mail Marketing - Email Automation - Lead Generation - Integrating Email with Social Media and Mobile- Measuring and maximizing email campaign effectiveness. Mobile Marketing- Mobile Inventory/channels- Location based; Context based; Coupons and offers, Mobile Apps, Mobile Commerce, SMS Campaigns- Profiling and targeting	[9]
Social Media Marketing * Social Media Marketing - Social Media Channels- Leveraging Social media for brand conversations and buzz. Successful /benchmark Social media campaigns. Engagement Marketing- Building Customer relationships - Creating Loyalty drivers - Influencer Marketing.	[9]
Digital Transformation * Digital Transformation & Channel Attribution- Analytics- Ad-words, Email, Mobile, Social Media, Web Analytics - Changing your strategy based on analysis- Recent trends in Digital marketing.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Fundamentals of Digital Marketing by Puneet Singh Bhatia;Publisher: Pearson Education; First edition (July 2017);ISBN-10: 933258737X;ISBN-13: 978-9332587373
2.	Digital Marketing by Vandana Ahuja ;Publisher: Oxford University Press (April 2015). ISBN-10: 0199455449
Reference(s):	
1.	Marketing 4.0: Moving from Traditional to Digital by Philip Kotler; Publisher: Wiley; 1st edition (April 2017); ISBN10: 9788126566938;ISBN13: 9788126566938;ASIN: 8126566930.
2.	Ryan, D. (2014). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited.
3.	Barker, Barker, Bormann and Neher(2017), Social Media Marketing: A Strategic Approach, 2E South- Western ,Cengage Learning.
4.	Pulizzi,J Beginner's Guide to Digital Marketing , Mcgraw Hill Education.

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Online Market**	
1.1	Online Market space, Market space	1
1.2	Digital Marketing Strategy	2
1.3	Components	1
1.4	Opportunities for building Brand Website 1	1
1.5	Planning and Creation	2
1.6	Content Marketing.	2
2.0	**Search Engine Optimisation**	
2.1	Search Engine optimization - Keyword Strategy	2
2.2	SEO Strategy - SEO success factors -On-Page Techniques - Off-Page Techniques	2
2.3	Search Engine Marketing- How Search Engine works	2
2.4	SEM components	1
2.5	PPC advertising -Display Advertisement	2
3.0	**E- Mail Marketing**	
3.1	E- Mail Marketing - Types of E- Mail Marketing	1
3.2	Email Automation - Lead Generation	1
3.3	Integrating Email with Social Media and Mobile- Measuring and maximizing email campaign effectiveness	2
3.4	Mobile Marketing- Mobile Inventory/channels- Location based-Context based	2
3.5	Coupons and offers, Mobile Apps, Mobile Commerce	1
3.6	SMS Campaigns-Profiling and targeting	2
4.0	**Social Media Marketing**	
4.1	Social Media Marketing - Social Media Channels	1
4.2	Leveraging Social media for brand conversations and buzz	1
4.3	Successful /benchmark Social media campaigns	1
4.4	Engagement Marketing	2
4.5	Building Customer relationships- Creating Loyalty drivers	2
4.6	Influencer Marketing	2
5.0	**Digital Transformation**	
5.1	Digital Transformation & Channel Attribution	2
5.2	Analytics- Ad-words, Email, Mobile, Social Media	2
5.3	Web Analytics	2
5.4	Changing your strategy based on analysis	1
5.5	Recent trends in Digital marketing	2

Course Designer(s)

1. P. Naveen Prabu– naveenprabu@ksrct.ac.in

60 CB E24	Risk Analytics	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To develop a basic understanding of risk assessment and its role within the risk management process.
- To understand risk assessment and its role within the risk management process.
- To differentiate between risk assessment and risk management.
- To develop a basic understanding of how to conduct and evaluate an uncertainty analysis for a risk assessment.
- To understand the risk management issues and challenges

Pre-requisites

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the core types of project risks.	Understand
CO2	Use qualitative and quantitative risk assessment methods.	Understand
CO3	Competently use risk simulation techniques.	Apply
CO4	Use risk analysis tools/methods and work in a group to create a risk management plan based on the ISO 31000:2009.	Apply
CO5	Identify a range of risk management issues/challenges and the risks as complex systems cascade and be competent to initiate potential actions in response.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	-	2	3	-	3	-	3	-	-	-	-	3
CO3	2	-	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	3	-	-	-	-	-	2	2	2	-	-	-	3	-
CO5	2	3	-	2	2	-	-	-	-	-	-	-	3	-	2

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	25	25	45
Apply	25	25	35
Analyse	10	10	20
Evaluate	0	0	0
Create	0	0	0
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech. Computer Science and Business Systems								
60 CB E24 - Risk Analytics								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction * Introduction, Fundamentals of Risk- Risk Planning, Assessment and Management Process and the Systems Approach-Types of Risk Assessment and Engineering Risk Assessment.	[9]
Risk Identification * Risk Identification- Historical data, comparative analysis, and checklist- Taxonomy based, risk breakdown structure, HHM, SWOT, root cause analysis, influence diagram - Expert/ user/ stakeholder-based elicitation (Delphi, brainstorming, interview), Scenario-based, experience based, objective-based analysis.	[9]
Tools and Methods for Risk Assessment * Preliminary Hazard Analysis (PHA), Hazards and Operability Analysis (HAZOP) - Job Safety Analysis (JSA) - Failure Modes and Effects Analysis (FMEA)- Fault Tree Analysis (FTA), Event Tree Analysis (ETA), Decision Trees- Cause-Consequence Analysis (CCA).	[9]
Risk Prioritization & Treatment * Risk Probability and Impact Assessment, Risk Index and Risk Ranking - − Risk Matrix, EV Analysis, Sensitivity and Tradeoff Analysis, Modeling and Simulation- Risk Attitude and Risk Tolerance, As Low As Reasonably Practicable (ALARP)- Avoidance, Separation, Reduction, Transfer, Acceptance- Detection, Control, Response and Recovery- Performance Monitoring.	[9]
Application Oriented Areas * ISO 3100, Quality and Reliability- Supply Chain Risk Management- Project Risk Management.	[9]
Total Hours:	**45**
Text Book(s):	

1.	Marvin Rausand Stein Haugen, Risk Assessment: Theory, Methods, and Applications, Wiley, 2020.
2.	Mohammad Modarres, Risk Analysis in Engineering Techniques, Tools, and Trends, CRC Press, 2006.
Reference(s):	
1.	Eduardo Rodriguez Risk Analytics Data-Driven Decisions under Uncertainty, CRC Press, 2023
2.	Edward H. K. Ng Risk Analytics: From Concept To Deployment (2021) World Scientific Publishing Co. Pte. Ltd.
3.	Gerardus Blokdyk Risk Analytics A Complete Guide - 2020 Edition, 5STARCooks
4.	David Vose Risk Analysis: A Quantitative Guide 3rd Edition, Wiley

* SDG 8:- Sustainable economic growth

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	Introduction	2
1.2	Fundamentals of Risk	1
1.3	Risk Planning	2
1.4	Assessment and Management Process and the Systems Approach	2
1.5	Types of Risk Assessment and Engineering Risk Assessment	3
2.0	**Risk Identification**	
2.1	Risk Identification	2
2.2	Historical data, comparative analysis, and checklist	2
2.3	Taxonomy based, risk breakdown structure	3
2.4	HHM, SWOT, root cause analysis, influence diagram	1
2.5	Expert/ user/stakeholder-based elicitation (Delphi, brainstorming, interview), Scenario-based, experience based, objective-based analysis	1
3.0	**Tools and Methods for Risk Assessment**	
3.1	Preliminary Hazard Analysis (PHA)	3
3.2	Hazards and Operability Analysis (HAZOP) - Job Safety Analysis (JSA)	3
3.3	Failure Modes and Effects Analysis (FMEA)- Fault Tree Analysis (FTA), Event Tree Analysis (ETA)	2
3.4	Decision Trees- Cause-Consequence Analysis (CCA	1
4.0	**Risk Prioritization & Treatment**	
4.1	Risk Probability and Impact Assessment, Risk Index and Risk Ranking	2
4.2	Risk Matrix, EV Analysis	1
4.3	Sensitivity and Tradeoff Analysis, Modeling and Simulation- Risk Attitude and Risk Tolerance, As Low As Reasonably Practicable (ALARP)	2
4.4	Avoidance, Separation, Reduction, Transfer, Acceptance	2
4.5	Detection, Control, Response and Recovery	2
4.6	Performance Monitoring	1
5.0	**APPLICATION ORIENTED AREAS**	**1**
5.1	ISO 3100	2
5.2	Quality and Reliability	2
5.3	Supply Chain Risk Management	2
5.4	Project Risk Management	2
	Total	**45**

Course Designer(s)

1. Dr.H.Kalaiarasi – kalaiarasi@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E25	Financing New Business Ventures	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To understand the concepts of business ventures
- To develop the basics of business venture financing
- To impart the knowledge essential for entrepreneurs for financing new ventures
- To adopt the learners with the sources of debt and equity financing
- To empower the learners towards fund raising for new ventures effectively

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the basics of starting a new business venture	Evaluate
CO2	Understand the basics of venture financing	Understand
CO3	Understand the sources of debt financing	Understand
CO4	Understand the sources of equity financing	Understand
CO5	Choose the methods of fund raising for new business ventures	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	-	3	2	2	-	-	2	2	-	2	2	3	-
CO2	3	2	2	3	3	2	-	3	-	-	-	2	3	3	-
CO3	3	3	2	3	2	2	-	2	2	2	-	-	-	3	-
CO4	-	2	-	3	2	3	2	3	-	-	-	2	2	3	-
CO5	2	3	3	3	-	-	-	3	2	2	2	3	2	3	-

3 - Strong; 2 - Medium; 1 – Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	40
Understand	20	25	35
Apply	20	15	25
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0
Total	60	60	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E25- Financing New Business Ventures								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Essentials of New Busines Venture * Setting up new Business Ventures – Need - Scope - Franchising - Location Strategy, Registration Process - State Directorate of Industries- Financing for New Ventures - Central and State Government Agencies **-** Types of loans – Financial Institutions - SFC, IDBI, NSIC and SIDCO.	[9]
Introduction to Venture Financing * Venture Finance – Definition – Historic Background - Funding New Ventures- Need – Scope – Types - Cost of Project - Means of Financing - Estimation of Working Capital - Requirement of funds – Mix of Debt and Equity - Challenges and Opportunities.	[9]
Sources of Debt Financing * Fund for Capital Assets - Term Loans - Leasing and Hire-Purchase - Money Market instruments – Bonds, Corporate Papers – Preference Capital- Working Capital Management- Fund based Credit Facilities - Cash Credit - Over Draft.	[9]
Sources of Equity Financing * Own Capital, Unsecured Loan - Government Subsidies, Margin Money- Equity Funding - Private Equity FundSchemes of Commercial banks - Angel Funding – Crowdfunding- Venture Capital.	[9]
Methods of Fund Raising for New Ventures * Investor Decision Process - Identifying the appropriate investors- Targeting investors- Developing Relationships with investors - Investor Selection Criteria- Company Creation- Raising Funds - Seed Funding- VC Selection Criteria – Process- Methods- Recent Trends.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Principles of Corporate Finance by Brealey and Myers et al.,12TH ed, McGraw Hill Education (India) Private.
2.	Prasanna Chandra, Projects: Planning, Analysis, Selection, Financing, Implementation and Review, McGraw Hilld Education India Pvt Ltd , New Delhi , 2019.
Reference(s):	
1.	Introduction to Project Finance. Andrew Fight, Butterworth-Heinemann, 2006.
2.	Metrick, Andrew; Yasuda, Ayako. Venture Capital And the Finance of Innovation. Venture Capital and The Finance of Innovation, 2nd Edition, Andrew Metrick and Ayako Yasuda, Eds., John Wiley and Sons, Inc, 2010.
3.	Lerner, Josh; Leamon, Ann; Hardymon, Felda. Venture Capital, Private Equity, And the Financing of Entrepreneurship. 2012
4.	Entrepreneurship. 2012. Camp, Justin J. Venture Capital Due Diligence: A Guide to Making Smart Investment Choices And Increasing Your Portfolio Returns. John Wiley & Sons, 2002

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Essentials of New Busines Venture**	
1.1	Setting up new Business Ventures – Need - Scope	2
1.2	Franchising - Location Strategy, Registration Process- State Directorate of Industries	2
1.3	Financing for New Ventures - Central and State Government Agencies	2
1.4	Types of loans	1
1.5	Financial Institutions - SFC, IDBI, NSIC and SIDCO.	2
2.0	**Introduction to Venture Financing**	
2.1	Venture Finance – Definition – Historic Background	2
2.2	Funding New Ventures- Need – Scope – Types	2
2.3	Cost of Project - Means of Financing - Estimation of Working Capital	3
2.4	Requirement of funds – Mix of Debt and Equity	1
2.5	Challenges and Opportunities	1
3.0	**Sources of Debt Financing**	
3.1	Fund for Capital Assets - Term Loans	2
3.2	Leasing and Hire-Purchase - Money Market instruments	2
3.3	Money Market instruments – Bonds, Corporate Papers – Preference Capital	2
3.4	Working Capital Management	2
3.5	Fund based Credit Facilities - Cash Credit - Over Draft	1
4.0	**Sources of Equity Financing**	
4.1	Own Capital, Unsecured Loan - Government Subsidies, Margin Money	2
4.2	Equity Funding - Private Equity Fund	2
4.3	Schemes of Commercial banks	2
4.4	Angel Funding – Crowdfunding	2
4.5	Venture Capital	1
5.0	**Methods of Fund Raising for New Ventures**	
5.1	Investor Decision Process - Identifying the appropriate investors	2
5.2	Targeting investors- Developing Relationships with investors	2
5.3	Investor Selection Criteria- Company Creation	2
5.4	Raising Funds - Seed Funding- VC Selection Criteria	2
5.5	Process- Methods- Recent Trends	1
	Total	**45**

Course Designer(s)

1. Mr.R.Murugaganesh – murugaganesh@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E26	Creativity & Innovation in Entrepreneurship	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To develop the creativity skills among the learners
- To impart the knowledge of creative intelligence essential for entrepreneurs
- To know the applications of innovation in entrepreneurship
- To identify the applications of innovation in building successful ventures
- To develop innovative business models for business

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the basics of creativity for developing Entrepreneurship.	Apply
CO2	Understand the significance of creative intelligence for business growth.	Understand
CO3	Understand the developments through Innovation in Industries.	Understand
CO4	Identify the applications of innovation in building successful ventures.	Understand
CO5	Articulate the innovative business models to run the business efficiently and effectively.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	-	-	-	-	3	-	-	3	2	-	2	-	-	3
CO2	3	2	-	2	-	2	-	3	-	-	2	-	2	-	-
CO3	3	-	-	-	-	-	2	-	-	3	-	-	-	-	2
CO4	3	2	-	2	2	3	2	-	-	-	-	2	-	2	-
CO5	2	-	-	-	-	-	-	-	2	-	-	-	2	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	25	25	35
Understand	25	25	45
Apply	10	10	20
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB E26- Creativity & Innovation in Entrepreneurship								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Creativity * Definition- Forms of Creativity- Creative Personality and Motivation -Essence, Elaborative and Expressive Creativities- Quality of Creativity-Existential, Entrepreneurial and Empowerment Creativities – Creative Environment- Creative Technology- Improving the quality of our creativity.	[9]
Creative Intelligence * A model of Creative Intelligence -Convergent thinking ability – Traits Congenial to creativity –-Credible Evaluation-– Creative Tools and Techniques - Blocks to creativity- fears and Disabilities- Strategies for Unblocking- Designing Creativity Enabling Environment- Creativity Training--Criteria for evaluating Creativity- Creative Personality and forms of creativity Motivation and Creativity - Energy for your creativity.	[9]
Innovation * Definition- Levels of Innovation- Incremental Vs Radical Innovation- Characteristics of Innovation in Different Sectors- Theories in Innovation and Creativity- Design Thinking and Innovation- Product Innovation and Process- Technological, Organizational Innovation – Indicators-. - Innovation as Collective Change-Innovation as a system.	[9]
Innovation and Entrepreneurship * Entrepreneurial Mindset- Entrepreneurial Opportunities- Entrepreneurial Strategies - Motivations and Behaviours- Opportunity Analysis and Decision Making- Industry Understanding -– Technology Pull/Market Push – Product -Market fit.	[9]
Innovative Business Models * Customer Discovery-Customer Segments-Prospect Theory and Developing Value Propositions- Developing Business Models: Elements of Business Models – Innovative Business Models: Elements, Designing Innovative Business Models- Responsible Innovation and Creativity.	[9]
Total Hours:	**45**

Text Book(s):	
1.	H.James Harrington,Creativity and Innovation in Entrepreneurship, Productivity Press,2018.
2.	Vinnie Jauhari, SudanshuBhushan, Innovation Management, Oxford Higher Education, 2014.
Reference(s):	
1.	A DaleTimpe, Creativity, Jaico Publishing House, 2003.
2.	Pradip N Khandwalla, Lifelong Creativity, An Unending Quest, Tata McGraw Hill, 2004.
3.	Brian Clegg, Paul Birch, Creativity, Kogan Page, 2009.
4.	P. N. Rastogi, Managing Creativity for Corporate Excellence, Macmillan 2009.
5.	Innovation Management, C. S. G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Creativity**	
1.1	Definition	1
1.2	Forms of Creativity	1
1.3	Creative Personality and Motivation	1
1.4	Essence, Elaborative and Expressive Creativities	1
1.5	Quality of Creativity	1
1.6	Existential, Entrepreneurial and Empowerment Creativities	1
1.7	Creative Technology	1
1.8	Creative Environment	1
1.9	Improving the quality of our creativity	1
2.0	**Creative Intelligence**	
2.1	A model of Creative Intelligence	1
2.2	Convergent thinking ability	1
2.3	Traits Congenial to creativity	1
2.4	Credible Evaluation , Creative Tools and Techniques	1
2.5	Blocks to creativity , fears and Disabilities	1
2.6	Strategies for Unblocking- Designing Creativity Enabling Environment	1
2.7	Creativity Training,Criteria for evaluating Creativity	1
2.8	Creative Personality and forms of creativity Motivation and Creativity	1
2.9	Energy for your creativity	1
3.0	**Innovation**	
3.1	Definition, Levels of Innovation	1
3.2	Incremental Vs Radical Innovation	1
3.3	Characteristics of Innovation in Different Sectors	1
3.4	Theories in Innovation and Creativity	1
3.5	Design Thinking and Innovation	1
3.6	Product Innovation and Process	1
3.7	Technological, Organizational Innovation	1
3.8	Indicators	1
3.9	Innovation as Collective Change-Innovation as a system	1
4.0	**Innovation and Entrepreneurship**	
4.1	Entrepreneurial Mindset	1
4.2	Entrepreneurial Opportunities	1
4.3	Entrepreneurial Strategies	1
4.4	Motivations and Behaviours	1
4.5	Opportunity Analysis and Decision Making	1
4.6	Industry Understanding	1
4.7	Technology Pull/Market Push	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.8	Product -Market fit	2
5.0	**Innovative Business Models**	
5.1	Customer Discovery	1
5.2	Customer Segments	1
5.3	Prospect Theory and Developing Value Propositions	2
5.4	Developing Business Models: Elements of Business Models	2
5.5	Innovative Business Models: Elements, Designing Innovative Business Models	2
5.6	Responsible Innovation and Creativity	1

Course Designer(s)

1. Dr.E.Kalaivani – kalaivanie@ksrct.ac.in

ELECTIVE III

		Category	L	T	P	Credit
60 CB E31	**Natural Language Processing**	**PC**	**2**	**0**	**2**	**3**

Objectives

- To learn the fundamentals of natural language processing
- To apply the word level analysis in the given text
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics
- To apply the NLP techniques to IR applications

Pre-requisites

- Basic Knowledge of probability, linear algebra, and calculus

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Classify the different language modelling.	Remember
CO2	Design an innovative application using NLP components.	Apply
CO3	Implement a rule based system to tackle morphology/syntax of a language.	Understand, Apply
CO4	Design a tag set used for statistical processing for real-time applications.	Understand, Apply
CO5	Compare and contrast the use of different statistical approaches for different types of NLP applications.	Understand, Analyze

Mapping with Programme Outcomes

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2	2	3	3	2	-	-	-	-	-	-	3	-	3
CO2	2	2	3	3	3	-	2	-	-	-	-	-	-	2	2
CO3	2	2	3	3	3	-	-	-	-	2	-	-	-	2	2
CO4	2	2	3	2	3	-	-	2	-	-	3	-	-	-	2
CO5	2	2	3	3	2	-	-	-	2	-	-	3	-	-	2
3 - High; 2 - Medium; 1 - Low															

Assessment Pattern

Bloom's Category	**Continuous Assessment Tests (Marks)**				**Model Exam (Marks)**		**End Sem Examination (Marks)**	
	Test 1		**Test 2**					
	Theory	**Lab**	**Theory**	**Lab**	**Theory**	**Lab**	**Theory**	**Lab**
Remember	20	-	20	-	40	-	40	-
Understand	40	-	40	-	60	-	60	-
Apply	-	50	-	50	-	50	-	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E31– Natural Language Processing								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Introduction* Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Text Normalization, Minimum Edit Distance.	**[6]**
Word Level Analysis* Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Named Entities and Named Entity Tagging, HMM Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.	**[6]**
Syntactic Analysis* Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.	**[6]**
Semantics and Pragmatics* Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.	**[6]**
Discourse Analysis and Lexical Resources* Discourse Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution –NLP Applications: Information extraction, Question Answering Systems, Chatbots & Dialogue Systems, Automatic Speech Recognition and Text-to-Speech.	**[6]**
Practical: 1.Implement a programs like Word Analysis 2 Implement a programs like Word Generation 3. Use the NLTK and spacy toolkit for NLP Programming. 4. Develop a programs using various pre-processing techniques for a given corpus. 5. Develop a programming logic using NLTK functions. 6. Build applications using various NLP techniques for a given corpus. 7. Implement a word Tokenizer, Sentence and Paragraph Tokenizers. 8. Implement a function that finds the 50 most frequently occurring words of a text that are not stop words. 8. Develop a program to find all the mis-spelled words in a paragraph. 10. Installation and exploring features of NLTK and spaCy tools. Download Word Cloud and few corpora	**[30]**
Total Hours: (Lecture - 45; Practical - 15)	**60**

Text Book(s):	
1.	Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2022.
2.	Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python‖, First Edition, O_Reilly Media, 2009.
Reference(s):	

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

1.	Hobson lane, Cole Howard, Hannes Hapke, “Natural language processing in action” MANNING Publications, 2019.
2.	Rajesh Arumugam, RajalingappaShanmugamani “Hands-on natural language processing with python: A practical guide to applying deep learning architectures to your NLP application”. PACKT publisher, 2018.
3.	Alexander Clark, Chris Fox, Shalom Lappin, “The Handbook of Computational Linguistics and Natural Language Processing”, Wiley-Blackwell, 2012
4.	NitinIndurkhya, Fred J. Damerau “Handbook of Natural Language Processing”, Second Edition, CRC Press, 2010.

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction**	
1.1	Origins and challenges of NLP – Language Modeling	1
1.2	Grammar-based LM, Statistical LM -	1
1.3	Regular Expressions	1
1.4	Finite- State Automata	1
1.5	English Morphology	1
1.6	Transducers for lexicon and rules, Tokenization	1
1.7	Detecting and Correcting Spelling Errors	1
1.8	Text Normalization	1
1.9	Minimum Edit distance	1
2	**Word Level Analysis**	
2.1	Unsmoothed N-grams, Evaluating N-grams	1
2.2	Smoothing, Smoothing, Interpolation and Backoff	1
2.3	Word Classes, Part-of-Speech Tagging	1
2.4	Named Entities and Named Entity Tagging	1
2.5	HMM Part-of-Speech Tagging	1
2.6	Rule-based, Stochastic	1
2.7	Transformation-based tagging.	1
2.8	Issues in PoS tagging	1
2.9	Hidden Markov.Maximum Entropy models	1
3	**Syntactic Analysis**	
3.1	Context-Free Grammars	1
3.2	Grammar rules for English, Treebanks,	1
3.3	Normal Forms for grammar ,Dependency Grammar	1
3.4	Syntactic Parsing, Ambiguity,	1
3.5	Dynamic Programming parsing	1
3.6	Shallow parsing – Probabilistic CFG, Probabilistic CYK	1
3.7	Probabilistic Lexicalized CFGs	1
3.8	Feature structures	1
3.9	Unification of feature structures	1
4	**Semantics and Pragmatics**	
4.1	Requirements for representation,	1
4.2	First -Order Logic, Description Logics	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.3	Syntax-Driven Semantic analysis, Semantic attachments	1
4.4	Word Senses, Relations between Senses	1
4.5	Thematic Roles, selectional restrictions	1
4.6	Word Sense Disambiguation	1
4.7	WSD using Supervised, Dictionary & Thesaurus	1
4.8	Bootstrapping methods	1
4.9	Word Similarity using Thesaurus, Distributional methods.	1
5	**Discourse Analysis and Lexical Resources**	
5.1	Discourse Coherence – Reference Phenomena,	1
5.2	Anaphora Resolution using Hobbs and Centering Algorithm	1
5.3	Coreference Resolution – Resources: Porter Stemmer	1
5.4	Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank	1
5.5	FrameNet, Brown Corpus, British National Corpus (BNC)	1
5.6	Lexicons for Sentiment, Affect	1
5.7	Connotation- NLP Applications: Information extraction	1
5.8	Question Answering Systems	1
5.9	Chatbots & Dialogue Systems, Automatic Speech Recognition and Text-to-Speech	1
Practical:		
1.	Implement a programs like Word Analysis	2
2.	Implement a programs like Word Generation	4
3.	Use the NLTK and spacy toolkit for NLP Programming.	4
4.	Develop a programs using various pre-processing techniques for a given corpus.	2
5.	Develop a programming logic using NLTK functions.	2
6.	Build applications using various NLP techniques for a given corpus.	4
7.	Implement a word Tokenizer, Sentence and Paragraph Tokenizers	3
8.	Implement a function that finds the 50 most frequently occurring words of a text that are not stop words	3
9.	Develop a program to find all the mis-spelled words in a paragraph	3
10.	Installation and exploring features of NLTK and spaCy tools. Download Word Cloud and few corpora	3

Course Designer(s)

1. Dr. P.MANIMARAN - manimaran@ksrct.ac.in

60 CB E32	Conversational Systems	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To enable attendees to acquire knowledge on chatbots and their terminologies
- To understand the different techniques of natural language processing
- Work with ML Concepts and different algorithms to build a custom ML Model
- To involve AI in building conversational systems
- To know the various applications of conversational systems and its future developments

Pre-requisites

- Familiarity with foundational computer science concepts and a grasp of language structure and Logical Thinking. Proficiency in ML Algorithms

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Will be familiar with the basic technologies required for building a conversational system.	Understand
CO2	Will be familiar with the NLTK tool kit and the pre-processing techniques of natural language processing.	Remember
CO3	Build a Chabot for any application and deploy it.	Understand
CO4	Involve AI in building conversational systems and build advanced systems that can be cognitively inclined towards human behaviour.	Apply
CO5	Will be able to build a real-time working conversational system for social domain that can intelligently process inputs and generate relevant replies.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	1	-	2	1	-	1	1	-	2	1	1	-	-
CO2	2	2	1	-	2	1	-	-	-	-	2	2	1	-	-
CO3	3	3	1	-	3	-	-	-	-	-	3	1	1	-	-
CO4	2	3	-	-	2	1	-	1	-	-	2	2	-	-	-
CO5	2	2	2	2	3	-	-	2	-	-	3	3	2	-	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Exam (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	-	-	-	-	-	-	-	-
Understand	40	-	20	-	40	-	40	-
Apply	10	50	40	50	60	50	60	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E32 - Conversational Systems

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Fundamentals of Conversational Systems * Overview, Explanation about different modes of engagement for a human being - Underlying technologies: Natural Language Processing, Artificial Intelligence and Machine Learning, Natural Language Generation, Speech-To-Text, Text-To-Speech.	[6]
Natural Language Processing * Introduction: Brief history, Basic Concepts, Phases of NLP, Application of chatbots. General chatbot architecture, Basic concepts in chatbots: Intents, Entities, Utterances, Variables and Slots, Fulfilment.	[6]
Building a Chatbot / Conversational AI Systems * Fundamentals of Conversational Systems (NLU, DM and NLG). Chatbot framework & Architecture, Conversational Flow and design, Intent Classification (ML and DL-based techniques), Dialogue Management Strategies, Natural Language Generation.UX design, APIs and SDKs, Usage of Conversational Design Tools.	[6]
Role of ML/AI in Conversational Technologies * Understanding how conversational systems Use ML technologies in ASR, NLP - Advanced Dialog management - Language Translation - Emotion/Sentiment Analysis - Information extraction to effectively converse.	[6]
Conversational Analytics and the Future of Conversational System* Conversation Analytics: The need for it. Introduction to Conversational Metrics - Summary, Robots and Sensory Applications overview - XR Technologies in Conversational Systems, XR-Commerce -What to expect next? – Future technologies and market innovations overview.	[6]
Practical: 1.Develop a Python program to identify morphological features of a word by analyzing it 2.Write a Python program to generate word forms from root and suffix information. 3. Implement a Python program to perform morphological analysis of a word by the use of an Add-Delete table. 4. Implement an NLU pipeline to extract intents and entities from user inputs. 5. Create a Python program to calculate the bigrams from a given corpus and calculate the probability of a sentence. 6. Implement intent classification using traditional machine learning techniques. 7. Implement a dialogue management system using reinforcement learning. 8. Write a Python program to do sentiment analysis for the given dataset and to classify sentences based on their categories. 9. Implement a Python program to find Parts – Of - Speech tags of words in a sentence. 10.Calculate and visualize key conversational metrics. **Tools used: Python,Unity**	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Michael McTear, “Conversational AI: Dialogue Systems, Conversational Agents, and Chatbots”, Second Edition,Moran and Claypool Publishers, 2020.
2.	Cathy Pearl, “Designing Voice User Interfaces: Principles of Conversational Experiences”, O’REILLY, 2016.

Reference(s):

1.	Luis Fernando D Haro, Zoraida Callejas, Satosh Nakamura, “Conversational Dialogue Systems for the Next Decade”, 1st Edition, Springer, 2021.
2.	Srini Janarthanam, “Chatbots and Conversational UI Development”, 1stEdition, Packt Publishers, 2017.
3.	Antonio Maranhao, “Prompt Engineering for Beginners : A Comprehensive Guide to Building Powerful

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	Conversational AI", Kindle Edition, 2023
4.	Erika Hall, "Conversation Design", A Book Apart publisher 2018

*SDG 4 – Quality Education

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Fundamentals of Conversational Systems**	
1.1	Overview	1
1.2	Explanation about different modes of engagement for a human being	1
1.3	Underlying technologies: Natural Language Processing	1
1.4	Artificial Intelligence and Machine Learning	1
1.5	Natural Language Generation	1
1.6	Speech-To-Text, Text-To-Speech	1
2	**Natural Language Processing**	
2.1	Introduction: Brief history	1
2.2	Basic Concepts, Phases of NLP	1
2.3	Application of chatbots	1
2.4	General chatbot architecture	1
2.5	Basic concepts in chatbots: Intents, Entities, Utterances	1
2.6	Variables and Slots, Fulfilment	1
3	**Building a Chatbot / Conversational AI Systems**	
3.1	Fundamentals of Conversational Systems (NLU, DM and NLG)	1
3.2	Chatbot framework & Architecture	1
3.3	Conversational Flow and design	1
3.4	Intent Classification (ML and DL-based techniques), Dialogue Management Strategies	1
3.5	Natural Language Generation.UX design, APIs and SDKs	1
3.6	Usage of Conversational Design Tools	1
4	**Role of ML/AI in Conversational Technologies**	
4.1	Understanding how conversational systems Use ML technologies in ASR, - - -	1
4.2	NLP	1
4.3	Advanced Dialog management	1
4.4	Language Translation	1
4.5	Emotion/Sentiment Analysis	1
4.6	Information extraction to effectively converse	1
5	**Conversational Analytics and the Future of Conversational System**	
5.1	Conversation Analytics: The need for it.	1
5.2	Introduction to Conversational Metrics	1
5.3	Summary, Robots and Sensory Applications overview	1
5.4	XR Technologies in Conversational Systems	1
5.5	XR-Commerce -What to expect next?	1
5.6	Future technologies and market innovations overview	1
Practical:		

1.	Develop a Python program to identify morphological features of a word by analyzing it	3
2.	Write a Python program to generate word forms from root and suffix information.	3
3.	Implement a Python program to perform morphological analysis of a word by the use of an Add-Delete table.	3
4.	Implement an NLU pipeline to extract intents and entities from user inputs	3
5.	Create a Python program to calculate the bigrams from a given corpus and calculate the probability of a sentence	3
6.	Implement intent classification using traditional machine learning techniques	3
7.	Implement a dialogue management system using reinforcement learning	3
8.	Write a Python program to do sentiment analysis for the given dataset and to classify sentences based on their categories	3
9.	Implement a Python program to find Parts – Of - Speech tags of words in a sentence	3
10.	Calculate and visualize key conversational metrics.	3

Course Designer(s)

1. Dr. K.Sakthivel - sakthivelk@ksrct.ac.in

60 CB E33	Virtual and Augmented Reality	Category	L	T	P	Credit
		PC	2	0	2	3

Objectives

- To recognize the various components of Virtual Reality (VR) and Augmented Reality (AR)
- To interpret the interaction and immersive techniques in virtual environments
- To develop a simple VR enabled applications
- To develop AR enabled applications with interactivity
- To explore AR, VR and Mixed Reality based applications for different sectors

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the various components of Virtual Reality (VR) and Augmented Reality (AR)	Remember
CO2	Interpret the interaction and immersive techniques in virtual environments	Understand
CO3	Implement a simple VR enabled applications with interactivity	Apply
CO4	Implement AR enabled applications with interactivity	Apply
CO5	Explore AR, VR and Mixed Reality based applications for different sectors	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Exam (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	-	40	-	40	-
Understand	40	-	40	-	60	-	60	-
Apply	-	50	-	50	-	50	-	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E33 - Virtual and Augmented Reality

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Introduction Introduction to Virtual Reality (VR) and Augmented Reality (AR) - Trajectories and Hybrid Space - Three I's of Virtual Reality - Virtual Reality vs 3D Computer Graphics – AR and VR Technologies - Input Devices: Types of Trackers, Navigation and Manipulation Interfaces, Gesture Interfaces - Output Devices: Graphics Display, Human Visual System, Personal Graphics Displays, Large Volume Displays, Sound Displays, Human Auditory System	[6]
Fundamentals of Virtual Environments Principles of 3D Graphics and Rendering - Interaction Techniques in Virtual Environments - Immersive Technologies: Haptics, Audio and Visuals - Design Considerations for Effective Virtual Experiences	[6]
VR Modeling* Modeling - Geometric Modeling - Virtual Object Shape - Object Visual Appearance - Kinematics Modeling - Transformation Matrices - Object Position - Transformation Invariants - Object Hierarchies - Viewing the 3D World - Physical Modeling - Collision Detection - Surface Deformation - Force Computation - Force Smoothing and Mapping - Behavior Modeling - Model Management	[6]
Augmented Reality* Introduction to Augmented Reality - Computer Vision for AR - Interaction-Modeling and Annotation Navigation - Wearable Devices - AR Platforms and Development Environments - Marker-based and Marker-less Tracking Techniques - Integration of Real and Virtual Objects - User Interface Design for AR Applications	[6]
Applications* Smart Cities - Social Media - Gaming - Education - Healthcare - Shopping and Business - Military Applications - Manufacturing - Robotics - Information Visualization - Entertainment - Emerging Applications using AR, VR and Mixed Reality (MR)	[6]
Practical: 1.Study of tools like Unity, Maya, 3DS MAX, AR Toolkit, Vuforia and Blender 2.Demonstrate various projection types using primitive objects 3. Apply lighting and shading effects 4. Adding audio and text special effects 5. Model three dimensional objects using various modeling techniques and apply textures over them 6. Create three dimensional realistic scenes and develop simple virtual reality enabled mobile applications which have limited interactivity 7. Develop VR enabled applications using motion trackers and sensors incorporating full haptic interactivity 8. Develop AR enabled applications with interactivity like E-learning environment, Virtual walkthroughs and Visualization of historic places 9. Develop AR enabled applications in healthcare 10.Develop simple MR enabled application for any real-time problem	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Steven M LaValle, "Virtual Reality", Cambridge University Press, 2016.
2.	Oliver Bimber and Ramesh Raskar, "Spatial Augmented Reality: Merging Real and Virtual Worlds", A K Peters Ltd., 2005.

Reference(s):

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

1.	Alan B Craig, William R Sherman and Jeffrey D Will, “Developing Virtual Reality Applications: Foundations of Effective Design”, Morgan Kaufmann, 2009.
2.	Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, “3D User Interfaces, Theory and Practice”, Addison Wesley, USA, 2005.
3.	Kaliraj P, Devi T, “Innovating with Augmented Reality: Applications in Education and Industry”, First Edition, Auerbach Publications, 2021.
4.	Burdea, Grigore C and Philippe Coiffet, “Virtual Reality Technology”, Wiley Inderscience, India, 2003.

*SDG 4 – Quality Education

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction**	
1.1	Introduction to Virtual Reality (VR) and Augmented Reality (AR)	1
1.2	Trajectories and Hybrid Space	1
1.3	Three I’s of Virtual Reality & Virtual Reality vs 3D Computer Graphics	1
1.4	AR and VR Technologies	1
1.5	Input Devices	1
1.6	Output Devices	1
2	**Fundamentals of Virtual Environments**	
2.1	Principles of 3D Graphics and Rendering	1
2.2	Interaction Techniques in Virtual Environments	1
2.3	Immersive Technologies	1
2.4	Haptics	1
2.5	Audio and Visuals	1
2.6	Design Considerations for Effective Virtual Experiences	1
3	**VR Modeling**	
3.1	Modeling	1
3.2	Geometric Modeling	1
3.3	Kinematics Modeling	1
3.4	Physical Modeling	1
3.5	Behavior Modeling	1
3.6	Model Management	1
4	**Augmented Reality**	
4.1	Introduction to Augmented Reality	1
4.2	Computer Vision for AR, Interaction	1
4.3	Modeling and Annotation Navigation, Wearable Devices	1
4.4	AR Platforms and Development Environments	1
4.5	Marker-based and Marker-less Tracking Techniques	1
4.6	User Interface Design for AR Applications, Integration of Real and Virtual Objects	1
5	**Applications**	
5.1	Smart Cities, Social Media, Gaming	1
5.2	Education, Healthcare, Shopping and Business	1

5.3	Military Applications	1
5.4	Manufacturing, Robotics	1
5.5	Information Visualization, Entertainment	1
5.6	Emerging Applications using AR, VR and Mixed Reality (MR)	1
Practical:		
1.	Study of tools like Unity, Maya, 3DS MAX, AR Toolkit, Vuforia and Blender	2
2.	Demonstrate various projection types using primitive objects	2
3.	Apply lighting and shading effects	2
4.	Adding audio and text special effects	2
5.	Model three dimensional objects using various modeling techniques and apply textures over them	2
6.	Create three dimensional realistic scenes and develop simple virtual reality enabled mobile applications which have limited interactivity	4
7.	Develop VR enabled applications using motion trackers and sensors incorporating full haptic interactivity	4
8.	Develop AR enabled applications with interactivity like E-learning environment, Virtual walkthroughs and Visualization of historic places	4
9.	Develop AR enabled applications in healthcare	4
10.	Develop simple MR enabled application for any real-time problem	4

Course Designer(s)

1. Dr. M. Tamilarasi - tamilarasi@ksrct.ac.in

60 CB E34	Cyber Security	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To learn cybercrime and cyber law
- To understand the cyber-attacks and tools for mitigating them
- To understand information gathering
- To learn how to detect a cyber-attack
- To learn how to prevent a cyber-attack

Pre-requisites

- Basic Knowledge of Cryptography and Network Security

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the basics of cyber security, cybercrime and cyber law.	Understand
CO2	Classify various types of attacks and learn the tools to launch the attacks.	Remember
CO3	Apply various tools to perform information gathering.	Apply
CO4	Apply intrusion techniques to detect intrusion.	Apply
CO5	Apply intrusion prevention techniques to prevent intrusion.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	1	1	1		1					1		2	2	1
CO2	1	3	1	3	2	1							2	2	1
CO3	2	1	1	1		1					1		2	2	2
CO4	3	3	2	2	2	1							2	2	3
CO5	3	2	1	1	1	1		1			1		2	2	3
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Exam (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	50	40	-	40	-
Understand	40	50	40	-	60	50	60	50
Apply	-	50	-	50	-	50	-	50
Analyse	-	-	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E34 – Cyber Security

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Introduction Cyber Security – History of Internet – Impact of Internet – CIA Triad – Reason for Cyber Crime – Need for Cyber Security – History of Cyber Crime – Cybercriminals – Classification of Cybercrimes	[6]
Attacks And Countermeasures* OSWAP – Malicious Attack Threats and Vulnerabilities – Scope of Cyber Attacks – Security Breach – Types of Malicious Attacks – Malicious Software – Common Attack Vectors – Social engineering Attack	[6]
Reconnaissance Harvester – Whois – Netcraft – Host – Extracting Information from DNS – Extracting Information from E-mail Servers – Social Engineering Reconnaissance – Scanning: Port Scanning, Network Scanning, Vulnerability Scanning	[6]
Intrusion Detection* Host Based Intrusion Detection – Network Based Intrusion Detection – Distributed or Hybrid Intrusion Detection – Intrusion Detection Exchange Format – Honeypots	[6]
Intrusion Prevention* Firewalls and Intrusion Prevention Systems: Need for Firewalls, Firewall Characteristics, Access Policy – Types of Firewalls – Firewall Basing – Firewall Location and Configurations	[6]
Practical: 1. Identify the Potential Risks Involved in Experimenting with Hacking Tools. To address this, you've Decided to set up a virtual environment using VirtualBox to install and Explore Kali Linux. 2. Explore Kali Linux and leveraging bash scripting to automate certain cybersecurity tasks. 3. Perform Open-Source Intelligence Gathering Using Netcraft, Whois Lookups, DNS Reconnaissance, Harvester and Maltego. 4. Understand the security posture to utilize Nmap, to conduct a comprehensive Assessment of systems and identify potential vulnerabilities. 5. Set up Metasploitable 2, a deliberately vulnerable virtual machine, on VirtualBox. Your goal is to simulate real-world attack scenarios and identify unpatched vulnerabilities within the system. 6. Identify an unpatched vulnerability in a critical system. use Metasploit, a widely-used penetration testing framework, to launch an attack against the vulnerable system. 7. Deploy a Linux server on VirtualBox and configure SSH (Secure Shell) for encrypted Remote access. 8. Implement Fail2Ban, a popular intrusion prevention tool, to monitor log files for Suspicious activity and automatically block IP addresses exhibiting malicious Behaviour. 9. Use Hydra, a powerful password-cracking tool, to launch brute-force attacks against the server. 10. Perform real-time network traffic analysis and packet logging. to detect and respond to Potential security threats as they occur. **Tools used: VirtualBox 6.1 and Linux Operating System**	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	AnandShinde, “Introduction to Cyber Security Guide to the World of Cyber Security”, Notion Press, 2021.
2.	Nina Godbole, SunitBelapure, “Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley Publishers, 2011.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Reference(s):	
1.	David Kim, Michael G. Solomon, “Fundamentals of Information Systems Security”, Jones & Bartlett Learning Publishers, 2013.
2.	Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made easy”, Elsevier, 2011.
3.	Kimberly Graves, “CEH Official Certified Ethical hacker Review Guide”, Wiley Publishers, 2007.
4.	William Stallings, Lawrie Brown, “Computer Security Principles and Practice”, Third Edition, Pearson Education, 2015.

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction**	
1.1	Cyber Security – History of Internet – Impact of Internet	2
1.2	CIA Triad; Reason for Cyber Crime	1
1.3	Need for Cyber Security	1
1.4	History of Cyber Crime; Cybercriminals	1
1.5	Classification of Cybercrimes	1
2	**Attacks And Countermeasures**	
2.1	OSWAP; Malicious Attack Threats and Vulnerabilities	1
2.2	Scope of Cyber-Attacks	1
2.3	Security Breach – Types of Malicious Attacks	2
2.4	Malicious Software – Common Attack Vectors	1
2.5	Social engineering Attack	1
3	**Reconnaissance**	
3.1	Harvester – Whois – Netcraft – Host – Extracting Information from DNS	1
3.2	Extracting Information from E-mail Servers –	2
3.3	Social Engineering Reconnaissance.	1
3.4	Scanning – Port Scanning	1
3.5	Network Scanning and Vulnerability Scanning	1
4	**Intrusion Detection**	
4.1	Host Based Intrusion Detection	1
4.2	Network -Based Intrusion Detection	2
4.3	Distributed or Hybrid Intrusion Detection	1
4.4	Intrusion Detection Exchange Format	1
4.5	Honeypots	1
5	**Intrusion Prevention**	
5.1	Firewalls and Intrusion Prevention Systems: Need for Firewalls	1
5.2	Firewall Characteristics and Access Policy	2
5.3	Types of Firewalls	1
5.4	Firewall Basing	1
5.5	Firewall Location and Configurations	1
Practical:		
1.	Identify the potential risks involved in experimenting with hacking tools. To	2

	address this, you've decided to set up a virtual environment using VirtualBox to install and explore Kali Linux.	
2.	Explore Kali Linux and leveraging bash scripting to automate certain cyber Security Tasks.	4
3.	Perform Open Source Intelligence Gathering Using Netcraft, Whois Lookups, DNSReconnaissance, Harvester and Maltego.	4
4.	Identify the security posture to utilize Nmap, to conduct a comprehensive assessment of systems and identify potential vulnerabilities.	2
5.	Set up Metasploitable 2, a deliberately vulnerable virtual machine, on VirtualBox. Your goal is to simulate real-world attack scenarios and identify unpatched vulnerabilities within the system.	2
6.	Identify an unpatched vulnerability in a critical system. Use Metasploit, a widely-used penetration testing framework, to launch an attack against the vulnerable system.	4
7.	Identify a Linux server on VirtualBox and configure SSH (Secure Shell) for encrypted remote access.	4
8.	Implement Fail2Ban, a popular intrusion prevention tool, to monitor log files for suspicious activity and automatically block IP addresses exhibiting malicious behaviour.	2
9.	Use Hydra, a powerful password-cracking tool, to launch brute-force attacks against the server.	4
10.	Perform real-time network traffic analysis and packet logging. to detect and Respond to potential security threats as they occur.	2

Course Designer(s)

1. K.Karthikeyan - karthikeyank@ksrct.ac.in

60 CB E35	Cryptocurrency and Blockchain Technologies	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To understand the basics of Blockchain
- To learn Different protocols and consensus algorithms in Blockchain
- To learn the Blockchain Implementation Framework
- To understand the Blockchain Applications
- To experiment the Hyperledger Fabric, Ethereum networks

Pre-requisites

- Basic knowledge of Machine Learning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand emerging abstract models for Blockchain Technology	Understand
CO2	Identify major research challenges and technical gaps existing between theory and practice in the crypto currency domain.	Remember
CO3	Apply the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.	Apply
CO4	Apply key factors influencing the adoption and implementation of blockchain solutions.	Apply
CO5	Execute transactions, query data, and monitor network activity using appropriate tools and interfaces.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	1	-	-	-	1	-	-	2	3	1	3
CO2	3	3	3	3	1	-	-	-	2	-	-	2	1	2	3
CO3	3	3	3	3	2	-	-	-	3	-	-	2	2	3	3
CO4	3	2	3	2	3	-	-	-	3	-	-	2	2	2	3
CO5	3	3	3	2	2	-	-	-	2	-	-	2	1	2	3
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Exam (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	50	20	50	34	50	34	50
Understand	-	-	-	-	-	-	-	-
Apply	40	50	40	50	66	50	66	50
Analyse	-	-	-	-	-		-	
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

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Approved in Academic Council Meeting held on 25/05/2024

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E35 - Cryptocurrency and Blockchain Technologies

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Introduction To Blockchain Blockchain: Public Ledgers, Blockchain as Public Ledgers - Block in a Blockchain – Transactions - The Chain and the Longest Chain - Permissioned Model of Blockchain - Cryptographic	[6]
Bitcoin and Cryptocurrency Basic crypto currency: Creation of Coins, Payments and Double Spending, FORTH: the Precursor for Bitcoin scripting - Bitcoin Scripts - Bitcoin P2P Network - Transaction in Bitcoin Network	[6]
Bitcoin Consensus Bitcoin Consensus - Proof of Work (PoW): HashcashPoW, BitcoinPoW, Attacks on PoW, Monopoly problem - Proof of Stake - Proof of Burn - Proof of Elapsed Time - Bitcoin Miner	[6]
Hyperledger Fabric & Ethereum: Architecture of Hyperledger - Fabric V1.1 - Chain code - Ethereum - Ethereum network – EVM- Smart contracts - Truffle Design and issue- DApps - NFT.	[6]
Blockchain Applications * Blockchain Applications in Supply Chain Management – Logistics - Smart Cities - Internet of Things-Medical Record Management System-Blockchain in Government and Blockchain Security.	[6]
Practical: **1.** Install and understand Docker container, Node.js, Java and Hyperledger Fabric, Ethereumand perform necessary software installation on local machine/create instance on cloud torun. **2.** Create and deploy a blockchain network using Hyperledger Fabric SDK for Java Set up and initialize the channel, install and instantiate chain code, and perform invoke and query on your blockchain network. **3.** Interact with a blockchain network. Execute transactions and requests against a blockchain network by creating an app to test the network and its rules. **4.** Deploy an asset-transfer app using blockchain. Learn app development within a Hyperledger Fabric network. **5.** Use blockchain to track fitness club rewards. Build a web app that uses Hyperledger Fabric To track and trace member rewards. **6.** Car auction network: A Hello World example with Hyperledger Fabric Node SDK and IBM Blockchain Starter Plan. Use Hyperledger Fabric to invoke chain code while storing results and data in the starter plan. **7.** Develop DeFi protocols, decentralized exchanges (DEX), automated market Makers (AMM), or other DeFi primitives. **8.** Explore blockchain platforms with native NFT support, such as Ethereum or Specialized NFT Platforms like Flow or Tezos. **9.** Build applications for creating, managing, and verifying digital identities using Block chain- based attestations and verifiable credentials. **10.** Develop applications for tracking and tracing products along the supply chain Using blockchain technology. **Tools Used: Docker, Node Js, java, R-studio, Anaconda**	[30]

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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	Total Hours: (Lecture - 30; Practical - 30)	**60**
Text Book(s):		
1.	Bashir and Imran, “Mastering Blockchain: Deeper insights into Decentralization, Cryptography, Bitcoin, and popular Blockchain Frameworks”, 2017.	
2.	Andreas Antonopoulos, “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”, O’Reilly, 2014.	
Reference(s):		
1.	Daniel Drescher, “Blockchain Basics”, First Edition, Apress, 2017.	
2.	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder.Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton UniversityPress, 2016.	
3.	Melanie Swan, “Blockchain: Blueprint for a New Economy”, O’Reilly, 2015.	
4.	RiteshModi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts forEthereum and Blockchain”, Packt Publishing.	

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction To Blockchain**	
1.1	Blockchain	1
1.2	Public Ledgers, Blockchain as Public Ledgers	1
1.3	Block in a Blockchain, Transactions	1
1.4	The Chain and the Longest Chain	1
1.5	Permissioned Model of Blockchain, Cryptographic	2
2	**Bitcoin and Cryptocurrency**	
2.1	Basic crypto currency, Creation of coins	1
2.2	Payments and double spending	1
2.3	FORTH – the precursor for Bitcoin scripting	1
2.4	Bitcoin Scripts	1
2.5	Bitcoin P2P Network	1
2.6	Transaction in Bitcoin Network	1
3	**Bitcoin Consensus**	
3.1	Bitcoin Consensus, Proof of Work (PoW)	1
3.2	HashcashPoW	1
3.3	BitcoinPoW	1
3.4	Attacks on PoW	1
3.5	monopoly problem- Proof of Stake- Proof of Burn	1
3.6	Proof of Elapsed Time- Bitcoin Miner	1
4.0	**Hyperledger Fabric &Ethereum**	
4.1	Architecture of Hyper ledger	1
4.2	fabric v1.1	1
4.3	chain code	1
4.4	Ethereum	1
4.5	Ethereum network	1

4.6	EVM	1
5.0	**Blockchain Applications**	
5.1	Smart contracts	1
5.2	Truffle Design and issue	1
5.3	DApps	1
5.4	NFT. Blockchain Applications in Supply Chain Management	1
5.5	Logistics	1
5.6	Smart Cities	1
Practical:		
1.	Install and understand Docker container, Node.js, Java and Hyperledger Fabric, Ethereumand perform necessary software installation on local machine/create instance on cloud torun.	2
2.	Create and deploy a blockchain network using Hyperledger Fabric SDK for Java Set up and initialize the channel, install and instantiate chain code, and perform invoke and query on your blockchain network.	4
3.	Interact with a blockchain network. Execute transactions and requests against a blockchain network by creating an app to test the network and its rules.	4
4.	Deploy an asset-transfer app using blockchain. Learn app development within a Hyperledger Fabric network.	2
5.	Use blockchain to track fitness club rewards. Build a web app that uses Hyperledger Fabric.	2
6.	Car auction network: A Hello World example with Hyperledger Fabric Node SDK and IBM Blockchain Starter Plan. Use Hyperledger Fabric to invoke chain code while storing results and data in the starter plan.	4
7.	Develop DeFi protocols, decentralized exchanges (DEX), automated market Makers (AMM), or other DeFi primitives	4
8.	Explore blockchain platforms with native NFT support, such as Ethereum or Specialized NFT Platforms like Flow or Tezos	2
9.	Build applications for creating, managing, and verifying digital identities using Block chain- based attestations and verifiable credentials.	4
10.	Develop applications for tracking and tracing products along the supply chain Using blockchain technology.	2

Course Designer(s)

1. K. Karthikeyan – karthikeyank@ksrct.ac.in

60 CB E36	Cognitive Science	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To know the theoretical background of cognition
- To understand the link between cognition and computational intelligence
- To explore probabilistic programming language
- To study the computational inference models of cognition
- To study the computational learning models of cognition

Pre-requisites

- Mathematics , Fundamentals of Programming Course

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the underlying theory behind cognition.	Understand
CO2	Connect to the cognition elements computationally.	Understand
CO3	Implement mathematical functions through WebPPL.	Analyse
CO4	Develop applications using cognitive inference model.	Apply
CO5	Develop applications using cognitive learning model.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	1	-	3	-	-	-	-	1	1	1	2	-
CO2	3	3	3	1	-	3	-	-	-	-	2	2	1	2	-
CO3	3	3	3	1	-	3	-	-	-	-	2	2	1	1	-
CO4	3	3	3	1	-	3	-	-	-	-	2	1	1	1	-
CO5	3	3	3	1	-	3	-	-	-	-	1	2	1	1	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Exam (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	-	-	-	-	-	-	-	-
Understand	40	-	-	-	40	-	40	-
Apply	-	50	40	50	60	50	60	50
Analyse	10	50	20	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E36 – Cognitive Science

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Philosophy, Psychology and Neuroscience* Philosophy: Mental, Physical Relation – Psychology: Place of Psychology within Cognitive Science, Science of Information Processing –Cognitive Neuroscience: Perception, Decision, Learning and Memory.	[6]
Computational Intelligence* Machines and Cognition – Artificial Intelligence – Architectures of Cognition – Knowledge Based Systems – Logical Representation and Reasoning – Logical Decision Making, Learning.	[6]
Probabilistic Programming Language* WebPPL Language, Syntax, Using Javascript Libraries, Manipulating probability types and distributions, Finding Inference – Coroutines: Functions that receive continuations – Enumeration.	[6]
Inference Models of Cognition* Generative Models, Conditioning, Causal and statistical dependence, Conditional dependence, Data Analysis, Algorithms for Inference.	[6]
Learning Models of Cognition* Learning as Conditional Inference, Learning with a Language of Thought, Hierarchical Models, and Learning (Deep) Continuous Functions, Mixture Models.	[6]
Practical: 1.Implementation of reasoning algorithms and frame it within a real-world context 2.Investigating the neural correlates of moral decision-making using functional magnetic resonance imaging (fMRI). 3. Developing a knowledge-based system for medical diagnosis using logical reasoning. 4. Demonstrate the use of mathematical functions in WebPPL and frame each function within a real-world context 5. Comparing reaction times between visual and auditory stimuli to understand sensory processing differences. 6. Training and evaluating a neural network model for classification tasks using a benchmark dataset. 7. Implementation of a generative model to simulate neural activity patterns associated with a specific cognitive task, such as memory recall 8. Developing an Application system using generative model and frame this in the context of generating personalized workout plans based on user preferences and fitness goals 9. Developing an Application using conditional inference learning model 10. Application development using Mixture model. **Tools used:** NLTK (Natural Language Toolkit).	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Vijay V Raghavan,Venkat N.Gudivada, VenuGovindaraju, C.R. Rao, “Cognitive Computing: Theory and Applications”: (Handbook of Statistics 35), Elsevier publications, 2016.
2.	Judith Hurwitz, Marcia Kaufman, Adrian Bowles, “Cognitive Computing and Big Data Analytics”, Wiley Publications, 2015.

Reference(s):

1.	Robert A. Wilson, Frank C. Keil, “The MIT Encyclopedia of the Cognitive Sciences”,The MIT Press, 1999.
2.	Jose Luis Bermúdez, Cognitive Science -An Introduction to the Science of the Mind, Cambridge University Press 2020

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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3.	Noah D. Goodman, Andreas Stuhlmuller, “The Design and Implementation of Probabilistic Programming Languages”, Electronic version of book, https://dippl.org/.
4.	Noah D. Goodman, Joshua B. Tenenbaum, The ProbMods Contributors, “Probabilistic Models of Cognition”, Second Edition, 2016, https://probmods.org/

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Philosophy, Psychology and Neuroscience**	
1.1	Philosophy: Mental, Physical Relation	1
1.2	Psychology: Place of Psychology within Cognitive Science	1
1.3	Science of Information Processing	1
1.4	Cognitive Neuroscience	1
1.5	Perception, Decision	1
1.6	Learning and Memory	1
2	**Computational Intelligence**	
2.1	Machines and Cognition	1
2.2	Artificial Intelligence	1
2.3	Architectures of Cognition	1
2.4	Knowledge Based Systems	1
2.5	Logical Representation and Reasoning	1
2.6	Logical Decision Making , Learning	1
3	**Probabilistic Programming Language**	
3.1	WebPPL Language	1
3.2	Syntax, Using Javascript Libraries	1
3.3	Manipulating probability types and distributions	1
3.4	Finding Inference	1
3.5	Coroutines: Functions that receive continuations	1
3.6	Enumeration	1
4	**Inference Models of Cognition**	
4.1	Generative Models	1
4.2	Conditioning	1
4.3	Causal and statistical dependence	1
4.4	Conditional dependence	1
4.5	Data Analysis	1
4.6	Algorithms for Inference	1
5	**Learning Models of Cognition**	
5.1	Learning as Conditional Inference	1
5.2	Learning with a Language of Thought	1
5.3	Hierarchical Models	1
5.4	Learning (Deep) Continuous Functions	1
5.5	Mixture Models	2

Practical:		
1.	Implementation of reasoning algorithms and frame it within a real-world context	2
2.	Investigating the neural correlates of moral decision-making using functional magnetic resonance imaging (fMRI)	4
3.	Developing a knowledge-based system for medical diagnosis using logical reasoning	4
4.	Demonstrate the use of mathematical functions in WebPPL and frame each function within a real-world context	2
5.	Comparing reaction times between visual and auditory stimuli to understand sensory processing differences	2
6.	Training and evaluating a neural network model for classification tasks using a benchmark dataset	4
7.	Implementation of a generative model to simulate neural activity patterns associated with a specific cognitive task, such as memory recall	2
8.	Developing an Application system using generative model and frame this in the context of generating personalized workout plans based on user preferences and fitness goals	4
9.	Developing an Application using conditional inference learning model	4
10.	Application development using Mixture model	2

Course Designer(s)

1. Mrs. R. Logapriya - logapriyar@ksrct.ac.in

ELECTIVE IV

60 CB E41	Behavioral Economics	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- Imparting knowledge on concepts regarding decision making in behavioral Economics perspective
- Incorporating psychological assumptions into economic models and interpret the implications of these assumptions
- Exposing the various choice available under uncertain economic situations
- Divulging the beliefs and heuristics in trading behavior
- Analyzing the social preferences under various anomalies

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand basic theories of behavioural economics	Understand
CO2	Demonstrate about choice anamolies and its implications	Apply
CO3	Analyse the choices under uncertainty	Analyse
CO4	Analyse the beliefes and heurstics in trading behavior	Analyse
CO5	Analyse the social preferences and anamolies	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	3	-	3	-	-	3	-
CO2	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
CO3	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	3	-	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	30	20	30
Apply	20	20	30
Analyse	-	10	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E41- Behavioral Economics								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction * The neoclassical/standard model and behavioral economics in contrast; historical background; behavioral economics and other social sciences; theory and evidence in the social sciences and in behavioral economics; applications – gains and losses, money illusion, charitable donation	[9]
Basics of Choice Theory * Revisiting the neoclassical model; utility in economics and psychology; models of rationality; connections with evolutionary biology and cognitive neuroscience; policy analysis – consumption and addiction, environmental protection, retail therapy; applications – pricing, valuation, public goods, choice anomalies	[9]
Choice Under Uncertainty * Background and expected utility theory; prospect theory and other theories; loss aversion; marginal utility; decision and probability weighting; applications – ownership and trade, income and consumption.	[9]
Beliefs, Heuristics and Biases * Revisiting rationality; causal aspects of irrationality; different kinds of biases and beliefs; self-evaluation and self-projection; inconsistent and biased beliefs; probability estimation; trading applications – trade in counterfeit goods, financial trading behavior, trade in memorabilia.	[9]
Social Preference* Individual preferences; choice anomalies and inconsistencies; social preferences; altruism; fairness; reciprocity; trust; learning; communication; intention; demographic and cultural aspects; social norms; compliance and punishment; inequity aversion; policy analysis – norms and markets, labor markets, market clearing, public goods; applications – logic and knowledge, voluntary contribution, compensation design	[9]
Total Hours:	**45**

Text Book(s):	
1.	N. Wilkinson and M. Klaes, “An Introduction to Behavioral Economics”, 2017, 3rd Edition, Red Globe Press
2.	M. Altman, Handbook of Contemporary Behavioural Economics: Foundation and Developments, Prentice Hall India,2007
Reference(s):	
1.	Bazerman, Max and Don Moore. Judgment in Managerial Decision Making, 2012. 8th Edition, John Wiley & Sons.
2.	Kahneman, Daniel.Thinking, Fast and Slow, 2011, New York: Farrar, Straus and Giroux
3.	Sanjit Dhami, "The Foundations of Behavioral Economic Analysis", Oxford University Press, 2016
4.	Erik Angner, “A Course in Behavioral Economics”, Palgrave Macmillan.

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BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction**	
1.1	The neoclassical/standard model and behavioral economics in contrast	2
1.2	historical background; behavioral economics	2
1.3	Theory and evidence in the social sciences and in behavioral economics	2
1.4	applications – gains and losses	1
1.5	money illusion, charitable donation	2
2.0	**Basics of Choice Theory**	
2.1	Revisiting the neoclassical model; utility in economics and psychology	2
2.2	models of rationality; connections with evolutionary biology and cognitive neuroscience	1
2.3	policy analysis – consumption and addiction	2
2.4	environmental protection, retail therapy; applications	2
2.5	pricing, valuation, public goods, choice anomalies	2
3.0	**Choice Under Uncertainty ***	
3.1	Background and expected utility theory	1
3.2	prospect theory and other theories	1
3.3	loss aversion	1
3.4	marginal utility	2
3.5	decision and probability weighting	1
3.6	applications	1
3.7	ownership and trade	1
3.8	income and consumption	1
4.0	**Beliefs, Heuristics and Biases ***	
4.1	Revisiting rationality	1
4.2	causal aspects of irrationality; different kinds of biases and beliefs	1
4.3	self-evaluation and self-projection	1
4.4	inconsistent and biased beliefs	1
4.5	probability estimation	1
4.6	trading applications	1
4.7	trade in counterfeit goods	1
4.8	financial trading behavior	2
4.9	trade in memorabilia	1
5.0	**Social Preference***	
5.1	Individual preferences; choice anomalies and inconsistencies	2
5.2	social preferences; altruism; fairness; reciprocity; trust	1
5.3	learning; communication; intention; demographic and cultural aspects	1
5.4	social norms; compliance and punishment; inequity aversion; policy analysis	2
5.5	norms and markets, labor markets, market clearing, public goods	1
5.6	applications – logic and knowledge	1
5.7	voluntary contribution, compensation design	1

Course Designer(s)

1. Dr.H.KALAIARASI – kalaiarasi@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E42	Customer Relation Management	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To enable the students to understand the fundamentals of Customer Relationship Management
- To gain the knowledge about customer behaviour and their perception
- To understand the CRM process and strategies for customer retention
- To impart knowledge on the process of CRM strategy development
- To give an insights about CRM IN E- Business and its change perspectives

Pre-requisites

- Marketing Management

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the concept of CRM, the benefits delivered by CRM and its context.	Understand
CO2	Identify the knowledge on customer perception and expectation.	Understand
CO3	Interpret the concept of CRM Structure, strategies for customer acquisition and retention.	Apply
CO4	Apply the implement CRM Process and Campaign Management	Apply
CO5	Examine the trends and issues in E - CRM and measures effectiveness of CRM.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	3	2	-	-	3	2	3	3	-	-	-	-
CO2	3	3	3	2	3	-	-	3	2	3	2	-	-	-	-
CO3	3	2	2	3	-	-	-	2	3	2	2	-	-	-	-
CO4	3	3	3	-	-	-	-	3	3	3	3	2	-	3	-
CO5	3	3	-	-	-	-	-	3	3	3	3	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	20
Understand	20	20	20
Apply	20	20	30
Analyse	-	-	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E42- Customer Relation Management								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Conceptual Foundation * Relationship Marketing: Evolution – Stages – Types – Purpose - Importance. Concepts of Customer Value - Strategic CRM: Significance – Growth – Elements - Developing CRM Strategies	[9]
Understanding Customers* Customer information Database – Customer Profile Analysis - Customer perception, Expectations analysis – Customer behavior in relationship perspectives; individual and group customer's - Customer life time value – Selection of Profitable customer segments	[9]
CRM Structures * Elements of CRM – CRM Process – Strategies for Customer acquisition – Retention and Prevention of defection – Models of CRM – CRM road map for business applications	[9]
CRM Process and Implementation * Customer Retention Management - Customer Experience Management - Loyalty Programs: Design- Drivers - Issues. Campaign Management - Customer Complaint Management - Role of Marketing Channels in CRM - Employee Factors in CRM	[9]
Trends and Issues in CRM* CRM in e-Business (B2B & B2C) - Measuring the Effectiveness of CRM - Factors Influencing the Future of CRM. E-CRM in Business - CRM: A Changing Perspective - Features of e-CRM - Advantage of e-CRM.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Peelen "Customer Relationship Management" Pearson Education, 1st Edition ,2022.
2.	Harikrishnan K T , "Customer Relationship Management", Romanson Printing & Publishing House Pvt ltd, 1 January 2022.
Reference(s):	
1.	Dr.B.Kavitha "Customer Relationship Management" OrangeBooks Publication, 1st Edition 2020.
2.	Francis & Stan Maklan Buttle "Customer Relationship Management : Concepts And Technologies, 4th Edition, 2019.
3.	V. Kumar, Werner Reinartz "Customer Relationship Management Concept, Strategy, and Tools", Springer Berlin Heidelberg, 3rd Edition 2018.
4.	Alok Kumar Rai ," Customer Relationship Management : Concepts And Cases", PHI Learning Pvt Ltd, Delhi, 2nd Edition ,2012.

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Conceptual Foundation**	
1.1	Relationship Marketing: Evolution	1
1.2	Stages ,Types ,Purpose	2
1.3	Importance. Concepts of Customer Value	2
1.4	Strategic CRM: Significance	1
1.5	Growth, Elements	1
1.6	Developing CRM Strategies	2
2.0	**Understanding Customers**	
2.1	Customer information Database	1
2.2	Customer Profile Analysis	1
2.3	Customer perception, Expectations analysis	2
2.4	Customer behavior in relationship perspectives	2
2.5	Individual and group customer's	1
2.6	Customer life time value	1
2.7	Selection of Profitable customer segments	1
3.0	**CRM Structures**	
3.1	Elements of CRM	1
3.2	CRM Process	1
3.3	Strategies for Customer acquisition	2
3.4	Retention and Prevention of defection	2
3.5	Models of CRM	2
3.6	CRM road map for business applications	1
4.0	**CRM Process and Implementation**	
4.1	Customer Retention Management	1
4.2	Customer Experience Management	2
4.3	Loyalty Programs: Design, Drivers , Issues	2
4.4	Campaign Management, Customer Complaint Management	2
4.5	Role of Marketing Channels in CRM	1
4.6	Employee Factors in CRM	1
5.0	**Trends and Issues in Crm**	
5.1	CRM in e-Business (B2B & B2C)	1
5.2	Measuring the Effectiveness of CRM	1
5.3	Factors Influencing the Future of CRM	2
5.4	E-CRM in Business	2
5.5	CRM: A Changing Perspective	1
5.6	Features of e-CRM	1
5.7	Advantage of e-CRM	1

Course Designer(s)

1.Dr.M.Mohanraj - mohanrajm@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E43	Financial Management	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To understand the operational functions of a Finance Manager
- To Comprehend the technique of making decisions related to finance function
- To Possess the techniques of managing finance in an organization
- To provide them knowledge on working capital management
- To make them to understand the concepts of Indian capital market and stock market

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the economic and industry environment, domestic and international	Understand
CO2	Apply the hands-on, pro forma modeling skills using.	Apply
CO3	Interpret the concept of cost of capital and valuation.	Apply
CO4	Apply the Financial Statements to obtain Cash Flows for the firm and equity holders.	Apply
CO5	Analyze the financial Statements to evaluate firm performance.	Analyze

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	3	-	3	-	-	-	-	-	-	3	3	-	3	-
CO2	-	3	-	3	-	-	-	-	-	-	3	2	-	3	-
CO3	-	3	-	3	-	-	-	-	-	-	3	2	-	3	-
CO4	-	3	-	3	-	-	-	-	-	-	3	3	-	3	-
CO5	-	3	-	3	-	-	-	-	-	-	3	3	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	30	20	20
Apply	30	20	50
Analyse	0	20	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E43- Financial Management								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Foundations of Finance Financial management – An overview- Time value of money- Introduction to the concept of risk and return of a single asset and of a portfolio- Financial decision in a firm - The fundamental principle of finance - Risk return trade off - Forms of business organization.	[9]
Investment Decisions Capital Budgeting: Principles and techniques - Nature of capital budgeting- Identifying relevant cash flows - Evaluation Techniques: Payback, Accounting rate of return, Net Present Value, Internal Rate of Return, Profitability Index.	[9]
Financing and Dividend Decision Financial and operating leverage - capital structure - Cost of capital and valuation – designing capital structure. Dividend policy - Aspects of dividend policy - practical consideration - forms of dividend policy - forms of dividends - share splits	[9]
Working Capital Management Principles of working capital: Concepts, Needs, Determinants, issues and estimation of working capital - Accounts Receivables Management and factoring - Inventory management – Cash management - Working capital finance : Trade credit, Bank finance and Commercial paper.	[9]
Long Term Sources of Finance Indian capital and stock market, New issues market Long term finance: Shares, debentures and term loans, lease, hire purchase, venture capital financing, Private Equity.	[9]
Total Hours:	**45**

Text Book(s):	
1.	M.Y. Khan and P.K.Jain Financial management, Text, Problems and cases Tata McGraw Hill, 6th edition, 2011.
2.	M. Pandey Financial Management, Vikas Publishing House Pvt. Ltd., 10th edition, 2012.
Reference(s):	
1.	Aswat Damodaran, Corporate Finance Theory and practice, John Wiley & Sons, 2011.
2.	James C. Vanhorne –Fundamentals of Financial Management– PHI Learning, 11th Edition, 2012
3.	Brigham, Ehrhardt, Financial Management Theory and Practice, 12th edition, Cengage Learning 2010
4.	Prasanna Chandra, Financial Management, 9th edition, Tata McGraw Hill, 2012

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Foundations of Finance**	
1.1	Financial management – An overview	2
1.2	Time value of money	4
1.3	Introduction to the concept of risk and return of a single asset and of a portfolio	3
2.0	**Investment Decisions**	
2.1	Capital Budgeting: Principles and techniques	2
2.2	Nature of capital budgeting	2
2.3	Identifying relevant cash flows	1
2.4	Evaluation Techniques: Payback, Accounting rate of return, Net Present Value	2
2.5	Internal Rate of Return, Profitability Index	2
3.0	**Financing and Dividend Decision**	
3.1	Financial and operating leverage	1
3.2	Capital structure - Cost of capital and valuation	2
3.3	Designing capital structure.	2
3.4	Dividend policy - Aspects of dividend policy	2
3.5	Practical consideration - forms of dividend policy	1
3.6	Forms of dividends - share splits	1
4.0	**Working Capital Management**	
4.1	Principles of working capital: Concepts & Needs	2
4.2	Determinants & issues and estimation of working capital	2
4.3	Accounts Receivables Management and factoring	1
4.4	Inventory management – Cash management	1
4.5	Working capital finance : Trade credit, Bank finance and Commercial paper.	3
5.0	**Electric and Autonomous Vehicles**	
5.1	Indian capital and stock market	2
5.2	New issues market Long term finance: Shares, debentures and term loans, lease, hire purchase, venture capital financing, Private Equity	7

Course Designer(s)

1. Mr.P.Sabareesh - sabareesh@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E44	Fintech Personal Finance and Payments	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- Identify the currency payment methods
- Understanding the digitalization of finance
- Analysing about Insure technology and its implications
- Critically evaluating about Peer to Peer lending
- Analysing about Fintech and Regtech Eco system

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand about currency payments and differents methods of exchange.	Understand
CO2	Understand about the Cryptocurrencies and Digital finance.	Understand
CO3	Interpret about Insurtech and fraud detection.	Apply
CO4	Demonstrate about Peer to Peer lending.	Apply
CO5	Analyse about the regaulatory issues pertaining to digital finance.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	-	-	-	-	-	-	-	-	3	-	3	-	-	3	-
CO2	-	-	-	-	-	-	-	-	3	-	2	2	-	3	-
CO3	-	-	-	-	-	-	-	3	-	-	3	-	-	3	-
CO4	-	-	-	-	-	-	-	-	3	-	3	-	-	2	-
CO5	-	-	-	-	-	-	-	3	-	-	3	3	-	3	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	10
Understand	50	20	30
Apply	-	20	30
Analyse	-	10	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E44 - Fintech Personal Finance and Payments								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Currency Payment and Exchange Fintech users, Individual Payments, RTGS, IMPS, UPI Systems, Digital Payments Smart Cards, Stored-Value Cards, EC Micropayments, Payment Gateways, Mobile Payments, Digital and Virtual Currencies, Security, Ethical, Legal, Privacy, and Technology Issues.	[9]
Cryptocurrency and Digital FINANCE Understand the concept of Crypto currency- Bitcoin and Applications -Cryptocurrencies and Digital Crypto Wallets -Types of Cryptocurrencies - Cryptocurrencies and Applications, block chain, Artificial Intelligence, machine learning. A Brief History of Financial Innovation, Digitization of Financial Services.	[9]
Insuretech InsurTech Introduction , Business model disruption AI/ML in InsurTech IoT and InsurTech ,Risk Modeling ,Fraud Detection Processing claims and Underwriting Innovations in Insurance Services.	[9]
Peer to Peer Lending P2P and Marketplace Lending, New Models and New Products in market place lending P2P Infrastructure and technologies, P2P and Crowd funding unicorns and business models, SME/MSME Lending: Unique opportunities and Challenges, Solutions and Innovations.	[9]
Regulatory Issues FinTech Regulations: Global Regulations and Domestic Regulations, Evolution of RegTech, RegTech Ecosystem: Financial Institutions, RegTech Ecosystem: Startups RegTech, Startups: Challenges, RegTech Ecosystem: Regulators, Use of AI in regulation and Fraud detection.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Swanson Seth, Fintech for Beginners: Understanding and Utilizing the power of technology, Create space Independent Publishing Platform,2016
2.	Models AuTanda, Fintech Bigtech And Banks Digitalization and Its Impact On Banking Business, Springer, 2019
Reference(s):	
1.	Henning Diedrich, Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations, Wildfire Publishing, 2016
2.	Jacob William, FinTech: The Beginner's Guide to Financial Technology, Create space Independent Publishing Platform, 2016
3.	IIBF, Digital Banking, Taxmann Publication, 2016
4.	Jacob William, Financial Technology, Create space Independent Pub, 2016

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Currency Exchange and Digital Payment**	
1.1	Fintech users, Individual Payments	2
1.2	RTGS, IMPS, UPI Systems, Digital Payments Smart Cards	2
1.3	Stored-Value Cards, EC Micropayments, Payment Gateways	2
1.4	Mobile Payments, Digital and Virtual Currencies,	1
1.5	Security, Ethical, Legal, Privacy, and Technology Issues	2
2.0	**Digital Finance**	
2.1	Understand the concept of Crypto currency	2
2.2	Bitcoin and Applications	1
2.3	Cryptocurrencies and Digital Crypto Wallets - -Types of Cryptocurrencies	2
2.4	Cryptocurrencies and Applications, block chain, Artificial Intelligence, machine learning	2
2.5	A Brief History of Financial Innovation	2
3.0	**Insuretech**	
3.1	InsurTech Introduction	2
3.2	Business model disruption AI/ML in Insur Tech IoT	1
3.3	InsurTech ,Risk Modeling	2
3.4	Fraud Detection Processing claims	2
3.5	Underwriting Innovations in Insurance Services	2
3.8	Tyre: Function, Types and Construction	2
4.0	**Steering, Brakes and Suspension Systems**	
4.1	P2P and Marketplace Lending	2
4.2	New Models and New Products in market place lending P2P Infrastructure and technologies	2
4.3	P2P and Crowd funding unicorns and business models	2
4.4	SME/MSME Lending: Unique opportunities and Challenges, Solutions and Innovations	3
5.0	**Electric and Autonomous Vehicles**	
5.1	FinTech Regulations: Global Regulations and Domestic Regulations,	1
5.2	Evolution of RegTech,	1
5.3	RegTech Ecosystem: Financial Institutions	1
5.4	RegTech Ecosystem: StartupsRegTech,	2
5.5	Startups: Challenges	1
5.6	RegTech Ecosystem: Regulators	2
5.7	Use of AI in regulation and Fraud detection	1

Course Designer(s)

1. Dr.H.KALAIARASI – kalaiarasi@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E45	Fundamentals of Investment	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To familiarize the students with different investment alternatives.
- To know how to evaluate different investment products by discounting techniques
- To understand concept of investment risks, returns of prospective investors in the market.
- To introduce them to the framework of portfolio analysis
- To highlight the role of SEBI and Stock Exchanges in investors protection

Pre-requisites

- Basic knowledge of Higher Secondary Mathematics, Binary Operations & Mathematical Logic

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the different investment alternatives and market participants	Understand
CO2	Apply the concept of time value of money and discounting techniques	Apply
CO3	Understand the concept of risk and return	Understand
CO4	Understand the concept of Portfolio Analysis and Financial Derivatives	Understand
CO5	Understand the role of SEBI and Stock Exchanges in investor protection	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	-	-	3	-	-	-	2	-	-	2	-	-	-	-
CO2	-	-	-	-	-	3	-	-	-	-	3	-	-	-	3
CO3	-	3	-	-	-	-	-	3	-	-	-	-	2	-	-
CO4	-	-	3	-	-	-	3	-	-	3	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	3	-	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	25	25	35
Understand	25	25	45
Apply	10	10	20
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E45- Fundamentals of Investment								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Investment Environment: The investment decision process, Types of Investments – Commodities, Real Estate and Financial Assets (Equity, Mutual funds, Debt), the Indian securities market, the market participants (Stock exchanges, Stock brokers, Clearing House, Depositories, Depository Participants, FIIs, Domestic institutional investors, Individual investors).	[9]
Time value of money: Basic Concepts, Importance of Time Value of Money, Compounding and discounting techniques, Difference between Nominal Interest Rate (NIR) and Effective Interest Rate.	[9]
Managing Investment Risk: Understand the concept of risk and return-Calculation of Expected Return-Systematic and Unsystematic risk.	[9]
Portfolio Analysis and Financial Derivatives: Portfolio and Diversification, Portfolio Risk and Return; Mutual Funds; Introduction to Financial Derivatives; Financial Derivatives Markets in India.	[9]
Investor Protection: Role of SEBI and stock exchanges in investor protection; Investor grievances and their redressal system, insider trading, investor awareness and activism.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Dhankhar, J. N. (2019). Indian Capital Market in Operation. New Delhi: Skylark Publications.
2.	Chandra, P. (2019). Investment Analysis. New Delhi: Tata McGraw Hill.
Reference(s):	
1.	Choudhry, M. (2022). Capital Market Instruments. London: Prentice Hall.
2.	Madhusoodanan, E.D. (2018). Indian Capital Markets. Delhi: Quest Publications.
3.	Gurusamy, (2019). Capital Markets. New Delhi: Tata McGraw Hill.
4.	Srivastava, R.M. (2022). Management of Indian Financial Institutions. Mumbai: Himalaya Publishing House..

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Investment Environment:**	
1.1	The investment decision process	1
1.2	Types of Investments – Commodities, Real Estate	1
1.3	Financial Assets (Equity, Mutual funds, Debt)	1
1.4	The Indian securities market	1
1.5	The market participants (Overview)	1
1.6	Stock exchanges, Stock brokers, Clearing House	1
1.7	Depositories, Depository Participants	1
1.8	FIIs, Domestic institutional investors	1
1.9	Individual investors	
2.0	**Time value of money:**	
2.1	Basic Concepts	2
2.2	Importance of Time Value of Money	2
2.3	Compounding and discounting techniques	3
2.4	Difference between Nominal Interest Rate (NIR) and Effective Interest Rate.	2
3.0	**Managing Investment Risk:**	
3.1	Understand the concept of risk and return	3
3.2	Calculation of Expected Return	3
3.3	Systematic and Unsystematic risk	3
4.0	**Portfolio Analysis and Financial Derivatives:**	
4.1	Portfolio and Diversification	1
4.2	Portfolio Risk and Return	3
4.3	Mutual Funds	2
4.4	Introduction to Financial Derivatives	1
4.5	Financial Derivatives Markets in India.	2
5.0	**Investor Protection**:	
5.1	Role of SEBI and stock exchanges in investor protection	3
5.2	Investor grievances and their redressal system	3
5.3	Insider trading, investor awareness and activism	3

Course Designer(s)

1. Mr.R.Murugaganesh – murugaganesh@ksrct.ac.in

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

60 CB E46	Introduction to Fintech	Category	L	T	P	Credit
		PE	3	0	0	3

Objectives

- To learn about history, importance and evolution of Fintech.
- To acquire the knowledge of Fintech in payment industry
- To acquire the knowledge of Fintech in insurance industry.
- To learn the Fintech developments around the world
- To know about the future of Fintech

Pre-requisites

- Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand about history, importance and evolution of Fintech	Understand
CO2	Understand the knowledge of Fintech in payment industry	Understand
CO3	Understand the knowledge of Fintech in insurance industry	Understand
CO4	Understand the Fintech developments around the world	Understand
CO5	Understand the about the future of Fintech	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	-	-	3	-	-	-	2	-	-	2	-	-	-	-
CO2	-	-	-	-	-	3	-	-	-	-	3	-	-	-	3
CO3	-	3	-	-	-	-	-	3	-	-	-	-	2	-	-
CO4	-	-	3	-	-	-	3	-	-	3	-	-	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	3	-	-	3	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	25	25	35
Understand	25	25	45
Apply	10	10	20
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E46- Introduction to Fintech								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction * Fintech - Definition, History, concept, meaning, architecture, significance, Goals, key areas in Fintech, Importance of Fintech, role of Fintech in economic development, opportunities and challenges in Fintech, Evolution of Fintech in different sectors of the industry.	[9]
Payment Industry * FinTech in Payment Industry-Multichannel digital wallets, applications supporting wallets, onboarding and KYC application, FinTech in Lending Industry- Formal lending, Informal lending, P2P lending, POS lending, Online lending, Payday lending, Microfinance, Crowdfunding.	[9]
Insurance Industry * FinTech in Wealth Management Industry-Financial Advice, Automated investing, Socially responsible investing, Fractional Investing, Social Investing. FinTech in Insurance Industry-P2P insurance, On-Demand Insurance, On-Demand Consultation.	[9]
Fintech around the Globe * FinTech developments - US, Europe and UK, Germany, Sweden, France, China, India, Africa, Australia, New Zealand, Brazil and Middle East, Regulatory and Policy Assessment for Growth of FinTech. FinTech as disruptors.	[9]
Future of Fintech * How emerging technologies will change financial services, the future of financial services, banking on innovation through data, why FinTech banks will rule the world, The FinTech Supermarket, Banks partnering with FinTech start-ups, The rise of BankTech, Fintech impact on Retail Banking.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Arner D., Barbers J., Buckley R, The evolution of FinTech: a new post crisis paradigm, University of New South Wales Research Series, 2015.
2.	Susanne Chishti, Janos Barberis, The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries, Wiley Publications, 2016.
Reference(s):	
1.	Richard Hayen, FinTech: The Impact and Influence of Financial Technology on Banking and the Finance Industry, 2016.
2.	Parag Y Arjunwadkar, FinTech: The Technology Driving Disruption in the financial service industry CRC Press, 2018.
3.	Sanjay Phadke, Fintech Future: The Digital DNA of Finance Paperback .Sage Publications, 2020.
4.	Pranay Gupta, T. Mandy Tham, Fintech: The New DNA of Financial Services Paperback, 2018..

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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction:**	
1.1	Fintech - Definition, History	1
1.2	concept, meaning	1
1.3	architecture	1
1.4	significance, Goals	1
1.5	key areas in Fintech	1
1.6	Importance of Fintech	1
1.7	role of Fintech in economic development	1
1.8	opportunities and challenges in Fintech	1
1.9	Evolution of Fintech in different sectors of the industry	1
2.0	**Payment Industry:**	
2.1	FinTech in Payment Industry	2
2.2	Multichannel digital wallets	1
2.3	applications supporting wallets	1
2.4	onboarding and KYC application	1
2.5	FinTech in Lending Industry	1
2.6	Formal lending, Informal lending	1
2.7	P2P lending, POS lending	1
2.8	Online lending, Payday lending, Microfinance, Crowdfunding	1
3.0	**Insurance Industry:**	
3.1	FinTech in Wealth Management Industry	2
3.2	Financial Advice, Automated investing	1
3.3	Socially responsible investing	1
3.4	Fractional Investing	1
3.5	Social Investing. FinTech in Insurance Industry	1
3.6	P2P insurance	1
3.7	On-Demand Insurance	1
3.8	On-Demand Consultation	1
4.0	**Fintech around the Globe:**	
4.1	FinTech developments	3
4.2	US, Europe and UK, Germany	3
4.3	Sweden, France, China, India, Africa	2
4.4	Australia, New Zealand, Brazil and Middle East	2
4.5	Regulatory and Policy Assessment for Growth of FinTech	2
4.6	FinTech as disruptors	2
5.0	**Future of Fintech**:	
5.1	How emerging technologies will change financial services	2
5.2	the future of financial services	1
5.3	banking on innovation through data	1
5.4	why FinTech banks will rule the world	1
5.5	The FinTech Supermarket	1

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

5.6	Banks partnering with FinTech start-ups	1
5.7	The rise of BankTech	1
5.8	Fintech impact on Retail Banking	1

Course Designer(s)

1. Dr.H.KALAIARASI – kalaiarasi@ksrct.ac.in

ELECTIVE V

60 CB E51	Exploratory Data Analysis	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To outline an overview of exploratory data analysis
- To implement data visualization using Matplotlib
- To perform univariate data exploration and analysis
- To use Data exploration and visualization techniques for multivariate and time series data
- To learn about the stream mining concepts

Pre-requisites

- Basic knowledge of Data Mining and Machine Learning Techniques

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the fundamentals of exploratory data analysis.	Understand
CO2	Analyze the data visualization using Matplotlib.	Analyse
CO3	Illustrate the working of univariate data exploration and analysis.	Apply
CO4	Use Data exploration and visualization techniques for multivariate and time series data.	Apply
CO5	Apply mining techniques for stream data.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	3	3	-	-	-	2	2	3	-	-	-	-
CO2	2	2	2	3	3	-	-	-	3	2	2	2	-	-	-
CO3	2	3	2	2	3	-	-	-	2	2	2	-	-	-	-
CO4	2	2	2	2	3	-	-	-	3	2	2	2	-	-	-
CO5	2	2	3	2	1	-	-	-	1	2	2	1	-	-	-
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	-	-	-	-	-	-	-	-
Understand	30	-	-	-	34	-	-	-
Apply	-	50	40	50	-	50	70	50
Analyse	30	50	20	50	66	50	30	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer science and Business Systems

60 CB E51 - Exploratory Data Analysis

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	2	0	2	60	3	50	50	100

Exploratory Data Analysis* EDA Fundamentals – Understanding Data Science – Significance of EDA – Making Sense of Data – Comparing EDA with Classical and Bayesian Analysis – Software Tools for EDA.	[6]
EDA using Python* Data Manipulation using Pandas – Pandas Objects – Data Indexing and Selection – Operating on Data – Handling Missing Data – Hierarchical Indexing.	[6]
Univariate Analysis* Introduction to Single Variable: Distribution Variables - Numerical Summaries of Level and Spread - Scaling and Standardizing – Inequality - Relationships between Two Variables.	[6]
Multivariate and Time Series Analysis * Introducing a Third Variable - Causal Explanations - Three-Variable Contingency Tables and Beyond – Fundamentals of TSA – Characteristics of Time Series Data – Data Cleaning.	[6]
Mining Data Streams* Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing -Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream	[6]
Practical: 1. Install the data Analysis and Visualization tool. 2. Perform exploratory data analysis (EDA) with datasets like email data set. Export all your emails as a dataset, import them inside a pandas data frame, visualize them and get different insights from the data. 3. Working with Numpy arrays, Pandas data frames, Basic plots using Matplotlib. 4. Explore various variable and row filters in R for cleaning data. Apply various plot features in R on sample data sets and visualize. 5. Perform Time Series Analysis and apply the various visualization techniques. 6. Perform Data Analysis and representation on a Map using various Map data sets with Mouse Rollover effect, user interaction, etc. 7. Build cartographic visualization for multiple datasets involving various countries of the world; states and districts in India etc. 8. Perform Exploratory Data Analysis (EDA) on Wine Quality Data Set. 9. Use a case study on a data set and apply the various EDA and visualization techniques and present an analysis report. 10. Perform Sentiment Analysis on X(Twitter app) Data using techniques like Bag-of-Words, TF-IDF, or pre-trained models like VADER **.** **Tools used: R / Python / Jupiter Notebook.**	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s)	
1.	Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", 2nd Edition, O Reilly, UK, 2022.
2.	Suresh Kumar Mukhiya, Usman Ahmed, “Hands-On Exploratory Data Analysis with Python”, 1st Edition, Packt Publishing, UK, 2020.
Reference(s):	
1.	Anand Rajaraman and Jeffrey David Ullman, ‘Mining of Massive Datasets’, 3rd Edition, Cambridge University Press, UK, 2020.
2.	Vignesh Prajapati, ‘Big Data Analytics with R and Hadoop’, 1st Edition, Packt Publishing, UK, 2013.
3.	Mohammedj.Zakiand Wagner Meira, ‘Data Mining and Analysis- Fundamental Concepts and

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	Algorithms', Cambridge University Press, 2014.
4.	Catherine Marsh, Jane Elliott, "Exploring Data: An Introduction to Data Analysis for Social Scientists", Wiley Publications, 2nd Edition, 2008.

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Exploratory Data Analysis**	
1.1	EDA Fundamentals	1
1.2	Understanding data science	1
1.3	Significance of EDA	1
1.4	Making Sense of Data	1
1.5	Comparing EDA with Classical and Bayesian Analysis	1
1.6	Software Tools for EDA	1
2	**EDA Using Python**	
2.1	Data Manipulation using Pandas	1
2.2	Pandas Objects	1
2.3	Data Indexing and Selection	1
2.4	Operating on Data	1
2.5	Handling Missing Data	1
2.6	Hierarchical Indexing	1
3	**Univariate Analysis**	
3.1	Introduction to Single Variable	1
3.2	Distribution Variables	1
3.3	Numerical Summaries of Level and Spread	1
3.4	Scaling and Standardizing	1
3.5	Inequality	1
3.6	Relationships between Two Variables	1
4	**Multivariate and Time Series Analysis**	
4.1	Introducing a Third Variable	1
4.2	Causal Explanations	1
4.3	Three-Variable Contingency Tables and Beyond	1
4.4	Fundamentals of TSA	1
4.5	Characteristics of Time Series Data	1
4.6	Data Cleaning	1
5	**Mining Data Streams**	
5.1	Introduction To Streams Concepts	1
5.2	Stream Data Model and Architecture	1
5.3	Stream Computing	1
5.4	Sampling Data in a Stream	1
5.5	Filtering Streams	1
5.6	Counting Distinct Elements in a Stream	1

Practical:		
1.	Install the data Analysis and Visualization tool.	3
2.	Perform exploratory data analysis (EDA) with datasets like email data set. Export all your emails as a dataset, import them inside a pandas data frame, visualize them and get different insights from the data.	3
3.	Explore various variable and row filters in R for cleaning data. Apply various plot features in R on sample data sets and visualize.	3
4.	Perform Time Series Analysis and apply the various visualization techniques	3
5.	Perform Data Analysis and representation on a Map using various Map data sets with Mouse Rollover effect, user interaction, etc.	3
6.	Build cartographic visualization for multiple datasets involving various countries of the world; states and districts in India etc.	3
7.	Perform Exploratory Data Analysis (EDA) on Wine Quality Data Set.	3
8.	Perform Exploratory Data Analysis (EDA) on Wine Quality Data Set.	3
9.	Use a case study on a data set and apply the various EDA and visualization techniques and present an analysis report.	3
10.	Perform Sentiment Analysis on X(Twitter app) Data using techniques like Bag-of-Words, TF-IDF, or pre-trained models like VADER.	3

Course Designer(s)

1. Mr. S. Vignesh - vigneshs@ksrct.ac.in

60 CB E52	Recommender Systems	Category	L	T	P	Credit
		PC	2	0	2	3

Objectives

- To understand the foundations of the recommender system
- To learn the significance of machine learning and data mining algorithms for Recommender systems
- To learn about collaborative filtering
- To make students design and implement a recommender system
- To learn collaborative filtering

Pre-requisites

- NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the basic concepts of recommender systems.	Understand
CO2	Implement machine-learning and data-mining algorithms in recommender systems data sets	Understand
CO3	Implementation of Collaborative Filtering in carrying out performance evaluation of recommender systems based on various metrics.	Understand
CO4	Design and implement a simple recommender system.	Apply
CO5	Understand the strengths, weaknesses, and applicability of different advanced topics of recommender systems.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	1	2	1	-	-	-	1	-	-	1	-	-	-
CO2	1	2	-	-	1	-	-	-	-	-	-	1	-	-	-
CO3	2	3	1	-	1	-	-	-	2	-	-	-	-	-	-
CO4	3	2	2	2	1	-	-	-	2	-	-	2	-	-	-
CO5	1	1	-	1	1	-	-	-	-	-	-	1	-	-	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	-	34	-	34	-
Understand	40	-	40	-	66	-	66	-
Apply	-	50	-	50	-	50	-	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E52 – Recommender Systems

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	2	0	2	60	3	50	50	100

Introduction: * Introduction and Basic Taxonomy of Recommender Systems - Traditional and Non-personalized Recommender Systems - Overview of Data Mining Methods for Recommender Systems - Similarity Measures - Dimensionality Reduction – Singular Value Decomposition (SVD)	[6]
Content-Based Recommendation Systems: High-level Architecture of Content-based Systems - Item Profiles, Representing Item Profiles, Methods for Learning User Profiles, Similarity-based Retrieval, and Classification Algorithms.	[6]
Collaborative Filtering: A Systematic Approach, Nearest-neighbor Collaborative Filtering (CF), User-based and Item-based CF, Components of Neighborhood Methods Rating Normalization, Similarity Weight Computation, and Neighborhood Selection	[6]
Attack-Resistant Recommender Systems: Introduction – Types of Attacks – Detecting Attacks on Recommender Systems – Individual Attack – Group Attack – Strategies for Robust Recommender Design - Robust Recommendation Algorithms.	[6]
Evaluating Recommender Systems: Evaluating Paradigms – User Studies – Online and Offline Evaluation – Goals of Evaluation Design – Design Issues – Accuracy Metrics – Limitations of Evaluation Measures.	[6]
Practical Exercises **1.** Implement Data similarity measures using Python 2. Implement dimension reduction techniques for recommender systems 3. Implement user profile learning 4. Implement content-based recommendation systems 5. Implement a simple nearest-neighbor collaborative filtering algorithm using Python. 6. Implement a user-based collaborative filtering algorithm in Python. 7. Create an attack for tampering with recommender systems 8. Focus on implementing and simulating an individual attack on a recommender system. 9. Implement accuracy metrics like Receiver Operated Characteristic curves 10. Implementing baseline recommender systems (popularity-based, random recommendation). **LAB TOOLS:** Jupyter Notebook	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):	
1.	Charu C. Aggarwal, Recommender Systems: The Textbook, Springer, 2016.
2.	Dietmar Jannach , Markus Zanker , Alexander Felfernig and Gerhard Friedrich , Recommender Systems: An Introduction, Cambridge University Press (2011), 1st ed
Reference(s):	
1.	Francesco Ricci , Lior Rokach , Bracha Shapira , Recommender Sytems Handbook, 1st ed, Springer (2011),
2.	Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman, Mining of massive datasets, 3rd edition, Cambridge University Press, 2020.
3.	“Attacks on the Press: Journalism on the World's Front Lines" by Committee to Protect

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	Journalists (2017, Wiley)
4.	Evaluating Learning Algorithms: A Classification Perspective" by Nathalie Japkowicz and Mohak Shah , Cambridge University Press , 2011

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1.0	**Introduction:**	
1.1	Introduction and Basic Taxonomy of Recommender Systems	1
1.2	Traditional and Non-personalized Recommender Systems	1
1.3	Overview of Data Mining Methods for Recommender Systems	1
1.4	Similarity Measures	1
1.5	Dimensionality Reduction	1
1.6	Singular Value Decomposition (SVD)	1
2.0	**Content-Based Recommendation Systems**:	
2.1	High-level Architecture of Content	1
2.2	Based Systems - Item Profiles	1
2.3	Representing Item Profiles	1
2.4	Methods for Learning User Profiles	1
2.5	Similarity-based Retrieval	1
2.6	Classification Algorithms	1
3.0	**Collaborative Filtering:**	
3.1	A Systematic Approach	1
3.2	Nearest-neighbor Collaborative Filtering (CF)	1
3.3	User-based and Item-based CF	1
3.4	Components of Neighborhood Methods Rating Normalization	1
3.5	Similarity Weight Computation	1
3.6	Neighborhood Selection	1
4.0	**Attack-Resistant Recommender Systems:**	
4.1	Introduction – Types of Attacks	1
4.2	Detecting Attacks on Recommender Systems	1
4.3	Individual Attack	1
4.4	Group Attack	1
4.5	Strategies for Robust Recommender Design	1
4.6	Robust Recommendation Algorithms	1
5.0	**Evaluating Recommender Systems:**	
5.1	Evaluating Paradigms – User Studies	1
5.2	Online and Offline Evaluation	1
5.3	Goals of Evaluation Design	1
5.4	Design Issues	1
5.5	Accuracy Metrics	1
5.6	Limitations of Evaluation Measures	1
Practical:		

1.	Implement Data similarity measures using Python	3
2.	Implement dimension reduction techniques for recommender systems	3
3.	Implement user profile learning	2
4.	Implement content-based recommendation systems	3
5.	Implement a simple nearest-neighbor collaborative filtering algorithm using Python.	4
6.	Implement a user-based collaborative filtering algorithm in Python.	3
7.	Create an attack for tampering with recommender systems	3
8.	Focus on implementing and simulating an individual attack on a recommender system.	3
9.	Implement accuracy metrics like Receiver Operated Characteristic curves	3
10.	Implementing baseline recommender systems (popularity-based, random recommendation).	3

Course Designer(s)

1. R.Karthik - karthikr@ksrct.ac.in

		Category	L	T	P	Credit
60 CB E53	Neural Networks and Deep Learning	PC	2	0	2	3

Objectives

- To understand the basic ideas and principles of Neural Networks
- To understand the basic concepts of Big Data and Data Analysis
- To familiarize the student with the image processing facilities like Tensorflow and Keras
- To analyze Different Deep Learning models for different Applications
- To understand and implement Deep Learning Architectures

Pre-requisites

- Machine Learning Techniques

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the building blocks of Deep learning	Remember, Understand
CO2	Implement Feature extraction and feature learning by using TensorFlow/ Keras in Deep Learning Applications	Understand, Apply
CO3	Design and implement image recognition and image classification using a pretrained network Learning	Understand, Apply, Analyze
CO4	Analyze Different Deep Learning Models in Image Related Projects	Understand, Analyze
CO5	Design and implement case studies using Convolutional Neural Networks	Understand, Apply, Analyze

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	2	-	-	-	-	-	-	3	-	3	3
CO2	3	3	3	3	2	-	-	-	-	-	-	3	-	3	3
CO3	3	3	3	3	2	-	-	-	-	-	-	3	-	3	3
CO4	3	3	3	2	2	-	-	-	-	-	-	3	-	3	3
CO5	3	3	3	2	2	-	-	-	-	-	-	3	-	3	3
3 – High, 2 – Medium, 1 – Low.															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	-	34	-	34	-
Understand	40	-	40	-	66	-	66	-
Apply	-	50	-	50	-	50	-	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CB E53– Neural Networks and Deep Learning								
Semester	**Hours / Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
VIII	2	0	2	60	3	50	50	100

Basics of Neural Networks* Basic concept of Neurons – role of Neural Networks - Building Blocks of Neural Network - Optimizers. Activation Functions. Loss Functions. Perceptron Algorithm – Boltzmann Machine and Perceptron - Data Pre-processing for neural networks.	**[6]**
Introduction to Deep Learning* Feed Forward Neural Networks – Gradient Descent – Back Propagation Algorithm – Vanishing Gradient problem – Mitigation – RelU Heuristics for Avoiding Bad Local Minima – Heuristics for Faster Training – Nestors Accelerated Gradient Descent – Regularization – Dropout.	**[6]**
Convolutional Neural Networks* Role of Convolutional Networks in Machine Learning.- CNN Architectures – Concept of Convolution – Pooling Layers – Transfer Learning – Image Classification using Transfer Learning.	**[6]**
Advanced Deep Learning Architectures LSTM, GRU, Encoder/Decoder Architectures – Auto encoders – Compression of features using Auto encoders- Standard- Sparse – Denoising.	**[6]**
Applications of Deep Learning* Image Segmentation – Object Detection – Automatic Image Captioning – Image generation with Generative Adversarial Networks – Video to Text with LSTM Models – Attention Models for Computer Vision – Case Study: Named Entity Recognition.	**[6]**
Practical: 1. Implement Simple Programs like vector addition in TensorFlow. 2. Implement a simple problem like regression model in Keras. 3. Implement Boltzmann Machines and Perceptrons for binary denoising tasks. 4. Implement a Feed-Forward Network in TensorFlow/Keras. 5. Implement Feature Selection from Video and Image Data. 6. Implement an Image Classifier using CNN in TensorFlow/Keras. 7. Sequence Prediction with LSTM, GRU, and Encoder/Decoder Architectures. 8. Text Generation with LSTM, GRU, and Encoder/Decoder Architectures. 9. Denoising Text with LSTM, GRU, and Encoder/Decoder Architectures. 10.Implement a Simple LSTM using TensorFlow/Keras.	**[30]**
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):	
1.	Ian Good Fellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press, 2017.
2.	Francois Chollet, “Deep Learning with Python”, Manning Publications, 2018.
Reference(s):	
1.	Phil Kim, “Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence”, Apress , 2017.
2.	Deep Learning A Practitioner’s Approach Josh Patterson and Adam Gibson O’Reilly Media, Inc. 2017
3.	Ragav Venkatesan, Baoxin Li, “Convolutional Neural Networks in Visual Computing”, CRC Press, 2018.
4.	Navin Kumar Manaswi, “Deep Learning with Applications Using Python”, Apress, 2018.

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1.0	**Basics of Neural Networks**	
1.1	Basic concept of Neurons - Building Blocks of Neural Network	1
1.2	Optimizers	1
1.3	Activation Functions, Loss Functions.	1
1.4	Perceptron Algorithm	1
1.5	Boltzmann Machine and Perceptron	1
1.6	Data Pre-processing for neural networks	1
2	**Introduction to Deep Learning**	
2.1	Feed Forward Neural Networks	1
2.2	Gradient Descent	1
2.3	Back Propagation Algorithm	1
2.4	Vanishing Gradient problem – Mitigation	1
2.5	RelU Heuristics for Avoiding Bad Local Minima	1
2.6	Gradient Descent – Regularization – Dropout	1
3	**Convolutional Neural Networks**	
3.1	Role of Convolutional Networks in Machine Learning	1
3.2	CNN Architectures	1
3.3	Concept of Convolution	1
3.4	Pooling Layers	1
3.5	Transfer Learning	1
3.6	Image Classification using Transfer Learning	1
4	**Steering, Brakes and Suspension Systems**	
4.1	More Deep Learning Architectures	1
4.2	LSTM	1
4.3	GRU	1
4.4	Encoder/Decoder Architectures, Auto encoders	1
4.5	Compression of features using Auto encoders	1
4.6	Standard- Sparse – Denoising	1
5	**Applications Of Deep Learning**	
5.1	Image Segmentation – Object Detection	1
5.2	Automatic Image Captioning	1
5.3	Image generation with Generative Adversarial Networks	1
5.4	Video to Text with LSTM Models	1
5.5	Attention Models for Computer Vision	1
5.6	Case Study: Named Entity Recognition	1
Practical:		
1.	Implement Simple Programs like vector addition in TensorFlow.	3
2.	Implement a simple problem like regression model in Keras.	3
3.	Implement Boltzmann Machines and Perceptrons for binary denoising tasks	3
4.	Implement a Feed-Forward Network in TensorFlow/Keras	3
5.	Implement Feature Selection from Video and Image Data	3

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

6.	Implement an Image Classifier using CNN in TensorFlow/Keras	3
7.	Sequence Prediction with LSTM, GRU, and Encoder/Decoder Architectures	3
8.	Text Generation with LSTM, GRU, and Encoder/Decoder Architectures	3
9.	Denoising Text with LSTM, GRU, and Encoder/Decoder Architectures	3
10.	Implement a Simple LSTM using TensorFlow/Keras.	3

Course Designer(s)

1. Dr. P.MANIMARAN -manimaran@ksrct.ac.in

60 CB E54	Social Text and Media Analytics	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To understand the basic issues and types of social, text and media mining
- Familiarize the learners with the concept of social, text and media analytics and understand its significance
- Familiarize the learners with the tools of social, text and media analytics
- Enable the learners to develop skills required for analyzing the effectiveness of social, text and media for business purposes
- To know the applications in real time systems

Pre-requisites

- Data Science, Natural Language Processing, Network Analysis

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand about social, text and media mining	Understand
CO2	Understand the significance of social text and media analytics.	Understand
CO3	Learn tools of social, text and media analytics.	Apply
CO4	Develop skills required for analyzing the effectiveness of social text and media for business purposes	Apply
CO5	Know the applications in real time systems.	Understand

Mapping with Programme Outcomes

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	2	1
CO2	3	2	1	2	2	-	-	-	-	-	-	-	2	1
CO3	3	3	2	-	1	-	-	-	-	-	-	-	2	1
CO4	3	2	2	2	3	-	-	-			-	-	2	2
CO5	3	1	1	1	3	-	-	-	-	-		-	2	2
3 - Strong; 2 - Medium; 1 - Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	-	34	-	34	-
Understand	40	50	-	50	66	50	66	50
Apply	-	50	40	50	-	50	-	50
Analyse	-	-	-	-	-	-	-	-
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E54 - Social Text and Media Analytics

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	2	0	2	60	3	50	50	100

Introduction to Social Media Analysis* Network Fundamentals and Models: The Social Networks Perspective - Nodes, Ties and Influencers - Social Network and Web Data and Methods. Graphs and Matrices - Basic measures for Individuals and Networks.	[6]
Overview of Text Mining* Definition - General Architecture – Algorithms – Core Operations – Pre-processing – Types of Problems. Basics of Document Classification - Information Retrieval, Clustering and Organizing Documents - Information Extraction - Prediction and Evaluation.	[6]
Text Mining for Information Retrieval and Information Extraction* Information Retrieval and Text Mining - Keyword Search - Nearest-Neighbor Methods - Inverted Lists. Information Extraction: Architecture - Co-reference - Named Entity and Relation Extraction - Database Construction. Text Summarization Techniques - Topic Representation - Influence of Context - Indicator Representations.	[6]
Web Analytics Tools* Click Stream Analysis - A/B Testing - Online Surveys - Web Crawling and Indexing. Natural Language Processing Techniques for Micro-text Analysis.	[6]
Marketing Research & Trends in Market * Introduction, Parameters, Demographics. Analyzing Page Audience - Reach and Engagement Analysis - Post-performance on FB. Social campaigns: Measuring and Analyzing Social Campaigns - Defining Goals and Evaluating Outcomes - Network Analysis.	[6]
Practical: 1. Pre-processing text document using NLTK of Python a. Stop-word elimination b. Stemming 2. Pre-processing text document using NLTK of Python a. Lemmatization b. POS tagging c. Lexical analysis 3. Extraction-based summarization using LSA Algorithm. 4. Sentiment analysis on customer review on products 5. Web analytics a. Web usage data (web server log data, clickstream analysis) b. Hyperlink data 6. Use Google analytics tools to implement the following a. Conversion Statistics b. Visitor Profiles 7. Use Google analytics tools to implement the Traffic Sources 8. Search engine optimization - implement spamdexing 9. SEO and Search Engine Marketing using Google Adwords Keyword Planner 10. RFM (Recency, Frequency and Monetary) Analysis using Excel and Google Analytics. **Tools used: Python NLTK, GoogleAdwords, Google Analytics, MS Excel**	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Marshall Sponder, “Social Media Analytics”, McGraw Hill, 2011.
2.	Charu C. Aggarwal, ChengXiang Zhai, “Mining Text Data”, Springer; 2012.

Reference(s):

1.	Matthew Ganis, Avinash Kohirkar, “Social Media Analytics: Techniques and Insights for

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	Extracting Business Value Out of Social Media", Pearson, 2016.
2.	Jim Sterne, "Social Media Metrics: How to Measure and Optimize Your Marketing Investment", Wiley, 2010.
3.	Oliver Blanchard,"Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization", Que Biz-Tech, 2019.
4.	Sholom Weiss, Nitin Indurkhya, Tong Zhang, Fred Damerau, "The Text Mining Handbook: Advanced Approaches in Analyzing Unstructured Data", Springer, 2010.

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1.0	**Introduction to Social Media Analysis**	
1.1	The Social Networks Perspective - Nodes, Ties and Influencers	1
1.2	Social Network and Web Data and Methods	2
1.3	Graphs and Matrices	2
1.4	Basic measures for Individuals and Networks	1
2.0	**Overview of Text Mining**	
2.1	Overview of Text Mining: Definition - General Architecture, Algorithms	1
2.2	Core Operations, Pre-processing, Types of Problems	2
2.3	Basics of Document Classification, Information Retrieval	1
2.4	Clustering and Organizing Documents	1
2.5	Information Extraction - Prediction and Evaluation	1
3.0	**Text Mining for Information Retrieval and Information Extraction**	
3.1	Keyword Search, Nearest-Neighbour Methods	1
3.2	Inverted Lists. Information Extraction, Architecture	1
3.3	Database Construction, Text Summarization Techniques	2
3.4	Topic Representation	1
3.5	Influence of Context, Indicator Representations	1
4.0	**Web Analytics Tools**	
4.1	Click Stream Analysis	1
4.2	A/B Testing , Online Surveys	1
4.3	Web Crawling and Indexing	1
4.4	Natural Language Processing Techniques for Micro-text Analysis	3
5.0	**Marketing Research & Trends in Market**	
5.1	Introduction, Parameters, Demographics. Analyzing Page Audience	1
5.2	Reach and Engagement Analysis - Post-performance on FB	1.5
5.3	Social campaigns - Measuring and Analyzing Social Campaigns	1.5
5.4	Defining Goals and Evaluating Outcomes - Network Analysis.	2
Practical:		
1.	Pre-processing text document using NLTK of Python a. Stop-word elimination b. Stemming	3
2.	Pre-processing text document using NLTK of Python a. Lemmatization b. POS tagging	4

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

	c. Lexical analysis	
3.	Extraction-based summarization using LSA Algorithm.	2
4.	Sentiment analysis on customer review on products	4
5.	Web analytics a. Web usage data (web server log data, clickstream analysis) b. Hyperlink data	4
6.	Use Google analytics tools to implement the following a. Conversion Statistics b. Visitor Profiles	2
7.	Use Google analytics tools to implement the Traffic Sources	2
8.	Search engine optimization - implement spamdexing	3
9.	SEO and Search Engine Marketing using Google Adwords Keyword Planner	3
10.	RFM (Recency, Frequency and Monetary) Analysis using Excel and Google Analytics.	3

Course Designer(s)

1. P. Venkatesh - venkateshp@ksrct.ac.in

60 CB E55	Computer Vision	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To understand the fundamental concepts related to Image formation and processing
- To learn feature detection, matching and detection
- To become familiar with feature failure based alignment and motion estimation
- To develop skills on 3D reconstruction
- To understand image based rendering and recognition

Pre-requisites

- Basic knowledge of Maths, Image Processing, Programming, Machine Learning, Deep Learning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand basic knowledge, theories and methods in image processing and computer vision.	Understanding
CO2	Implement basic and some advanced image processing techniques in OpenCV.	Apply
CO3	Apply 2D a feature-based based image alignment, segmentation and motion estimations.	Apply
CO4	Apply 3D image reconstruction techniques	Apply
CO5	Design and develop innovative image processing and computer vision applications.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1	1	1	1	-	-	-	-	1	2	2	1	1	3
CO2	3	2	3	2	3	-	-	-	-	1	2	2	1	1	3
CO3	3	2	3	2	3	-	-	-	-	1	2	2	1	1	3
CO4	3	2	3	2	3	-	-	-	-	1	2	2	2	1	3
CO5	3	2	3	2	2	-	-	-	-	1	2	2	2	1	3
3 - Strong; 2 - Medium; 1 - Low															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	20	-	20	-	34	-	34	-
Understand	-	-	-	-	-	-	-	-
Apply	40	50	40	50	66	50	66	50
Analyse	-	50	-	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E55– Computer Vision

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	2	0	2	60	3	50	50	100

Introduction to Image Formation and Processing* Computer Vision - Geometric primitives and transformations - Photometric image formation - The digital camera - Point operators - Linear filtering - More neighborhood operators - Fourier transforms - Pyramids and wavelets - Geometric transformations - Global optimization.	[6]
Feature Detection, Matching and Segmentation* Points and patches - Edges - Lines - Segmentation - Active contours - Split and merge - Mean shift and mode finding - Normalized cuts - Graph cuts and energy-based methods.	[6]
Feature-Based Alignment & Motion Estimation* 2D and 3D feature-based alignment - Pose estimation - Geometric intrinsic calibration - Triangulation - Two-frame structure from motion - Factorization - Bundle adjustment - Constrained structure and motion - Translational alignment - Parametric motion - Spline-based motion - Optical flow - Layered motion.	[6]
3D Reconstruction* Shape from X - Active range finding - Surface representations - Point-based representations- Volumetric representations - Model-based reconstruction - Recovering texture maps and albedosos.	[6]
Image-Based Rendering and Recognition* View interpolation Layered depth images - Light fields and Lumigraphs - Environment mattes - Video-based rendering - Object detection - Face recognition - Instance recognition - Category recognition - Context and scene understanding - Recognition databases and test sets.	[6]
Practical: 1.Open CV installation and Working with Python 2. Basic Image Processing – loading images, Cropping, Resizing, Thresholding, Contour analysis, Bolb detection 3. Image Annotation – Drawing lines, text circle, rectangle, ellipse on images 4. Image segmentation using Graphcut / Grabcut 5. Implement image translation alignment using cross-correlation or phase correlation methods. Align two images that have undergone translational motion. 6. Implement B-spline or cubic spline interpolation to model and smooth the motion of feature points over time in a sequence of images. 7. 3D Reconstruction – Creating Depth map from stereo images. 8. Object Detection and Tracking using Kalman Filter, Camshift. 9. Implement real-time object detection using the YOLO algorithm. 10.Generate intermediate views between two images using interpolation techniques. **Tools:** Python, OpenCV	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Richard Szeliski, “Computer Vision: Algorithms and Applications”, Springer- Texts in Computer Science, Second Edition, 2022.
2.	E. R. Davies, Computer and Machine Vision, Fourth Edition, Academic Press, 2012.

Reference(s):

1.	Computer Vision: A Modern Approach, D. A. Forsyth, J. Ponce, Pearson Education, Second Edition, 2015.
2.	Christopher M. Bishop; Pattern Recognition and Machine Learning, Springer, 2006
3.	Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004.

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.	https://opencv.org/opencv-free-course/

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Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction to Image Formation and Processing**	
1.1	Computer Vision	1
1.2	Geometric primitives and transformations - Photometric image formation	1
1.3	The digital camera - Point operators	1
1.4	Linear filtering - More neighborhood operators	1
1.5	Fourier transforms - Pyramids and wavelets	1
1.6	Geometric transformations - Global optimization.	1
2	**Feature Detection, Matching and Segmentation**	
2.1	Points and patches	1
2.2	Edges - Lines	1
2.3	Segmentation -Active contours	1
2.4	Split and merge	1
2.5	Mean shift and mode finding - Normalized cuts	1
2.6	Graph cuts and energy-based methods.	1
3	**Feature-Based Alignment & Motion Estimation**	
3.1	2D and 3D feature-based alignment - Pose estimation	1
3.2	Geometric intrinsic calibration - Triangulation - Two-frame structure from motion	1
3.3	Factorization - Bundle adjustment	1
3.4	Constrained structure and motion - Translational alignment	1
3.5	Parametric motion - Spline-based motion	1
3.6	Optical flow - Layered motion.	1
4	**3D Reconstruction**	
4.1	Shape from X	1
4.2	Active rangefinding	1
4.3	Surface representations	1
4.4	Point-based representations	1
4.5	Volumetric representations - Model-based reconstruction	1
4.6	Recovering texture maps and albedosos	1
5	**Image-Based Rendering and Recognition**	
5.1	View interpolation Layered depth images	1
5.2	Light fields and Lumigraphs - Environment mattes	1
5.3	Video-based rendering-Object detection	1
5.4	Face recognition - Instance recognition	1
5.5	Category recognition - Context and scene understanding	1
5.6	Recognition databases and test sets	1

Practical:		
1.	OpenCV Installation and working with Python	2
2.	Basic Image Processing - loading images, Cropping, Resizing, Thresholding, Contour analysis, Bolb detection	4
3.	Image Annotation – Drawing lines, text circle, rectangle, ellipse on images	4
4.	Image segmentation using Graphcut / Grabcut.	2
5.	3D Reconstruction – Creating Depth map from stereo images.	2
6.	Object Detection and Tracking using Kalman Filter, Camshift	4
7.	3D Reconstruction – Creating Depth map from stereo images	3
8.	Object Detection and Tracking using Kalman Filter, Camshift	3
9.	Implement real-time object detection using the YOLO algorithm	3
10.	Generate intermediate views between two images using interpolation techniques	3

Course Designer(s)

1. Dr.K. Sakthivel - sakthivelk@ksrct.ac.in

60 CB E56	Business Analytics	Category	L	T	P	Credit
		PE	2	0	2	3

Objectives

- To understand the Analytics Life Cycle
- To comprehend the process of acquiring Business Intelligence
- To understand various types of analytics for Business Forecasting
- To model the supply chain management for Analytics
- To apply analytics for different functions of a business

Pre-requisites

- R and Python Programming

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the real world business problems and model with analytical solutions.	Remember
CO2	Identify the business processes for extracting Business Intelligence.	Understand
CO3	Apply predictive analytics for business fore-casting.	Apply
CO4	Apply analytics for supply chain and logistics management.	Apply
CO5	Use analytics for marketing and sales.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	1	1	3	-	-	-	-	1	1	1	2	-
CO2	3	2	3	1	1	3	-	-	-	-	2	2	1	2	-
CO3	3	2	3	1	1	3	-	-	-	-	2	2	1	1	-
CO4	3	2	3	1	1	3	-	-	-	-	2	1	1	1	-
CO5	3	2	3	1	1	3	-	-	-	-	1	2	1	1	-

3 - Strong; 2 - Medium; 1 - Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)				Model Examination (Marks)		End Sem Examination (Marks)	
	Test 1		Test 2					
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
Remember	30	-	-	-	10	-	10	-
Understand	30	-	-	-	25	-	25	-
Apply	-	50	40	50	65	50	65	50
Analyse	-	50	20	50	-	50	-	50
Evaluate	-	-	-	-	-	-	-	-
Create	-	-	-	-	-	-	-	-
Total	60	100	60	100	100	100	100	100

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB E56 – Business Analytics

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VIII	2	0	2	60	3	50	50	100

Introduction to Business Analytics* Analytics and Data Science – Analytics Life Cycle – Types of Analytics – Data Analysis-Microsoft EXCEL - Power BI-Business Intelligence (BI)- Power BI Desktop (Power Query, Power Pivot, Power View)- Power BI Service -Data Collection – Data Preparation – Modeling .	[6]
Business Intelligence* Data Warehouses and Data Mart - Knowledge Management –Types of Decisions - Decision Making Process - Decision Support Systems – Business Intelligence –OLAP.	[6]
Business Forecasting* Introduction to Business Forecasting and Predictive analytics - Logic and Data Driven Models – Data Mining and Predictive Analysis Modeling –Machine Learning for Predictive analytics.	[6]
HR & Supply Chain Analytics* Human Resources – Planning and Recruitment – Training and Development - Supply chain network - Planning Demand, Inventory and Supply –Analytics applications in HR & Supply Chain.	[6]
Marketing & Sales Analytics* Marketing Strategy, Marketing Mix, Customer Behaviour –selling Process – Sales Planning – Analytics applications in Marketing and Sales.	[6]
Practical: 1.Data Aggregation and Statistical functions in Tableau. 2.Predict the Customer Credit Risk for Credit card data-set using Linear Regression. 3. Predict house prices based on various features such as square footage, number of bedrooms, and location using linear regression. 4. Predict customer churn based on various customer attributes using classification algorithms and compare their performance. 5. Predict sales based on various features using regression models and compare their performance. 6. Apply HR Analytics to make a prediction of the demand for hourly-employees for the following month or for the next few years. 7. Apply HR Analytics to make a prediction of the demand for hourly employees for a year. 8. Do predictive analytics for customers' behaviour in marketing and sales. 9. Apply analytics for forecasting and inventory planning for a large retailer. 10. Perform predictive analytics for customers' behaviour in marketing and sales. **Tools used:** Pandas, Matplotlib, Scikit - learn	[30]
Total Hours: (Lecture - 30; Practical - 30)	**60**

Text Book(s):

1.	Mahadevan B, “Operations Management -Theory and Practice”,3rd Edition, Pearson Education,2018.
2.	Philip Kotler and Kevin Keller, “Marketing Management”, 15th edition, PHI, 2016.

Reference(s):

1.	VSP RAO, “Human Resource Management”, 3rd Edition, Excel Books, 2010.
2.	R. Evans James, “Business Analytics”, 2017
3.	R N Prasad, Seema Acharya, “Fundamentals of Business Analytics”, 2016.
4.	https://www.udemy.com/course/the-business-intelligence-analyst-course 2018/?couponCode=LEADERSALE24B

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Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of Hours
1	**Introduction to Business Analytics**	
1.1	Analytics and Data Science	1
1.2	Analytics Life Cycle	1
1.3	Types of Analytics	1
1.4	Business Problem Definition	1
1.5	Data Collection	1
1.6	Data Preparation – Modeling	1
2	**Business Intelligence**	
2.1	Data Warehouses and Data Mart	1
2.2	Knowledge Management	1
2.3	Types of Decisions	1
2.4	Decision Making Process	1
2.5	Decision Support Systems	1
2.6	Business Intelligence –OLAP	1
3	**Business Forecasting**	
3.1	Introduction to Business Forecasting and Predictive analytics	1
3.2	Logic Models	1
3.3	Data Driven Models	1
3.4	Data Mining	1
3.5	Predictive Analysis Modeling	1
3.6	Machine Learning for Predictive analytics	1
4	**HR & Supply Chain Analytics**	
4.1	Human Resources	1
4.2	Planning and Recruitment	1
4.3	Training and Development	1
4.4	Supply chain network	1
4.5	Planning Demand, Inventory and Supply	1
4.6	Analytics applications in HR & Supply Chain	1
5	**Marketing & Sales Analytics**	
5.1	Marketing Strategy	1
5.2	Marketing Mix	1
5.3	Customer Behaviour	1
5.4	Selling Process	1
5.5	Sales Planning	1
5.6	Analytics applications in Marketing and Sales	1
Practical:		
1.	Implement Machine learning techniques for Predictive analytics.	2
2.	Predict the Customer Credit Risk for Credit card data-set using Linear Regression.	4
3.	Predict house prices based on various features such as square footage, number of bedrooms, and location using linear regression.	4

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

4.	Predict customer churn based on various customer attributes using classification algorithms and compare their performance.	2
5.	Predict sales based on various features using regression models and compare their performance.	2
6.	Apply HR Analytics to make a prediction of the demand for hourly-employees for the following month or for the next few years.	4
7.	Apply HR Analytics to make a prediction of the demand for hourly employees for a year.	2
8.	Do predictive analytics for customers' behaviour in marketing and sales.	4
9.	Apply analytics for forecasting and inventory planning for a large retailer.	4
10.	Perform predictive analytics for customers' behaviour in marketing and sales.	2

Course Designer(s)

1. Mrs. R. Logapriya - logapriyar@ksrct.ac.in

Open Elective

60 CB L01	C# and.NET Programming	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To gain the fundamental skills in C# programming Language
- To understand object-oriented concepts in C#
- To develop cross-platform web-pages using ASP.NET Core platform
- To implement data access and manipulation using EF Core and Razor pages
- To develop cross-platform web-apps using MVC architecture in ASP.NET Core platform

Pre-requisites

- Basic knowledge of C or C++ or any programming language or programming fundamentals.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the basic programming concepts of C#	Remember
CO2	Understand the Object-Oriented concepts in C#.	Understand
CO3	Develop cross-platform web pages using Razor pages in ASP.NET Core platform.	Apply
CO4	Implement the data manipulation concept using EF Core and Razor Pages.	Apply
CO5	Implement the MVC based web-apps using ASP.NET Core platform.	Apply

Mapping with Programme Outcomes

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1	-	3	2	2	1	-	1	3	-	-	1	3	-
CO2	2	-	3	2	2	1	-	1	3	-	-	1	3	-
CO3	2	-	3	2	2	1	-	1	3	-	-	1	3	-
CO4	2	-	3	2	3	1	-	1	3	-	-	1	3	-
CO5	2	-	3	2	3	1	-	1	3	-	-	1	3	-
3 - Strong; 2 - Medium; 1 - Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	15	10	20
Understand	25	20	45
Apply	20	30	35
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
B.Tech – Computer Science and Business Systems								
60 CB L01- C# and.NET Programming								
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction to C# ** Introducing C# - Overview of C# - Literals, Variables and Data Types - Operators and Expressions - Branching and Looping - Methods - Arrays - Strings - Structures and Enumerations.	[9]
Object Oriented Aspects of C# ** Classes and Objects - Inheritance and Polymorphism - Interfaces - Operator Overloading - Delegates and Events - Errors and Exceptions. - Collections – Managing Filesystem.	[9]
ASP.NET Core Web Application using Razor Pages: * Introduction to ASP.NET Core Web Application – Environment Setup – Project Layout – Static and Default Files - Enabling and Defining Razor Pages – Shared Layouts – Using code-behind files.	[9]
Using Entity Framework Core: ** Setting up EF Core: Defining and Building EF Core models - Defining the entity and context classes - Manipulating data with EF Core - Transactions. Manipulating data using Razor pages: OnGet –OnPost – OnPostDelete – OnPostEdit – OnPostView. REST API – Model and Controller for REST API.	[9]
Model-View-Controller (MVC) in ASP.NET Core: * Introduction to MVC – Setting up an ASP.NET Core MVC Website – MVC Routing – Controllers and Actions – Model – Views – Parameters Passing – View Helpers – Model Validation.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Mark J. Price, “C# 8.0 and .NET Core 3.0 – Modern Cross-Platform Development”, 4th Edition, Packt Publishing Limited, 2019.
2.	Dino Esposito, “Programming ASP.NET Core”, 1st Edition, Pearson Education Inc., 2018.
Reference(s):	
1.	E. Balagurusamy, “Programming in C#”, 4th Edition, Tata McGraw-Hill, 2017.
2.	Andrew Troelsen Phil Japikse, “Pro C# 8 with .NET Core 3: Foundational Principles and Practices in Programming”, Apress, 2020.
3.	Jon Skeet, “C# in Depth”,Fourth Edition, Manning Publications Co. 2019.
4.	Christian Nagel, “Professional C# 7 and .NET Core 2.0”, 1st Edition, Wiley Publication, 2018.

*SDG 9 – Industry Innovation and Infrastructure

**SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
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Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to C#**	
1.1	Introducing C# - Overview of C# - Literals, Variables	1
1.2	Data Types, Operators and Expressions	1
1.3	Branching and Looping	3
1.4	Methods - Arrays - Strings	3
1.5	Structures and Enumerations	1
2.0	**Object Oriented Aspects of C#**	
2.1	Classes and Objects	1
2.2	Inheritance and Polymorphism	2
2.3	Interfaces , Operator Overloading	
2.4	Delegates and Events Errors and Exceptions	2
2.5	Collections , Managing File system	2
3.0	**ASP.NET Core Web Application using Razor Pages:**	
3.1	Introduction to ASP.NET Core Web Application	1
3.2	Environment Setup , Project Layout	1
3.3	Static and Default Files	1
3.4	Enabling and Defining Razor Pages	1
3.5	Shared Layouts	2
3.6	Using code-behind files	3
4.0	**Using Entity Framework Core:**	
4.1	Defining and Building EF Core models	1
4.2	Defining the entity and context classes	2
4.2	Manipulating data with EF Core - Transactions	3
4.3	OnGet –OnPost – OnPostDelete – OnPostEdit – OnPostView	1
4.4	REST API – Model and Controller for REST API	3
5.0	**Model-View-Controller (MVC) in ASP.NET Core:**	
5.1	Introduction to MVC	.5
5.2	Setting up an ASP.NET Core MVC Website	.5
5.3	MVC Routing	1
5.4	Controllers and Actions	2
5.5	Model – Views	1
5.6	Parameters Passing	1.5
5.7	View Helpers	1.5
5.8	Model Validation	1

Course Designer(s)

1. Venkatesh P - venkateshp@ksrct.ac.in

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60 CB L02	Automation Testing Tools	Category	L	T	P	Credit
		OE	3	0	0	3

Objectives

- To understand the basics of software testing and test planning
- To build test cases and execute them
- To focus on automation testing using selenium
- To automate the testing using TestNG
- To get an insight about test automation using Cucumber

Pre-requisites

- Basic knowledge of programming languages

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the basic concepts of software testing and test planning.	Understand
CO2	Design effective test cases that can uncover critical defects in the application.	Apply
CO3	Automate the software testing using Selenium.	Analyse
CO4	Automate the software testing using TestNG.	Analyse
CO5	Automate the software testing using Cucumber.	Analyse

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	1	1	-	-	-	-	-	-	-	-	1	-	2
CO2	2	2	1	2	2	2	-	-	-	-	-	-	1	-	2
CO3	2	2	2	1	3	2	-	-	-	-	-	-	-	2	2
CO4	1	2	1	1	-	-	-	-	-	-	-	-	1	-	1
CO5	1	1	1	2	-	-	-	-	-	-	-	-	-	2	1
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	-	-	-
Understand	20	20	40
Apply	40	-	30
Analyse	-	40	30
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022							
B.Tech – Computer Science and Business Systems							
60 CB L02- Automation Testing Tools							
Semester	**Hours/Week**			**Total Hours**	**Credit**	**Maximum Marks**	
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Introduction to Software Testing and Test Planning* Why do we test Software?, Black-Box Testing and White-Box Testing, Software Testing Life Cycle, V-model of Software Testing, Program Correctness and Verification, Reliability versus Safety, Failures, Errors and Faults (Defects), Software Testing Principles, Program Inspections, Stages of Testing: Unit Testing, Integration Testing, System Testing-Performance Testing-The Goal of Test Planning, High Level Expectations, Intergroup Responsibilities, Test Phases, Test Strategy, Resource Requirements, Tester Assignments, Test Schedule, Test Cases, Bug Reporting, Metrics and Statistics.	[9]
Test Design and Execution * Test Objective Identification, Test Design Factors, Requirement identification, Testable Requirements, Modeling a Test Design Process, Modeling Test Results, Boundary Value Testing, Equivalence Class Testing, Path Testing, Data Flow Testing, Test Design Preparedness Metrics, Test Case Design Effectiveness, Model-Driven Test Design, Test Procedures, Test Case Organization and Tracking, Bug Reporting, Bug Life Cycle.	[9]
Selenium * Introducing Web Driver and Web Elements, Working with Firefox, IE, Chrome browsers, Identifying Web-Elements using id, name, linkname, class, xpath, tagname- Handling Input box/buttons, list/selection/drop down boxes, radio buttons, check boxes- Extracting links and other Web-Elements-Extracting Data from WebTable-Capturing screenshots-Handling pop-ups, frames, and windows- Exceptions in Selenium - Data driving from csv and excel using Java APIs-Debugging Tests-Page Object Model.	[9]
TestNg * Introduction to TestNg-Advantages over Junit-Annotations in TestNg-Understand and Read TestNg Reports-Testng and its configuration-Grouping the testcases, Exclusion of groups, Partial Groups-TestSuite.xml/Suite creation-Types of parameterization-Parameter from TestNg.xml (pass value at Suite and Test level)-Assertion,Verification.	[9]
Cucumber * Introduction to Behavior Driven Development(BDD)-BDD framework using Cucumber-Preparing selenium and cucumber environment -creating a feature files using Gherkins and Gherkin syntax-writing features and scenario, Given – When -Then structure -Writing glue code -Cucumber and Java step definitions-writing step definition/ implementing scenarios steps-Cucumber data driven testing.	[9]
Total Hours:	**45**

Text Book(s):	
1.	Yogesh Singh, “Software Testing”, Cambridge University Press, 2012.
2.	Unmesh Gundecha, Satya Avasarala, "Selenium WebDriver 3 Practical Guide" - Second Edition 2018.
Reference(s):	
1.	Glenford J. Myers, Corey Sandler, Tom Badgett, The Art of Software Testing, 3rd Edition, 2012, John Wiley & Sons, Inc.
2.	Ron Patton, Software testing, 2nd Edition, 2006, Sams Publishing
3.	Paul C. Jorgensen, Software Testing: A Craftsman’s Approach, Fourth Edition, 2014, Taylor & Francis Group.
4.	Carl Cocchiaro, Selenium Framework Design in Data-Driven Testing, 2018, Packt Publishing

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction to Software Testing and Test Planning**	
1.1	Why do we test Software?, Black-Box Testing and White-Box Testing	1
1.2	Software Testing Life Cycle, V-model of Software Testing	1
1.3	Program Correctness and Verification, Reliability versus Safety, Failures, Errors and Faults (Defects)	1
1.4	Software Testing Principles, Program Inspections, Stages of Testing: Unit Testing, Integration Testing	1
1.5	System Testing-Performance Testing-The Goal of Test Planning	1
1.6	High Level Expectations, Intergroup Responsibilities, Test Phases, Test Strategy, Resource Requirements	2
1.7	Tester Assignments, Test Schedule, Test Cases	1
1.8	Bug Reporting, Metrics and Statistics	1
2.0	**Test Design and Execution**	
2.1	Test Objective Identification, Test Design Factors	2
2.2	Requirement identification, Testable Requirements, Modeling a Test Design Process	2
2.3	Modeling Test Results, Boundary Value Testing	1
2.4	Equivalence Class Testing, Path Testing, Data Flow Testing, Test Design Preparedness Metrics	1
2.5	Test Case Design Effectiveness, Model-Driven Test Design, Test Procedures	1
2.6	Test Case Organization and Tracking, Bug Reporting, Bug Life Cycle	2
3.0	**Selenium**	
3.1	Introducing Web Driver and Web Elements, Working with Firefox	1
3.2	IE, Chrome browsers	1
3.3	Identifying Web-Elements using id, name, linkname, class, xpath, tagname	1
3.4	Handling Input box/buttons, list/selection	2
3.5	drop down boxes, radio buttons, check boxes	1
3.6	Extracting links and other Web-Elements-Extracting Data from WebTable- -	1
3.7	Capturing screenshots-Handling pop-ups, frames, and windows- Exceptions in Selenium	1
3.8	Data driving from csv and excel using Java APIs-Debugging Tests-Page Object Model	1
4.0	**TestNg**	
4.1	Introduction to TestNg-Advantages over Junit	1
4.2	Annotations in TestNg-Understand and Read TestNg Reports	1
4.3	Testng and its configuration	1
4.4	Grouping the testcases, Exclusion of groups, Partial Groups	1
4.5	TestSuite.xml/Suite creation	1
4.6	Types of parameterization	1
4.7	Parameter from TestNg.xml (pass value at Suite and Test level)	1
4.8	Assertion, Verification	2
5.0	**Cucumber**	
5.1	Introduction to Behavior Driven Development(BDD)-BDD framework using Cucumber	1

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5.2	Preparing selenium and cucumber environment	1
5.3	creating a feature files using Gherkins and Gherkin syntax	1
5.4	writing features and scenario, Given – When -Then structure -Writing glue code	2
5.5	Cucumber and Java step definitions	1
5.6	writing step definition/ implementing scenarios steps	2
5.7	Cucumber data driven testing	1

Course Designer(s)

1. Mr. P.Venkatesh- venkateshp@ksrct.ac.in

60 CB L03	Usability Design of Software Applications	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To learn the fundamentals of User Centered Design, their relevance and contribution to businesses
- To study the principles of heuristic evaluation for interactive design
- To understand the appreciation of user research, solution conceptualization and validation as interwoven activities in the design and development lifecycle
- To familiarize the facets of User Experience (UX) Design, particularly as applied to the digital artefacts
- To utilize scenarios and persona technique to enhance understanding, usability, and user-centred design in various contexts

Pre-requisites

- Basic Knowledge of Software Development and User Experience (UX) Fundamentals

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Summarize the fundamentals and importance of User-Centred design.	Understand
CO2	Analyse the design evaluation by applying the heuristic principles.	Analysis
CO3	Illustrate an application focusing on the design aspects.	Apply
CO4	Remember the UX research techniques for analysing the application.	Remember
CO5	Analyse the personal technique for different projects.	Analysis

Mapping with Programme Outcomes

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	3	2	2	2	-	-	-	-	-	-	-	-	2	2
CO2	3	2	2	1	1	-	-	-	-	-	-	-	-	3	2
CO3	2	3	3	3	3	-	-	-	-	-	-	-	2	3	2
CO4	2	1	2	3	2	-	-	-	-	-	-	-	1	2	2
CO5	2	2	1	2	1	-	-	-	-	-	-	-	2	2	2
3 - Strong; 2 - Medium; 1 - Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	20	20	06
Understand	40	-	14
Apply	-	40	40
Analyse	-	-	40
Evaluate	-	-	-
Create	-	-	-
Total	60	60	100

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Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022

B.Tech – Computer Science and Business Systems

60 CB L03 - Usability Design of Software Applications

Semester	Hours/Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Introduction to User Centred Design* Aspects of User Centred Design, Elements - Models and Approaches – User Centred Design Principles - UCD Process - Analysis Tools: Personas, Scenarios, and Essential Use Cases with Examples - Agile Aspects of User Centred Design.	[9]
Interactive Design Evaluation* Introduction to Interactive Design Process – Interactive Design in Practice – Introducing Evaluation – Evaluation: Inspection, Analysis and Models – Inspection - Heuristic Evaluation: 10 Heuristic Principles, Examples – Case Study.	[9]
Development of Application* Case Study: Development of any Application like Mobile or Web Based on User Centred Design – Design Lifecycle: Establishing Requirements, Design, Prototyping and Construction.	[9]
UX Research* Understanding Users: Their Goals - Context of Use - Environment of Use - Research Techniques - Contextual Enquiry - User Interviews - Competitive Analysis for UX.	[9]
Scenarios and Persona Technique* Presentation of Personas for the Group Project - Design Thinking Technique - Discovery and Brainstorming - Concept Development - Task Flow Detailing for the Project - Prototyping Techniques - Paper-Electronic - Prototyping Tools. Tools used: Sketch/Figma	[9]
Total Hours:	**45**

Text Book(s):

1.	Jenny Preece, Helen Sharp and Yvonne Rogers, “Interaction Design: Beyond Human-Computer Interaction”, 5th Edition, John Wiley & Sons, Inc, USA, 2019.
2.	Jonny Schneider, “Understanding Design Thinking, Lean, and Agile”, 1st Edition, Apress, USA, 2020.

Reference(s):

1.	Thomas Tullis and Bill Albert, “Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics”, 3rd Edition, Elsevier, Netherlands, 2022.
2.	Jesse James Garrett,”The Elements of User Experience User-Centered Design for the Web and Beyond”, 2nd Edition, New Riders, USA, 2021.
3.	Alan Cooper and Robert Reimann, “About Face”, 4th Edition, John Wiley, USA, 2014.
4.	Elizabeth Goodman, Mike Kuniavsky, Andrea Moed, ”Observing the User Experience”, 2nd Edition, Morgan Kaufmann, USA, 2012.

*SDG 4 – Quality Education

Passed in BoS Meeting held on 24/05/24
Approved in Academic Council Meeting held on 25/05/2024

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Introduction To User Centred Design**	
1.1	Aspects of User Centred Design	1
1.2	Elements - Models and approaches	1
1.3	User Centred Design Principles	2
1.4	UCD Process	1
1.5	Analysis Tools: Personas, Scenarios	1
1.6	Essential Use Cases with Examples	2
1.7	Agile Aspects of User Centred Design	1
2.0	**Interactive Design Evaluation**	
2.1	Introduction to Interactive Design Process	1
2.2	Interactive Design in Practice	1
2.3	Introducing Evaluation	1
2.4	Evaluation: Inspection, Analysis and Models	2
2.5	Inspection - Heuristic Evaluation	1
2.6	10 Heuristic Principles	1
2.7	Examples – Case Study	2
3.0	**Development of Application**	
3.1	Case Study: Development of any Application like Mobile or Web Based on User Centred Design	3
3.2	Design Lifecyle	1
3.3	Lifecyle: Establishing Requirements	2
3.4	Lifecyle: Design	1
3.5	Prototyping and Construction	2
4.0	**UX Research**	
4.1	Understanding users – their goals	1
4.2	Context of use and environment of use	2
4.3	Research Techniques	2
4.4	Contextual Enquiry	2
4.5	User Interviews	1
4.6	Competitive Analysis for UX	1
5.0	**Scenarios and Persona Technique**	
5.1	Presentation of Personas for the group project	1
5.2	Design Thinking Technique	1
5.3	Discovery and Brainstorming	2
5.4	Concept Development	2
5.5	Task flow detailing for the Project	1
5.6	Prototyping Techniques	1
5.7	Paper-Electronic -Prototyping Tools	1

Course Designer(s)

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