K.S. Rangasamy College of Technology

(Autonomous Institution affiliated to Anna University, Chennai)

CURRICULUM AND SYLLABI of

B.E. Computer Science and Engineering
(For the batch admitted in 2022– 23)

R 2022

Courses Accredited by NBA, 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.

B.E.(CSE) - Degree Programme 2022 - 2023

Department of Computer Science and Engineering VISION

To produce competent software professionals, academicians and researchers through Quality Education.

MISSION

- To produce competent software developers, system designers and network programmers through innovative teaching-learning practices.

- To keep abreast of the latest developments and technological transformations in computer science and engineering for social benefits.

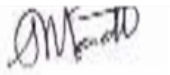
Program Educational Objectives (PEOs) for B.E. (CSE) Programme

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 learning.

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

Passed in BoS Meeting held on 02/12/2023
Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

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.

PO2: Problem a n a l y s i s : Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

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.

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.

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.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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 and management 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 in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) for B.E.(CSE) Programme

Engineering Graduates will be able to:

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PSO1: Apply standard Software Engineering practices and strategies in software project development using open-source programming environment and deliver a quality product for business success.

PSO2: Analyze and Interpret data by applying advanced data analytic models for decision making in Complex Problems and facilitate inter disciplinary research.

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

The B.E. Computer Science and Engineering Programme outcomes leading to the achievement of the objectives are summarized in the following Table.

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

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

MAPPING-UG-COMPUTER SCIENCE AND ENGINEERING

Year	Sem	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	I	Professional English - I								2	3	3	2	3
		Matrices and Calculus	3	3	2.8	2.4	2.4							2
		Engineering Graphics	3	2.6	3	3	3	1	1	1		3	1.4	3
		C Programming	3	3	3		3				2	2		2
		Basic Electrical and Electronics Engineering	2.6	2.8	1.7	1.7	2	2	2.3	1.5	2	2	2	2.3
		Environmental Studies and Climate Change	2.8	2.8	3	2.8	2.8	2.6	3	3	2.2	2.2	1.8	2.8
		C Programming Laboratory	3	3	3		3				2	2		2
		Fabrication and Reverse Engineering Laboratory	3	2.6	2.8	1.6	3	2	2	2.2	3	2	1.6	3
I	II	Professional English - II								2	3	3	2	3
		Integrals and Partial Differential Equations	3	3	2.6	2.4	2.6							2
		Physics for Computer Technology	3	2.8	3	2.6	2.2	2.8	2.4	2	2.25	1.6	2	2.6
		Engineering Chemistry	2.6	2.75	2.4	2.4	2.6	2.5	2.75	2.3	2.4	2.5	2.75	2.6
		Python Programming	3	2	3	2.8					2	2	2	2
		NCC/NSS/NSO/YRC/RRC/Fine Arts*	3	2	1	1	3	3	3	3	3	3		

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		Heritage of Tamils*							3	3		2		3
		Engineering Physics and Chemistry Laboratory	3	2.4	2.6	2.5	2.6	2.2	2.4	2	2	2.3	1.67	2
		Python Programming Laboratory	3	2	3	2.8					2	2	2	2
		Web Development	3	2	3	2.8					2	2	2	2
		Career Skill Development - I								2	3	3	2	3
II	III	Mathematical Statistics and Numerical Methods	3	3	2.6	3	2						2	2
		Data Structures	3	3	2	2.6	2	2	2	2.4	2.6	2		2
		Java Programming	2.6	3	3	2	3	2		2	3	3	2	3
		Digital Logic and Microprocessor	2.8	2.8	3	2.4	2.8							
		Computer Networks	2.8	2.6	2.8	2	2.3		2	2.5	2.5	2.5		2
		Universal Human Values						3	3	3	2.8	3	2	3
		Tamils and Technology							3	3		2		3
		Data Structures Laboratory	3	3	2	2.6	2	2	2	3	2.6	2		2
		Java Programming Laboratory	2.6	3	3	2	3	2		2	3	3	2	3
		Career Skill Development – II								2	3	3	2	3
II	IV	Discrete Mathematics	3	3	2	2.6	2.2							2.4
		Design and Analysis of Algorithms	3	3	3	2	3					2		
		Advanced Web Development	3	2	3		3				3	3	2	3
		Database Management Systems	3	3	2		2	2	2		3			2
		Software Engineering	3	3	2.8	2.6	3		2	2	2.5	2.3	3	3
		Startups and Entrepreneurship	2.8	2.6	3	2.4	2.2	2.5	1.6	1.8	1.3	2	2.2	2.4
		Advanced Web Development Laboratory	2	2.4	3	2.4	2.2	2.8		3				2
		Database Management Systems Laboratory	3	3	3		3	2	2		3	3		2
		Career Skill Development – III	2.6	2.6	2.6	2.8		2.4				2	3	3
III	V	Artificial Intelligence	3	2.6	2	2	2	2						2.4
		Computer Architecture	2.6	2.4	2		2		2			2		2
		Operating Systems	3	2.6	2.8	3			2			2		2.2

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		Formal Language and Automata Theory	3	3	2.4	2				2		1	1.8	2
		Design Thinking	3	3	2	3	2	2	2	3	2.6	2	3	2.4
		Operating Systems Laboratory	3	2.6	2.8	3			2		2	2		2.2
		Design Thinking Laboratory	3	3	2	3	2	2	2	3	2.6	2	2	2.4
		Career Skill Development – IV	3	2.3	2	2.3	2.5	1.5	1	2	3	2.6	2.7	3
III	VI	Cryptography and Network Security	3	2.4	3					2	3	3	2	3
		Principles of Compiler Design	3	2.8	2.6	2.2	2.6		2		2.6	2.4	1.6	2.6
		Data Science	2.6	3	3	2.5	2.8	3	3		2		2	2.2

K.S. RANGASAMY COLLEGE OF TECHNOLOGY

Credit Distribution for B.E (CSE) Programme – 2022 – 2023 Batch

S.No.	Category	Credits Per Semester								Total Credits	Percentage %
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	2	2	-	-	-	-	3	-	**07**	**4.3**
2.	BS	4	12	4	4	-	-	-	-	**24**	**14.6**
3.	ES	14	-	3	-	-	-	-	-	**17**	**10.4**
4.	PC	-	7	14	16	20	14	11	-	**82**	**50.0**
5.	PE	-	-	-	-	3	6	3	3	**15**	**9.2**
6.	OE	-	-	-	3	3	3		-	**09**	**5.5**
7.	CG	-	-	-	-	-	-	2	8	**10**	**6.0**
8.	GE	-	GE I	GE II	-	-	-	-	-	**-**	**-**
9.	MC	MC I		MC II	MC III	-	-	-	-	**-**	**-**
10.	AC	-	-	-	-	-	-	AC I	AC II	**-**	**-**
Total		**20**	**21**	**21**	**23**	**26**	**23**	**19**	**11**	**164**	**100**

HS – HUMANITIES AND SOCIAL SCIENCES

Passed in BoS Meeting held on 02/12/2023

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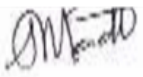

BoS Chairman

BS – BASIC SCIENCE
ES – ENGINEERING SCIENCES
PC – PROFESSIONAL CORE
PE – PROFESSIONAL ELECTIVES
MC – MANDATORY COURSES
OE – OPEN ELECTIVES
CG – CAREER GUIDANCE COURSES
GE – GENERAL ELECTIVE COURSES
AC – AUDIT COURSES

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

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CONCEIVE DEVELOP IMPLEMENT EXECUTE (CDIE)

HUMANITIES AND SOCIAL SCIENCE (HS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 EN 001	Professional English – I	HS	3	1	0	2	2	Basic knowledge of reading and writing in English
2.	60 EN 002	Professional English – II	HS	3	1	0	2	2	Basic knowledge of reading and writing in English and should have completed Professional English I.
3.	60 HS 002	Engineering Economics and Financial Accounting	HS	3	3	0	0	3	

BASIC SCIENCE (BS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4	NIL
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4	NIL
3.	60 PH 004	Physics for Computer Technology	BS	3	3	0	0	3	NIL

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4.	60 CH 004	Engineering Chemistry	BS	3	3	0	0	3	NIL
5.	60 CP 0P2	Engineering Physics and Chemistry Laboratory	BS	4	0	0	4	2	NIL
6.	60 MA 010	Mathematical Statistics and Numerical Methods	BS	4	3	1	0	4	
7.	60 MA 017	Discrete Mathematics	BS	4	3	1	0	4	

ENGINEERING SCIENCES (ES)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 ME 002	Engineering Graphics	ES	6	2	0	4	4	NIL
2.	60 CS 001	C Programming	ES	3	3	0	0	3	NIL
3.	60 EE 001	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3	NIL
4.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2	NIL
5.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2	NIL
6.	60 EC 001	Digital Logic and Microprocessor	ES	4	2	0	2	3	Basic knowledge of Electrical and Electronics Engineering

PROFESSIONAL CORE (PC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 IT 001	Python Programming	PC	4	3	1	0	4	Basic Knowledge of mathematics and programming
2.	60 IT 0P1	Python Programming Laboratory	PC	4	0	0	4	2	Basic Knowledge of mathematics and programming

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3.	60 CS 2P1	Web Development	PC	2	0	0	2	1	Basic knowledge of programming
4.	60 CS 003	Data Structures	PC	3	3	0	0	3	Basic knowledge of mathematics and programming language in C
5.	60 CS 004	Java Programming	PC	3	3	0	0	3	Basic knowledge of any programming language with ability to solve logical problems
6.	60 CS 301	Computer Networks	PC	5	3	0	2	4	
7.	60 CS 0P3	Data Structures Laboratory	PC	4	0	0	4	2	Programming knowledge in C language
8.	60 CS 0P4	Java Programming Laboratory	PC	4	0	0	4	2	

9.	60 IT 002	Design and Analysis of Algorithms	PC	3	3	0	0	3	Basic knowledge of Data Structures and Computer programming
10.	60 CS 401	Advanced Web Development	PC	3	3	0	0	3	HTML, CSS
11.	60 CS 402	Database Management Systems	PC	3	3	0	0	3	
12.	60 CS 403	Software Engineering	PC	4	2	0	2	3	
13.	60 CS 4P1	Advanced Web Development Laboratory	PC	4	0	0	4	2	HTML, CSS
14.	60 CS 4P2	Database Management Systems Laboratory	PC	4	0	0	4	2	
15.	60 CS 501	Artificial Intelligence	PC	3	3	0	0	3	
16.	60 CS 502	Computer Architecture	PC	3	3	0	0	3	
17.	60 CS 503	Operating Systems	PC	3	3	0	0	3	
18.	60 CS 504	Formal Language and Automata Theory	PC	4	3	1	0	4	
19.	60 CS 505	Design Thinking	PC	3	3	0	0	3	Software Engineering
20.	60 CS 5P1	Operating Systems Laboratory	PC	4	0	0	4	2	

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21.	60 CS 5P2	Design Thinking Laboratory	PC	4	0	0	4	2	
22.	60 CS 601	Cryptography and Network Security	PC	3	3	0	0	3	
23.	60 CS 602	Principles of Compiler Design	PC	4	3	1	0	4	
24.	60 CS 603	Data Science	PC	3	3	0	0	3	Fundamentals in linear algebra / statistics / probability
25.	60 CS 6P1	Cryptography and Network Security Laboratory	PC	4	0	0	4	2	Basic knowledge of Computer Networks
26.	60 CS 6P1	Data Science Laboratory	PC	4	0	0	4	2	Fundamentals in linear algebra / statistics / probability
27.	60 CS 701	Cloud Computing	PC	3	3	0	0	3	
28.	60 CS 702	Mobile Computing	PC	4	2	0	2	3	
29	60 CS 703	Software Testing	PC	3	3	0	0	3	
30.	60 CS 7P1	Cloud Computing Laboratory	PC	4	0	0	4	2	

PROFESSIONAL ELECTIVES (PE) SEMESTER V, ELECTIVE I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS E11	Node.js and React.js	PE	4	2	0	2	3	HTML, CSS, JavaScript
2.	60 CS E12	C# and .NET Core	PE	4	2	0	2	3	
3.	60 CS E13	Generative AI	PE	3	3	0	0	3	Knowledge on statistics, linear algebra, matrix, calculus, probability, programming languages and data modelling
4.	60 CS E14	Angular	PE	4	2	0	2	3	
5.	60 CS E15	Parallel and Distributed Computing	PE	3	3	0	0	3	

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6.	60 CS E16	Data Mining	PE	4	2	0	2	3	Basic understanding of Linear Algebra, Statistics and programming

SEMESTER VI, ELECTIVE II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS E21	Cyber Security	PE	3	3	0	0	3	
2.	60 CS E22	Mobile Application Development	PE	4	2	0	2	3	
3.	60 CS E23	Salesforce	PE	4	2	0	2	3	
4.	60 CS E24	User Interface Technologies	PE	3	3	0	0	3	
5.	60 CS E25	Computational Intelligence	PE	3	3	0	0	3	
6.	60 CS E26	Graph Theory	PE	3	3	0	0	3	

SEMESTER VI, ELECTIVE III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS E31	Deep Learning	PE	4	2	0	2	3	
2.	60 CS E32	Semantic Web	PE	4	2	0	2	3	
3.	60 CS E33	Industrial Applications Development and Practices	PE	3	3	0	0	3	
4.	60 CS E34	Xml and Web Services	PE	3	3	0	0	3	
5.	60 CS E35	Information Storage and Management	PE	3	3	0	0	3	
6.	60 CS E36	Professional Readiness for Innovation, Employability and Entrepreneurship	PE	6	0	0	6	3	

SEMESTER VII, ELECTIVE IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS E41	Human Computer Interaction	PE	3	3	0	0	3	

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2.	60 CS E42	Multimedia Computing	PE	3	3	0	0	3	
3.	60 CS E43	Natural Language Processing	PE	3	3	0	0	3	
4.	60 CS E44	DevOps	PE	3	3	0	0	3	
5.	60 CS E45	Multicore Architecture and Programming	PE	3	3	0	0	3	
6.	60 CS E46	Agile Methodology	PE	3	3	0	0	3	

SEMESTER VIII, ELECTIVE V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS E51	Big Data	PE	3	3	0	0	3	
2.	60 CS E52	Foundations of Block Chain Technology	PE	3	3	0	0	3	
3.	60 CS E53	Advanced Algorithm and Design	PE	3	3	0	0	3	
4.	60 CS E54	Cyber Forensics and Malware	PE	3	3	0	0	3	
5.	60 CS E55	Image Processing	PE	3	3	0	0	3	
6	60 CS E56	Social Network Analysis	PE	3	3	0	0	3	

SEMESTER VII &SEMESTER VIII, AUDIT COURSES (AC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 AC 001	Research Methodology – I	AC	1	1	0	0	0	
2.	60 AC 002	Research Methodology – II	AC	1	1	0	0	0	

MANDATORY COURSES (MC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0	NIL

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2.	60 MY 002	Universal Human Values	MC	3	3	0	0	3	
3.	60 MY 003	Startups and Entrepreneurship	MC	2	2	0	0	0	Basic knowledge of reading and writing in English

GENERAL ELECTIVE COURSES (GE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 GE 001	Heritage of Tamils / தமிழர் மரபு	GE	1	1	0	0	1	NIL
2.	60 GE 002	Tamils and Technology / தமிழரும் ததொழில்நுட்பமும்	GE	1	1	2	0	1	NIL

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

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS L01	Object Oriented Programming	OE	4	2	0	2	3	
2.	60 CS L02	AngularJS	OE	4	2	0	2	3	Moderate knowledge of HTML, CSS, and JavaScript
3.	60 CS L03	C# and .NET Core	OE	4	2	0	2	3	Basic knowledge of HTML, Visual Studio, and Object Oriented Programming
4.	60 CS L04	Data Mining	OE	4	2	0	2	3	Basic understanding of Linear Algebra, Statistics and programming
5.	60 CS L05	Artificial Intelligence	OE	4	2	0	2	3	Knowledge on statistics, linear algebra, matrix, calculus, probability, programming languages and data modelling
6.	60 CS L06	Python Programming for Data Analytics	OE	4	2	0	2	3	

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7.	60 CS L07	Java Programming	OE	4	2	0	2	3	
8.	60 CS L08	Linux and Shell Programming	OE	4	2	0	2	3	
9.	60 CS L09	Salesforce	OE	4	2	0	2	3	
10.	60 CS L10	Scripting Languages	OE	3	3	0	0	3	
11.	60 CS L11	Advanced Java Programming	OE	3	3	0	0	3	
12.	60 CS L12	Generative AI	OE	3	3	0	0	3	

CAREER GUIDANCE COURSES (CGC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CG 0P1	Career Skill Development – I	CG	2	0	0	2	1	Basic knowledge of reading and writing in English
2.	60 CG 0P2	Career Skill Development – II	CG	2	0	0	2	1	Basic knowledge of reading and writing in English
3.	60 CG 0P3	Career Skill Development – III	CG	2	0	0	2	1	Basic knowledge of Arithmetic and Logical Reasoning
4.	60 CG 0P4	Career Skill Development – IV	CG	2	0	0	2	1	Basic knowledge of Arithmetic and Logical Reasoning
5.	60 CG 0P5	Comprehensive Test	CG	2	0	0	2	1	
6.	60 CS 6P2	Mini Project	CG	4	0	0	4	2	
7.	60 CS 7P2	Project Work Phase-I	CG	4	0	0	4	2	
8.	60 CS 8P1	Project Work Phase-II	CG	16	0	0	16	8	

K.S. RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637215

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COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

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SEMESTER I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.		Induction Programme	-	-	-	-	-	0
THEORY								
2.	60 EN 001	Professional English – I	HS	3	1	0	2	2
3.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4
4.	60 EE 001	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3
5.	60 ME 002	Engineering Graphics	ES	6	2	0	4	4
6.	60 CS 001	C Programming	ES	3	3	0	0	3
7.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0
PRACTICALS								
8.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2
9.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2
			Total	**29**	**14**	**1**	**14**	**20**

* **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 - additional credit is offered not accounted for CGPA
* Internship - 3 additional credits not accounted for CGPA is offered based on the Internship duration

SEMESTER II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 002	Professional English – II	HS	3	1	0	2	2
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4
3.	60 PH 004	Physics for Computer Technology	BS	3	3	0	0	3
4.	60 CH 004	Engineering Chemistry	BS	3	3	0	0	3
5.	60 IT 001	Python Programming	PC	4	3	1	0	4
6.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
7.	60 GE 001	Heritage of Tamils / தமிழர் மரபு*	GE	1	1	0	0	1*
PRACTICALS								
8.	60 CP 0P2	Engineering Physics and Chemistry Laboratory	BS	4	0	0	4	2
9.	60 IT 0P1	Python Programming Laboratory	PC	4	0	0	4	2
10.	60 CS 2P1	Web Development	PC	2	0	0	2	1
11.	60 CG 0P1	Career Skill Development – I	CG	2	0	0	2	1*
12.	60 CG 0P6	Internship*	CG	-	-	-	-	1/2/3*

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Total	**34**	**16**	**2**	**16**	**21**

* Heritage of Tamils / தமிழர் மரபு* - additional 1 credit is offered and not account for CGPA

SEMESTER III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 010	Mathematical Statistics and Numerical Methods	BS	4	3	1	0	4
2.	60 CS 003	Data Structures	PC	3	3	0	0	3
3.	60 CS 004	Java Programming	PC	3	3	0	0	3
4.	60 EC 001	Digital Logic and Microprocessor	ES	4	2	0	2	3
5.	60 CS 301	Computer Networks	PC	5	3	0	2	4
6.	60 MY 002	Universal Human Values*	MC	3	3	0	0	3*
7.	60 GE 002	Tamils and Technology / தமிழரும் ததொழில்நுட்பமும்*	GE	1	1	0	0	1*
PRACTICALS								
8.	60 CS 0P3	Data Structures Laboratory	PC	4	0	0	4	2
9.	60 CS 0P4	Java Programming Laboratory	PC	4	0	0	4	2
10.	60 CG 0P2	Career Skill Development – II	CG	2	0	0	2	1*
11.	60 CG 0P6	Internship*	CG	-	-	-	-	1/2/3*
		Total		**33**	**18**	**1**	**14**	**21**

* Universal Human Values – additional 3 credit is offered and not accounted for CGPA

* Tamils and Technology / தமிழரும் ததொழில்நுட்பமும்* – additional 1 credit is offered and not account for CGPA

SEMESTER IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 017	Discrete Mathematics	BS	4	3	1	0	4
2.	60 IT 002	Design and Analysis of Algorithms	PC	3	3	0	0	3
3.	60 CS 401	Advanced Web Development	PC	3	3	0	0	3
4.	60 CS 402	Database Management Systems	PC	3	3	0	0	3
5.	60 CS 403	Software Engineering	PC	4	2	0	2	3
6.	60…L**	Open Elective–I	OE	3	3	0	0	3
7.	60 MY 003	Startups and Entrepreneurship	MC	2	2	0	0	0
PRACTICALS								
8.	60 CS 4P1	Advanced Web Development Laboratory	PC	4	0	0	4	2
9.	60 CS 4P2	Database Management Systems Laboratory	PC	4	0	0	4	2

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10.	60 CG 0P3	Career Skill Development – III	CG	2	0	0	2	1*
11.	60 CG 0P6	Internship*	CG	-	-	-	-	1/2/3*
			Total	**32**	**19**	**1**	**12**	**23**

SEMESTER V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 CS 501	Artificial Intelligence	PC	3	3	0	0	3
2.	60 CS 502	Computer Architecture	PC	3	3	0	0	3
3.	60 CS 503	Operating Systems	PC	3	3	0	0	3
4.	60 CS 504	Formal Language and Automata Theory	PC	4	3	1	0	4
5.	60 CS 505	Design Thinking	PC	3	3	0	0	3
6.	60 CS E1*	Elective –I	PE	3	3	0	0	3
7.	60…L**	Open Elective-II	OE	3	3	0	0	3
PRACTICALS								
8.	60 CS 5P1	Operating Systems Laboratory	PC	4	0	0	4	2
9.	60 CS 5P2	Design Thinking Laboratory	PC	4	0	0	4	2
10.	60 CS 5P3	Mini Project	CG	0	0	0	0	1*
11.	60 CG 0P4	Career Skill Development – IV	CG	2	0	0	2	1*
12.	60 CG 0P6	Internship*	CG	-	-	-	-	1/2/3*
			Total	**32**	**21**	**1**	**10**	**26**

* Mini Project – One Additional credit is offered and not accounted for CGPA calculation

SEMESTER VI

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 CS 601	Cryptography and Network Security	PC	3	3	0	0	3
2.	60 CS 602	Principles of Compiler Design	PC	4	3	1	0	4
3.	60 CS 603	Data Science	PC	3	3	0	0	3
4.	60 CS E2*	Elective–II	PE	3	3	0	0	3
5.	60 CS E3*	Elective– III	PE	3	3	0	0	3
6.	60…L**	Open Elective-III	OE	3	3	0	0	3
PRACTICALS								
7.	60 CS 6P1	Cryptography and Network Security Laboratory	PC	4	0	0	4	2
8.	60 CS 6P2	Data Science Laboratory	PC	4	0	0	4	2
9.	60 CG 0P5	Comprehension Test	CG	2	0	0	2	1*
10.	60 CG 0P6	Internship*	CG	-	-	-	-	1/2/3*
			Total	**29**	**18**	**1**	**10**	**23**

* Comprehension Test – One additional credit is offered and not accounted for CGPA calculation

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SEMESTER VII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 002	Engineering Economics and Financial Accounting	HS	3	3	0	0	3
2.	60 CS 701	Cloud Computing	PC	3	3	0	0	3
3.	60 CS 702	Mobile Computing	PC	4	2	0	2	3
4.	60 CS 703	Software Testing	PC	3	3	0	0	3
5.	60 CS E4*	Elective– IV	PE	3	3	0	0	3
6.	60 AC 001	Research Methodology – I	AC	1	1	0	0	0
PRACTICALS								
7.	60 CS 7P1	Cloud Computing Laboratory	PC	4	0	0	4	2
8.	60 CS 7P2	Project Work Phase-I	CG	4	0	0	4	2
9.	60 CG 0P6	Internship *	CG	-	-	-	-	1/2/3*
			Total	**25**	**15**	**0**	**10**	**19**

* **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

SEMESTER VIII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 CS E5*	Elective V	PE	3	3	0	0	3
2.	60 AC 002	Research Methodology – II	AC	1	1	0	0	0
PRACTICALS								
3.	60 CS 8P1	Project Work Phase-II	CG	16	0	0	16	8
4.	60 CG 0P6	Internship *	CG	-	-	-	-	1/2/
			Total	**20**	**4**	**0**	**16**	**11**3*

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

BS : Basic Science
HS : Humanities and Social Science
ES : Engineering Science
PC : Professional Core
PE : Professional Elective
MC : Mandatory Course

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CG : Career Guidance
L: Lecture
T: Tutorial
P: Practical **Note**:

1 Hour Lecture is equivalent to 1 credit

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

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 2022-2023 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 001	Professional English – I	2	40	60	100	45	100
2	60 MA 001	Matrices and Calculus	2	40	60	100	45	100
3	60 CS 001	C Programming	2	40	60	100	45	100
4	60 EE 001	Basic Electrical and Electronics Engineering	2	40	60	100	45	100
5	60 MY 001	Environmental Studies and Climate Change	2	100	-	100	45	100
6	60 ME 002	Engineering Graphics	2	50	50	100	45	100

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PRACTICAL								
7	60 CS 0P1	C Programming Laboratory	2	60	40	100	45	100
8	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	2	60	40	100	45	100

SECOND 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 002	Professional English – II	2	40	60	100	45	100
2	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	2	40	60	100	45	100
3	60 PH 004	Physics for Computer Technology	2	40	60	100	45	100
4	60 CH 004	Engineering Chemistry	2	40	60	100	45	100
5	60 IT 001	Python Programming	2	40	60	100	45	100

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6	60 AB 00*	NCC/NSS/NSO/ YRC/RRC/Fine Arts*	2	40	60	100	45	100
PRACTICAL								
7	60 CP 0P2	Engineering Physics and Chemistry Laboratory	3	60	40	100	45	100
8	60 IT 0P1	Python Programming Laboratory	3	60	40	100	45	100
9	60 CS 2P1	Web Development	3	60	40	100	45	100

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 MA 010	Mathematical Statistics and Numerical Methods	2	40	60	100	45	100
2	60 CS 003	Data Structures	2	40	60	100	45	100
3	60 CS 004	Java Programming	2	40	60	100	45	100

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4	60 EC 001	Digital Logic and Microprocessor	2	50	50	100	45	100
5	60 CS 301	Computer Networks	2	50	50	100	45	100
6	60 MY 002	Universal Human Values	2	100	-	100	-	100
PRACTICAL								
7	60 CS 0P3	Data Structures Laboratory	3	60	40	100	45	100
8	60 CS 0P4	Java Programming Laboratory	3	60	40	100	45	100

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 017	Discrete Mathematics	2	40	60	100	45	100
2	60 IT 002	Design and Analysis of Algorithms	2	40	60	100	45	100
3	60 CS 401	Advanced Web Development	2	40	60	100	45	100
4	60 CS 402	Database Management Systems	2	40	60	100	45	100
5	60 CS 403	Software Engineering	2	50	50	100	45	100
PRACTICAL								
6	60 CS 4P1	Advanced Web Development Laboratory	3	60	40	100	45	100
7	60 CS 4P2	Database Management Systems Laboratory	3	60	40	100	45	100

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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 CS 501	Artificial Intelligence	2	40	60	100	45	100
2	60 CS 502	Computer Architecture	2	40	60	100	45	100
3	60 CS 503	Operating Systems	2	40	60	100	45	100
4	60 CS 504	Formal Language and Automata Theory	2	40	60	100	45	100
5	60 CS 505	Design Thinking	2	40	60	100	45	100
PRACTICAL								
6	60 CS 5P1	Operating Systems Laboratory	3	60	40	100	45	100
7	60 CS 5P2	Design Thinking Laboratory	3	60	40	100	45	100

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 CS 601	Cryptography and Network Security	2	40	60	100	45	100

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2	60 CS 602	Principles of Compiler Design	2	40	60	100	45	100
3	60 CS 603	Data Science	2	40	60	100	45	100
PRACTICAL								
6	60 CS 6P1	Cryptography and Network Security Laboratory	3	60	40	100	45	100
7	60 CS 6P2	Data Science Laboratory	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

HONOURS DEGREE PROGRAMME - FULL STACK DEVELOPMENT
LIST OF COURSES

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 CS H01	Foundations of Cloud Computing	PE	3	3	0	0	3
2.	60 CS H02	DevOps	PE	3	3	0	0	3
3.	60 CS H03	Advanced Java	PE	3	3	0	0	3

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4.	60 CS H04	Data Analytics	PE	3	3	0	0	3
5.	60 CS H05	Advanced .NET	PE	3	3	0	0	3
6.	60 CS H06	Cyber Security	PE	3	3	0	0	3
			Total	18	18	0	0	18

MINOR DEGREE PROGRAMME – FULL STACK DEVELOPMENT

LIST OF COURSES

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 CS M01	Java Programming	PE	3	3	0	0	3
2.	60 CS M02	Front End Development	PE	3	3	0	0	3
3.	60 CS M03	Database Technology	PE	3	3	0	0	3
4.	60 CS M04	Node JS	PE	3	3	0	0	3
5.	60 CS M05	React JS	PE	3	3	0	0	3
6.	60 CS M06	Enterprise Integration	PE	3	3	0	0	3
				Total	18	0	0	18

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60 EN 001	PROFESSIONAL ENGLISH - I	Category	L	T	P	Credit
		HS	1	0	2	2

Objective

- 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

Prerequisite

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 Express their opinions effectively in both oral and written medium of communication	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1								2	3	3	2	3	2	2
CO2								2	3	3	2	3	2	2
CO3								2	3	3	2	3	2	2
CO4								2	3	3	2	3	2	2
CO5								2	3	3	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 (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0

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K. S. Rangasamy College of Technology – Autonomous R2022				
60 EN 001 – Professional English I				
Common to all Branches				
	Hours / Week		Credit	Maximum Marks

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Semester	L	T	P	Total hrs	C	CA	ES	Total
I	1	0	2	45	2	40	60	100

Introduction to Fundamentals of Communication* **Listening:** General information-specific details-conversation: introduction to classmates – audio / video (formal & informal). **Speaking:** Self Introduction; Introducing a friend; conversation - politeness strategies. **Reading:** Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. **Writing:** Writing letters – informal and formal – basics and format orientation **Language Focus:** Present Tenses; word formation (affixes); synonyms, antonyms and contranyms, and phrasal verbs; abbreviations & acronyms (as used in technical contexts).	[9]
Narration and Summation* **Listening:** Podcast, anecdotes / stories / event narration; documentaries and interviews with celebrities. **Speaking:** Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews. **Reading:** Biographies, travelogues, newspaper reports, excerpts from literature, and travel & technical blogs. **Writing:** Paragraph writing, short report on an event (field trip etc.). **Language Focus:** Past tenses and prepositions; One-word substitution.	[9]
Description of a process / product* **Listening:** Listen to a product and process descriptions; advertisements about products or services **Speaking:** Picture description; giving instruction to use the product; presenting a product. **Reading:** Advertisements, gadget reviews and user manuals. **Writing:** Definitions; instructions; and product /process description. **Language Focus:** Imperatives; comparative adjectives; future tenses. Homonyms; and Homophones, discourse markers (connectives & sequence words)	[9]
Classification and Recommendations* **Listening:** TED Talks; scientific lectures; and educational videos. **Speaking:** Small Talk; Mini presentations **Reading:** Newspaper articles and Journal reports **Writing:** Note-making / Note-taking; recommendations; Transferring information from non-verbal (chart, graph etc, to verbal mode) **Language Focus:** Articles; Pronouns -Possessive & Relative pronouns; subject-verb agreement; collocations.	[9]
Expression* **Listening:** Debates/ discussions; different viewpoints on an issue; and panel discussions. **Speaking:** Group discussions, debates & role plays. **Reading:** Editorials; and opinion blogs. **Writing:** Essay Writing (Descriptive or narrative). **Language Focus:** Punctuation; Compound Nouns; simple, compound & complex sentences. cause & effect expressions.	[9]
Total Hours	**45**

Text Book(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

Refe rence(s):

1. Paul Emmerson and Nick Hamilton, *'Five Minute Activities for Business English',* Cambridge University Press, New York, 2005
2. Arthur Brookes and Peter Grundy,' *Beginning to Write: Writing Activities for Elementary and Intermediate Learners',* Cambridge University Press, New York, 2003

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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**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Fundamentals of Communication**	
1.1	Listening for general information and Specific details	1
1.2	Self-introduction	1
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	1
1.5	Writing letters – informal	1
1.6	Writing letters - formal	1
1.7	Present Tenses	1
1.8	synonyms, antonyms and contranyms, and affixes	1
1.9	phrasal verbs; abbreviations & acronyms	1
2	**Narration and Summation**	
2.1	Listening to podcasts, documentaries and interviews with celebrities	1
2.2	Narrating personal experiences	1
2.3	Summarizing of documentaries	1
2.4	Reading travelogues, and excerpts from literature	1
2.5	Paragraph writing	1
2.6	Short report on an event (field trip etc.).	1
2.7	Past tenses	1
2.8	Prepositions	1
2.9	One-word substitution	1
3	**Description of a process / product**	
3.1	Listen to a product and process descriptions	1
3.2	Picture description	1
3.3	Giving instruction to use the product	1
3.4	Reading Advertisements, gadget reviews and user manuals	1
3.5	Writing Definitions and instructions	1
3.6	Future Tenses	1
3.7	Homonyms and Homophones	1
3.8	Imperatives	1
3.9	comparative adjectives, and discourse markers	1
4	**Classification and Recommendations**	
4.1	Listening to TED Talks and educational videos	2
4.2	Listening to scientific lectures	1
4.3	Small Talk and mini presentations	2
4.4	Reading newspaper articles and journal reports	2

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4.5	Note-making / Note-taking	1
4.6	Recommendations	1
4.7	Transferring information from non-verbal	1
4.8	Articles and Pronouns	2
4.9	Subject-verb agreement and collocations	1
5	**Expression**	
5.1	Listening to debates and panel discussions	1
5.2	Group discussions	2
5.3	Role plays	1
5.4	Reading editorials and opinion blogs	1
5.5	Essay Writing (Descriptive or narrative)	1
5.6	Punctuation and cause & effect expressions.	1
5.7	Compound Nouns	1
5.8	Simple, compound & complex sentences	1
	Total	45

Course Designers

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

60 MA 001	**MATRICES AND CALCULUS**	Category	L	T	P	Credit
		BS	3	2	0	4

Objective

- To familiarize the students with basic concepts in Cayley-Hamilton theorem and orthogonal transformation.
- To get exposed to the fundamentals of differential calculus in various methods.
- To acquire skills to understand the concepts involved in Jacobians and maxima and minima.
- To solve various linear differential equations and method of variation of parameters.
- To learn various techniques and methods in solving definite and indefinite integrals.

Prerequisite

NIL

Course Outcomes

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

CO1	Apply Cayley-Hamilton theorem and reduce the quadratic form into canonical form.	Remember, Apply, Evaluate

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CO2	Apply differential calculus in solving various Engineering problems.	Remember, Understand, Apply
CO3	Analyze Jacobian methods and constrained maxima and minima of the functions	Remember, Understand, Analyze
CO4	Apply various methods in solving the differential equations	Remember, Apply
CO5	Evaluate definite and indefinite integrals using different techniques.	Remember, Apply,
		Evaluate

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							2	2	3
CO2	3	3	2	2	2							2	2	3
CO3	3	3	3	2	2							2	2	3
CO4	3	3	3	3	2							2	2	3
CO5	3	3	3	2	3							2	2	3
		3- Strong; 2-Medium; 1-Some												

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		Model Exam	End Sem Examination(Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	20	40	40
Analyze (An)	0	20	20	20
Evaluate (Ev)	10	0	20	20
Create (Cr)	0	0	0	0
Total	60	60	100	100

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60 MA 001 - MATRICES AND CALCULUS

Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT, AI&DS, AI&ML

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

Matrices Characteristic equation - Eigen values and Eigen vectors of a real matrix - Properties of Eigen values and Eigen vectors - Cayley-Hamilton theorem - Orthogonal transformation of a symmetric matrix to diagonal form - Reduction of quadratic form to canonical form by an Orthogonal transformation - Nature of quadratic form - Applications: Stretching of an elastic membrane.	[9]
Differentiation Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Successive Differentiation - Leibnitz's theorem - **Applications: Maxima and Minima of functions of one variable.***	[9]

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Functions of Several Variables Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians - Taylor's series for functions of two variables - **Applications: Maxima and minima of functions of two variables - Constrained maxima and minima: Lagrange's Method of Undetermined Multipliers.***	[9]
Differential Equations Linear differential equations of second and higher order with constant coefficients - R.H.S is of the form $e^{ax}, sin\ \alpha\ x, cos\ \alpha\ x, x^n, n > 0$ - Differential equations with variable coefficients: Cauchy's and Legendre's form of linear equations - Method of variation of parameters.	[9]
Integration Definite and Indefinite integrals – Substitution rule - Techniques of Integration: Integration by parts, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.	[9]
Total Hours:45+15(Tutorial)	**60**

Text Book(s):	
1.	Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2	Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.
Reference(s):	
1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016.
2.	Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd, New Delhi, 2017
3.	Bali N P and Manish Goyal," A text book of Engineering Mathematics",10th Edition, Laxmi Publications (P) Ltd, 2016.
4.	"Matrix Analysis with Applications" Dr Gupta S K and Dr Sanjeev Kumar and Prof. Somnath Roy "Matrix Solvers", NPTEL Online Video Courses.

***SDG: 4 – Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	Number of Hours
1	**Matrices**	
1.1	Characteristic equation	1
1.2	Eigen values and Eigen vectors of a real matrix	1
1.3	Properties of Eigen values and Eigen vectors	1
1.4	Cayley-Hamilton theorem	1
1.5	Tutorial	2
1.6	Orthogonal transformation of a symmetric matrix to diagonal form	1
1.7	Reduction of quadratic form to canonical form by Orthogonal transformation	1
1.8	Nature of quadratic form	1
1.9	Stretching of an elastic membrane	1
1.10	Tutorial	2
2	**Differentiation**	
2.1	Representation of functions	1
2.2	Limit of a function and Continuity	1
2.3	Differentiation rules (sum, product, quotient, chain rules)	2
2.4	Successive differentiation	1

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2.5	Tutorial	2
2.6	Leibnitz's theorem	1
2.7	Maxima and minima of functions of one variable	2
2.8	Tutorial	2
3	**Functions of Several Variables**	
3.1	Partial differentiation	1
3.2	Homogeneous functions and Euler's theorem	1
3.3	Jacobians	2
3.4	Tutorial	2
3.5	Taylor's series for functions of two variables	1
3.6	Maxima and minima of functions of two variables	1
3.7	Lagrange's Method of Undetermined Multipliers	2
3.8	Tutorial	2
4	**Differential Equations**	
4.1	Linear differential equations of second and higher order with constant co-efficient	1
4.2	R.H.S is of the form $e^{\alpha x}, sin\ \alpha\ x, cos\ \alpha\ x, x^n, n > 0$	2
4.3	Tutorial	2
4.4	Differential equations with variable coefficients: Cauchy's form of linear equations	2
4.5	Differential equations with variable coefficients: Legendre's form of linear equations	2
4.6	Method of variation of parameters	1
4.7	Tutorial	2
5	**Integration**	
5.1	Definite and Indefinite integrals	1
5.2	Substitution rule	1
5.3	Techniques of Integration: Integration by parts	1
5.4	Integration of rational functions by partial fraction	1
5.5	Tutorial	2
5.6	Integration of irrational functions	1
5.7	Improper integrals	1
5.8	Hydrostatic force.	1
5.9	Pressure, moments and centres of mass.	1
5.10	Tutorial	2
	Total	60

List of MATLAB Programs:

1. Introduction to MATLAB.
2. Matrix Operations - Addition, Multiplication, Transpose, Inverse and Rank.
3. Solution of system of linear equations.
4. Computation of Eigen values and Eigen vectors of a Matrix.
5. Finding ordinary and partial derivatives.
6. Solving first and second order ordinary differential equations. 7. Computing Maxima and Minima of a function of one variable.
8. Computing Maxima and Minima of a function of two variables.

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Course Designers

1. Dr.C.Chandran - cchandran@ksrct.ac.in
2. Mr. G.Mohan - mohan@ksrct.ac.in

60 EE 001	**Basic Electrical and Electronics Engineering**	Category	L	T	P	Credit
		ES	3	0	0	3

Objective

- To familiarize the basic concept on electrical circuits and its various parameters
- To facilitate the various types of electrical machines and their uses
- To gain knowledge on Electrical safety
- To provide exposure on the functions of various semiconductor devices
- To familiarize the use of various measuring instruments

Prerequisite

NIL

Course Outcomes

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

CO1	Apply the basic laws of electric circuits to calculate the unknown quantities.	Remember, Understand and Apply
CO2	Acquire knowledge on different electrical machines and select suitable machines for industrial applications.	Remember, Understand and Analyze
CO3	Recognize the significance of various components of low voltage electrical installations and create awareness on electrical safety.	Remember, Understand
CO4	Realize the operation and characteristics of semiconductor devices.	Remember, Understand and Analyze
CO5	Understand the operating principles of measuring instruments and choose suitable instrument for measuring the parameters.	Remember, Understand

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	-	2	-	-	-	-	2	3	-	3	2
CO2	3	3	1	1	-	-	2	-	2	-	2	1	3	2
CO3	3	3	-	2	-	2	-	-	-	-	2	2	3	2
CO4	2	2	3	-	2	-	2	1	-	2	1	3	3	2
CO5	2	3	1	2	-	-	3	2	-	-	2	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	20	30
Understand	20	25	30
Apply	20	10	30

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Analyse	10	5	10
Evaluate	0	0	0
Create	0	0	0

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60 EE 001 – Basic Electrical and Electronics Engineering

Common to CSE, IT, AIDS, AIML, MECH, MCT, BT, FT and CIVIL Branches

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

ELECTRICAL CIRCUITS DC Circuits: Circuit Components: Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws – Simple problems. Introduction to AC Circuits and Parameters: Waveforms, Average value and RMS Value of Sinusoidal Waveform real power, reactive power and apparent power, power factor – Steady state analysis of RLC series circuits- Simple problems. Introduction to three phase AC circuits	[10]
ELECTRICAL MACHINES* Construction and Working principle - Separately and Self excited DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, Working principle and Applications of Transformer, Three phase Alternator, Synchronous motor and Three Phase Induction Motor.	[10]
ELECTRICAL INSTALLATIONS* Domestic wiring, types of wires and cables, earthing, protective devices - switch fuse unit - Miniature Circuit Breaker - Moulded Case Circuit Breaker - Earth Leakage Circuit Breaker, Batteries and types, UPS, Safety precautions and First Aid.	[9]
ANALOG ELECTRONICS Introduction to Semiconductor Materials – PN Junction Diodes, Zener Diode – Characteristics and Applications – Bipolar Junction Transistor - Biasing and Configuration (NPN) - **Regulated power supply unit, switched mode power supply*.**	[8]
MEASUREMENTS AND INSTRUMENTATION Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Operating principles and Types of Wattmeter, Energy Meter, Instrument Transformers - **CT and PT, DSO - Block diagram - Data acquisition*.**	[8]
Total Hours	45

Text Book(s):

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
2. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

Reference(s):

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
3. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
4. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010

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***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**ELECTRICAL CIRCUITS**	
1.1	Circuit Components: Resistor, Inductor, Capacitor	1
1.2	Ohm's Law - Kirchhoff's Laws	1
1.3	Ohm's Law - Kirchhoff's Laws - Problems	2
1.4	Introduction to AC Circuits and Parameters: Waveforms, Average value and RMS Value of Sinusoidal Waveform	2
1.5	Real power, reactive power and apparent power, power factor	1
1.6	Steady state analysis of RLC series circuits	1
1.7	RLC series circuits - Problems	1
1.8	Introduction to three phase system	1
2	**ELECTRICAL MACHINES**	
2.1	Construction and Working principle of DC Generator	1
2.2	Types and Applications of Separately and Self excited DC Generators	1
2.3	EMF equation of DC Generator	1
2.4	Working Principle of DC motors	1
2.5	Torque Equation	1
2.6	Types and Applications	1
2.7	Construction, Working principle and Applications of Transformer	1
2.8	Construction, Working principle and Applications of Three phase Alternator	1
2.9	Construction, Working principle and Applications of Synchronous motor	1
2.10	Construction, Working principle and Applications of Three Phase Induction Motor	1
3	**ELECTRICAL INSTALLATIONS**	
3.1	Domestic wiring, types of wires and cables	1
3.2	Earthing, protective devices	2
3.3	Switch fuse unit - Miniature Circuit Breaker	1
3.4	Molded Case Circuit Breaker - Earth Leakage Circuit Breaker	1
3.5	Batteries and types	2
3.6	UPS	1
3.7	Safety precautions and First Aid	1
4	**ANALOG ELECTRONICS**	
4.1	Introduction to Semiconductor Materials	1
4.2	Characteristics and Applications of PN Junction Diodes	1
4.3	Characteristics and Applications of Zener Diode	1

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4.4	Bipolar Junction Transistor	1
4.5	Biasing & Configuration (NPN)	2
4.6	Regulated power supply unit	1
4.7	Switched mode power supply	1
5	**MEASUREMENTS AND INSTRUMENTATION**	
5.1	Functional elements of an instrument	1
5.2	Standards and calibration	1
5.3	Moving Coil meters - Operating Principle, types	1
5.4	Moving Iron meters - Operating Principle, types	1
5.5	Operating principles and Types of Wattmeter	1
5.6	Energy Meter	1
5.7	Instrument Transformers – CT & PT	1
5.9	DSO - Block diagram - Data acquisition	1
	Total	45

Course Designers

1. Mr.S.Srinivasan - srinivasan@ksrct.ac.in
2. Ms.R.Radhamani - radhamani@ksrct.ac.in
3. Ms.S.Jaividhya - jaividhya@ksrct.ac.in
4. Dr.S.Gomathi - gomathi@ksrct.ac.in
5. Mr.T.Prabhu - prabhut@ksrct.ac.in

60 ME 002	ENGINEERING GRAPHICS

Category	L	T	P	Credit
ES	2	0	4	4

Objective

- To acquire various concepts of dimensioning, conventions and standards.
- To impart the graphic skills for converting pictorial views of solids in to orthographic views.
- To learn the concept in projection of solids, section of solids and development of different types of surfaces.
- To learn the concept of isometric projection.
- To learn the geometry and topology of engineered components

Prerequisite

NIL

Course Outcomes

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

CO1 Demonstrate the Impact of computer technologies on graphical communication. Re/Un/Ap

CO2 Convert the pictorial views in to orthographic views using drafting software. Re/Un/Ap

CO3 Draw the projection of simple solids, true shape of sections and development of surfaces. Re/Un/Ap

CO4 Construct the isometric projections of objects using drafting software. Re/Un/Ap

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CO5	Interpret a design project illustrating engineering graphical skills.	Re/Un/Ap

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3	2	3											2	3
CO2	3 3 3		2 3 CO3	3 3 3	3	3	2 3								
CO4	3	3	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	10	10	20
Understand	20	20	30
Apply	30	30	50
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0

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60 ME 002 – ENGINEERING GRAPHICS

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	2	0	4	90	4	50	50	100

Introduction to Computer Aided Drafting (CAD) software* Theory of CAD software – Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension) – Drawing Area (Background, Crosshairs, Coordinate System) – Dialog boxes and windows – Shortcut menus (Button Bars) – The Command Line and Status Bar – Different methods of zoom – Select and erase objects.	[6+12]
Orthographic Projection* Theory of projection – Terminology and Methods of projection – first angle and third angle projection – Conversion of pictorial views into orthographic views	[6+12]
Projection of Solids and Sections of Solids* Projections of simple solids: prism, pyramid, cylinder and cone (Axis parallel to one plane and perpendicular to other, axis inclined to one plane and parallel to other). Sections of simple solids: prism, pyramid, cylinder and cone in simple positions (cutting plane is inclined to one of the principal planes and perpendicular to the other) – True shape of sections	[6+12]
Development of Surfaces* Principle of development-Methods of development: Parallel line development-Cube, Prism and Cylinder. Radial line development – Pyramid and cone	[6+12]
Isometric Projection* Principles of Isometric projection – Isometric scale, Isometric views, Conventions – Isometric views of lines, Planes, Simple and compound Solids – Conversion of Orthographic views in to Isometric view	

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	[6+12]
Application of Engineering Graphics* Geometry and topology of engineered components: Creation of engineering models and their presentation in standard 2D blueprint form, 3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models – Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc. – Applying colour coding according to building drawing practice – Drawing sectional elevation showing foundation to ceiling – Introduction to Building Information Modelling (BIM).	[6+12]
Total Hours	**90**

Text Book(s):	
1.	Bhatt N.D., —Engineering Drawing, Charotar Publishing House Pvt. Ltd., 53rd Edition, Gujarat, 2019.
2	Venugopal K., —Engineering Graphics, New Age International (P) Limited, 2014.
Reference(s):	
1.	Shah M.B., Rana B.C., and V.K.Jadon., —Engineering Drawing, Pearson Education, 2011.
2.	Natarajan K.V., —A Text Book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2014.
3.	Agrawal B. & Agrawal C. M., —Engineering Graphics, TMH Publication, 2012.
4.	Narayana, K.L. & P Kannaiah, —Text book on Engineering Drawing, Scitech Publishers, 2008.

*** SDG 9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Computer Aided Drafting (CAD) software**	
1.1	Theory of CAD software	1
1.2	Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension)	2
1.3	Drawing Area (Background, Crosshairs, Coordinate System)	3
1.4	Dialog boxes and windows – Shortcut menus	3
1.5	The Command Line and Status Bar	1
1.6	Different methods of zoom – Select and erase objects.	2
2	**Orthographic Projection**	
2.1	Introduction to orthographic projections	2
2.2	Planes of projection,	2
2.3	Projection of points	1
2.4	Projection of lines inclined to both planes.	2
2.5	Projection of planes	2
2.6	Projection of planes Inclined to both planes	1
2.7	Conversions of pictorial views to orthographic views.	3
2.8	Practice class for pictorial views to orthographic views.	2

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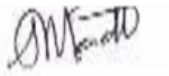

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2.9	Practice class for pictorial views to orthographic views.	1
3	**Projection of Solids**	
3.1	Projections of simple solids: prism	2
3.2	Projections of simple solids: cylinder	3
3.3	Projections of simple solids: pyramid	2
3.4	Projections of simple solids: Cone	2
3.5	Practice class for Projection of Solids	2
3.6	Axis of solid inclined to both HP and VP	5
3,7	Section of solids for Prism,	2
3,8	Section of solids for Cylinder,	2
3,9	Section of solids for Pyramid,	2
3,10	Section of solids for Cone	2
3,11	Auxiliary Views - Draw the sectional orthographic views of	3
	geometrical solids.	
3.12	Draw the sectional orthographic views of objects from industry.	3
3,13	Development of surfaces of Right solids Prism,	2
3.14	Development of surfaces of Right solids Pyramid	2
3.15	Development of surfaces of Right solids Cylinder and Cone	2
4	**Isometric Projection and Introduction to AutoCAD**	
4.1	Principles of isometric projection	1
4.2	Isometric scale	2
4.3	Isometric projections of simple solids: Prism,	2
4.4	Isometric projections of simple solids: Pyramid,	2
4.5	Isometric projections of simple solids: Cylinder	1
4.6	Isometric projections of simple solids: Cone	2
4.7	Isometric projections of frustum	2
4.8	Isometric projections of truncated solids	2
4.9	Combination of two solid objects in simple vertical positions.	3
5	**Application of Engineering Graphics**	
5.1	Geometry and topology of engineered components:	2
5.2	Creation of engineering models and their presentation in standard 2D blueprint form,	3
5.3	3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models	3
5.4	Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc.	3
5.5	Applying colour coding according to building drawing practice	2
5.6	Drawing sectional elevation showing foundation to ceiling	2
5.7	Introduction to Building Information Modelling (BIM).	2

Course Designers

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60 CS 001	C PROGRAMMING

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- 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

Prerequisite

NIL

Course Outcomes

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

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

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-

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60 CS 001 – C Programming

Common to all Branches

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Semester	Hours / Week			Total hrs	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.	[7]
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.	[11]
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**

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**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

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1.4	Operators–expressions and precedence	1
1.5	Console I/O– Unformatted and Formatted Console I/O	1
1.6	Conditional Branching	1
1.7	Iteration and loops	2
1.8	Writing and evaluation of conditionals and consequent branching	1
2	**Arrays and Strings**	
2.1	One Dimensional Array	1
2.2	Two-Dimensional Array and Matrix Manipulation	1
2.3	Character arrays and Strings Basics	1
2.4	String Manipulation without String Handling Functions	2
2.5	String Manipulation with String Handling Functions	2
3	**Functions and Pointers**	
3.1	Scope of a Function – Library Functions,	1
	User defined functions and Function Prototypes	
3.2	Function Call by value and Function Call by reference, Function Categorization	2
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 - Indexing Pointers	1
3.9	Function and pointers	1
3.10	Dynamic memory allocation	1
4	**Structures, Unions, Enumerations, Typedef and Preprocessors**	
4.1	Introduction to Structures and Initialization	1
4.2	Arrays and Structures, Arrays of Structures	1
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	2
5	**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
	Total Hours	**45**

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

60 MY 001	ENVIRONMENTAL STUDIES AND CLIMATE CHANGE

Category	L	T	P	Credit
MC	2	0	0	0

Objective

- To understand the importance of ecosystem and biodiversity.
- To analyze the impacts of pollution, control and legislation.
- To enlighten awareness and recognize the social responsibility in environmental issues. To enlighten the waste management

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the impacts of pollution on climate change	Understand
CO2	Enhance the awareness the methods of waste management.	Apply
CO3	Examine the value of sustainable future	Evaluate
CO4	Evaluate the clean and green development for environmental problem	Evaluate CO5
	Analyze the role of Geo-science in environmental management	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3	3	3	2	3	3	3	3	1	3	2	3	2		
CO2	3	3	3	3	2	3	3	3	3	2	2	3	2	3	
CO3	3	3	3	3	3	3	3	3	2	2	2	3	2	3	
CO4	2	2	3	3	-	1	3	3	2	2	1	2			
CO5	3	3	3	3	3	3	3	3	3	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	Model Exam	
Remember	10	10	20	-
Understand	20	20	20	-
Apply	30	30	30	-
Analyse	30	30	30	-
Evaluate	-	-	-	-
Create	-	-	-	-

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Model Titles for Case Study

1. Environmental impacts of quarry industries in MelurTaluk.
2. A study on impacts of tanneries on ground water and soil quality in Bhavani, Erode district.
3. Effect of pharmaceutical industry on groundwater quality in oikaraipatty village, AlagarKovil.
4. Solid waste and waste water management in KSR hostel.
5. Environmental effect of Kudankulam atomic power plant.
6. Case study on effect of Sterlite industry
7. Effect of textile wastes in Tiruppur and Karur District.
8. Segregation of waste and its recycling by Pallipalayam Municipality at Nammakal
9. Effect of fire work waste on atmosphere in Sivakasi region.

10. Effect of noise pollution waste on atmosphere in Sivakasi region.

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

Pollution and its impact on climate change* Pollution: Sources and impacts of air pollution – green house 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. *Activity*: Study of carbon emission nearby place or industry.	[6]
Integrated Waste Management ** Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan – Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste - risk management: Collection, segregation, treatment and disposal methods. Waste water treatment- ASP *Activity*: Analysis and design of waste management systems, prepare a model / project -wealth from waste	[6]
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. *Activity*: Select a topic and analyze the value of sustainable development.	[6]
Environment and Agriculture§§**:** Organic farming – bio-pesticides- composting, bio composting, vermicomposting, roof gardening and irrigation. Waste land reclamation. Climate resilient agriculture. Green auditing *Activity*: Prepare a green auditing report on energy, water etc.	[6]
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). *Activity*: Prepare the report using IT tool.	[6]
Total Hours	30

Text Book(s):

1.	Anubha Kaushik , C P Kaushik. Perspectives In Environmental Studies, New Age International publishers; Sixth edition (1 January 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 Private Limited, 3rd Edition,2015
3.	Erach Bharucha. Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2000

§§ SDG: 3 – Good Health and Well-being

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

**SDG: 4 – Clean Water and Sanitation
§SDG: 6 - Affordable and Clean Energy *SDG:
13 – Climate Action

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 – green house 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
2.4	Waste water treatment- ASP	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 Designers

1.Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
2.Dr.K.PRABHA – prabhak@ksrct.ac.in
3.Dr.S.MEENACHI – meenachi@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023
Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

60 CS 0P1	C PROGRAMM

Category	L	T	P	Credit
ES	0	0	4	2

Objective

- 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 file handling operations through C

Prerequisite

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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-Low														

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 Array manipulation*.
5. Implementation of 2D Array manipulation*.
6. Implementation of String operations*.

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7. Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions*.
8. Implementation of Pointers*
9. Implementation of structures and Union*.
10. Implementation of Bit Fields, Typedef and Enumeration*.
11. Implementation of Preprocessor directives*.
12. Implementation of File operations*.

*** SDG:4- Quality Education**

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

60 ME 0P1	**Fabrication and Rever**	Category	L	T	P	Credit
		ES	0	0	4	2

Objective

- To acquire skills in operating 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

Prerequisite

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

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CO1	3		2		3		3	2	3		2	3	2	2
CO2	3	3	3		3	2		2	3	3		3	2	2
CO3	3	3	3		3	2	2	2	3	3	2	3	2	2
CO4	3	3	3	2	3	3	2	3	3			3	2	2
CO5	3	3	3	3	3	2	2	2	3	2	2	3	2	2
3- Strong; 2-Medium; 1-Low														

Syllabus

Performs of Power Tools
Drilling in different Walls and Materials Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with clamps.

Carpentry Process
Design and Development of Wooden Model using the Carpentry Process T / Cross Joint / different joints

Sheet Metal and Filling Process
Design and Development of Metal Model - Make a Tray Components using Sheet Metal Process and Mating of Square joint in MS Plate using the Filling Process

Welding Process
Fabrication of Models with MS Plate using Arc Welding- Lap Joint, Butt Joint, T Joint

Plumbing Process
Repair and Maintenances of Pipe Fitting for Home Applications Study of plumbing tools, assembly of G.I. pipes/ PVC and pipe fittings, cutting of threads in G.I. Pipes by thread cutting dies.

Residential house wiring
Design and Excusion of Residential house wiring With and Without UPS- 1 BHK - 2 BHK. Design and fabrication of domestic LED lamps - Circuit designing (calculation of components)

Electronic Circuit wiring
PCB fabrication – Soldering - Assembling of Audio Amplifiers- Connecting USB/Bluetooth MP3 player board - Connecting Volume controllers - Connecting bass & treble filter boards - Connecting Surround and subwoofer filter board

Assembling and dismantling of Electronics Machines
Iron box, Induction stove, Water heater, Mixer, Table fan, Ceiling fan

Study Exercises
Demonstration of Centre Lathe operations Facing, Turning, and drilling and its components.
Assemble and dismantle of Vacuum Cleaner / Refrigerator and its components

Computer Hardware Study Exercises
Identify internal components of computer - Assemble and dismantle desktop computer systems

List of Experiments

1. **Fitting of Wall mounting Parts using Power Tools**

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a) Drilling in different Walls and Materials

b) Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with Clamps.

2. **Making of Wooden model using the Carpentry Process**

a) T / Cross Joint

b) Mortise and Tenon Joint / different joints

3. **Making of Metal Model**

a) Making of Components using Sheet Metal Process

b) Mating of Components using the Filling Process

4. **Fabrication of Welded model**
5. **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

6. **Assembling and dismantling of**

a) Iron box

b) Induction stove

c) Water heater

d) Mixer

e) Table fan

f) Ceiling fan

7. **Design and Execution of Residential house wiring**

a) 1 BHK

b) 2 BHK

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

a) 1 BHK

b) 2 BHK

9. **Design and fabrication of domestic LED lamps**

a) Circuit designing (calculation of components)

b) PCB fabrication

c) Soldering

10. **Assembling of Audio Amplifiers**

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

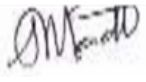
1. Demonstration of Centre Lathe and its operations like Facing, Turning, and drilling.
2. Dismantle and Assemble of Vacuum Cleaner / Refrigerator.
3. Study of components of computer. Dismantle and assemble of desktop computer systems

Course Designers

1. Mr.S Sakthivel - sakthivel_s@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

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

60 EN 002	PROFESSIONAL ENGLISH - II

Category	L	T	P	Credit
HS	1	0	2	2

Objective

- 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

Prerequisite

Basic knowledge of reading and writing in English and should have completed Professional English I.

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1									2	3	3	2	3	2	2
CO2									2	3	3	2	3	3	3
CO3									2	3	3	2	3	2	3
CO4									2	3	3	2	3	2	2
CO5									2	3	3	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 (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

K. S. Rangasamy College of Technology – Autonomous R2022								
60 EN 002 – PROFESSIONAL ENGLISH - II								
Common to all								
Semester	Hours / Week			**Branches** Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	2	45	2	40	60	100

Making Comparisons* **Listening:** Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) **Speaking:** Marketing a product, persuasive speech techniques. **Reading:** Reading advertisements, user manuals and brochures. **Writing:** Professional emails, Email etiquette - compare and contrast essay. **Language Focus:** mixed tenses, prepositional phrases, same words used in different contexts and discourse markers	[9]
Expressing Causal Relations in Speaking and Writing* **Listening:** Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects. **Speaking:** Describing and discussing the reasons of accidents or disasters based on news reports. **Reading:** longer technical texts– cause and effect essays, and letters / emails of complaint, **Writing:** Writing responses to complaints **Language Focus:** Active Passive Voice transformations, Infinitive and Gerunds – Word Formation (Noun-Verb-Adj-Adv), Adverbs.	[9]
Problem Solving* **Listening:** Listening to / watching movie scenes/ documentaries depicting a technical problem and suggesting solutions. **Speaking:** Group Discussion (based on case studies), - techniques and Strategies. **Reading:** Case Studies, excerpts from literary texts, news reports etc. Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay **Language Focus:** Error correction; If conditional sentences - Compound Words, Sentence Completion.	[9]
Reporting of Events and Research * **Listening:** Listening Comprehension based on new report and documentaries – **Speaking:** Interviewing, presenting oral reports, Mini presentations on select topics. **Reading:** Newspaper articles. **Writing:** Recommendations, Transcoding, Accident Report, Precis writing and Summarising and Plagiarism **Language Focus:** Reported Speech – Modals - Conjunctions- use of Prepositions	[9]
The Ability to put Ideas or Information Coherently* **Listening:** Listening to TED Talks, Presentations, Formal job interviews, (analysis of the interview performance). **Speaking:** Participating in role plays, virtual interviews, making presentations with visual aids **Reading:** excerpts of interview with professionals **Writing:** Job / Internship application – Cover letter & Résumé **Language Focus:** Numerical Adjectives, question types: Wh/ Yes or No/ and Tags; Relative Clauses - Idioms.	[9]
Total Hours	45

Text Book(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

Passed in BoS Meeting held on 02/12/2023

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Reference(s):

:

Passed in BoS Meeting held on 02/12/2023

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1.	Raman. Meenakshi, Sharma. Sangeeta, *'Professional English'*. Oxford university press. New Delhi. 2019
2.	Arthur Brookes and Peter Grundy,' *Beginning to Write: Writing Activities for Elementary and Intermediate Learners',* Cambridge University Press, New York, 2003
3.	Prof. R.C. Sharma & Krishna Mohan, *'Business Correspondence and Report Writing'*, Tata McGraw Hill & Co. Ltd., New Delhi, 2001
4.	V.N. Arora and Laxmi Chandra, *'Improve Your Writing'*, Oxford University Press, New Delhi, 2001

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Making Comparisons**	
1.1	Evaluative Listening	1
1.2	Product Descriptions and filling a graphic organiser	1
1.3	Marketing a product by using persuasive techniques	2
1.4	Reading advertisements, user manuals and brochures	1
1.5	Writing professional emails	1
1.6	Compare and contrast essay	1
1.7	mixed tenses and prepositional phrases	1
1.8	Same words used in different contexts	1
2	**Expressing Causal Relations in Speaking and Writing**	
2.1	Listening to longer technical talks	1
2.2	Listening to process/event descriptions	1
2.3	Describing and discussing the reasons of accidents or disasters	1
2.4	Reading longer technical texts– cause and effect essays	1
2.5	Writing responses to complaints	1
2.6	Active Passive Voice transformations	2
2.7	Infinitive and Gerunds	1
2.8	Word Formation (Noun-Verb-Adj-Adv), Adverbs.	1
3	**Problem Solving**	
3.1	Listening to documentaries and suggesting solutions	1
3.2	Group Discussion (based on case studies)	2
3.3	Reading Case Studies, excerpts from literary texts and news reports	1
3.4	Letter to the Editor	1
3.5	Checklists	1
3.6	Problem solution and argumentative essays	1
3.7	Error correction and Sentence Completion	1
3.8	If conditional sentences	1
4	**Reporting of Events and Research**	
4.1	Listening Comprehension	1
4.2	Interviewing and presenting oral reports	1
4.3	Mini presentations on select topics	1

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4.4	Reading newspaper articles	1
4.5	Recommendations	1
4.6	Transcoding	1
4.7	Precis writing and Summarising	1
4.8	Reported Speech, Modals	1
4.9	Conjunctions	
5	**The Ability to put Ideas or Information Coherently**	
5.1	Listening to Formal job interviews	1
5.2	Role plays	2
5.3	Virtual interviews	1
5.4	Reading Company profiles	1
5.5	Writing Statement of Purpose (SoPs)	1
5.6	Writing Résumé	1
5.7	Numerical Adjectives and Relative Clauses - Idioms	1
5.8	question types: Wh/ Yes or No/ and Tags	1
	Total	**45**

Course Designers

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

60 MA 003	**INTEGRALS, PARTIAL DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM**	Category	L	T	P	Credit
		BS	3	2	0	4

Objective

- To provide exposure in handling the situations involving multiple integrals
- To familiarize the basic concepts in Vector calculus
- To get exposed to the fundamentals of analytic functions
- To develop the mathematical skills in solving partial differential equations To facilitate the concepts in Laplace transform techniques

Prerequisite

NIL

Course Outcomes

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

CO1	Evaluate double and triple integrals.	Remember, Apply, Evaluate
CO2	Analyze the basic concepts of vector calculus	Remember, Analyze, Evaluate

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CO3	Construct the analytic functions and evaluate complex integrals	Remember, understand, Apply
CO4	Compute the solution of partial differential equations using different methods	Remember, Apply
CO5	Apply Laplace transform techniques for solving differential equations.	Remember, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3							2	3	2
CO2	3	3	2	2	3							2	3	2
CO3	3	3	3	2	2							2	3	2
CO4	3	3	3	3	2							2	3	2
CO5	3	3	2	3	3							2	3	2
3- Strong; 2-Medium; 1-Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		Model Exam Marks	End Sem Examination(Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	0	10	10	10
Apply (Ap)	20	40	40	40
Analyze (An)	10	0	20	20
Evaluate (Ev)	20	0	20	20
Create (Cr)	0	0	0	0
Total	60	60	100	100

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60 MA 003 – Integrals, Partial Differential Equations and Laplace Transform

Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT

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

MULTIPLE INTEGRALS

Double integration – Cartesian and polar co-ordinates – Change of order of integration – Area as double integral – Triple integration in Cartesian co-ordinates – Change of variables - Cartesian to polar coordinates and Cartesian to Cylindrical co-ordinates. [9]

VECTOR CALCULUS*

Introduction - Gradient of a scalar point function –Directional derivative – Angle of intersection of two surfaces – Divergence and curl (excluding vector identities) – Solenoidal and irrotational vectors – Application : Green's theorem in the plane – Gauss divergence theorem -Stokes' theorem (statement only). [9]

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ANALYTIC FUNCTIONS AND INTEGRALS Analytic function – Necessary and Sufficient conditions (statement only)-Properties – Harmonic function – Construction of an analytic function – Cauchy's Integral theorem (statement only) – Cauchy's integral formula – Classification of singularities – Application : Cauchy's residue theorem.	[9]
PARTIAL DIFFERENTIAL EQUATIONS* Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Non-Linear partial differential equations of first order – Lagrange's linear equations – Application: Homogeneous Linear partial differential equations with constant coefficients.	[9]
LAPLACE TRANSFORM Conditions for existence – Transforms of elementary functions – Basic properties - Derivatives and integrals of transforms - Initial and final value theorem – Transform of periodic functions. Inverse Laplace transform – Convolution theorem (excluding proof) – Application: Solution of second order ordinary differential equations with constant co-efficients.	[9]
Total Hours:45+15(Tutorial)	**60**

Text Book(s):

1.	Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2	Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.

Reference(s):

1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016.
2.	Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd, New Delhi, 2017.
3.	Bali N P and Manish Goyal," A text book of Engineering Mathematics",10th Edition, Laxmi Publications (P) Ltd, 2016.
4.	Dr.P.N.Agrawal, Dr.D.N.Pandey ,"Integral Equations, Calculus of Variations and its Applications", NPTEL online video courses.

***SDG:4 Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**MULTIPLE INTEGRALS**	
1.1	Double integration	1
1.2	Cartesian and polar coordinates	1
1.3	Change of order of integration	1
1.4	Area as double integral	1
1.5	Tutorial	2
1.6	Triple integration in Cartesian coordinates	1
1.7	Change of variables	1
1.8	Cartesian to polar coordinates	1
1.9	Cartesian to Cylindrical coordinates	1
1.10	Tutorial	2
2	**VECTOR CALCULUS**	
2.1	Introduction: Gradient of a scalar point function	1

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2.2	Directional derivative	1
2.3	Angle of intersection of two surfaces	1
2.4	Divergence and curl (excluding vector identities)	1
2.5	Tutorial	2
2.6	Solenoidal and irrotational vectors	1
2.7	Application: Green's theorem in the plane	1
2.8	Gauss divergence theorem	1
2.9	Stokes' theorem (statement only)	1
2.10	Tutorial	2
3	**ANALYTIC FUNCTIONS AND INTEGRALS**	
3.1	Analytic function	1
3.2	Necessary and Sufficient conditions (statement only)	1
3.3	Properties	1
3.4	Harmonic function	1
3.5	Tutorial	2
3.6	Construction of an analytic function	1
3.7	Cauchy's Integral theorem (statement only), Cauchy's integral formula	1
3.8	Classification of singularities	1
3.9	Applications : Cauchy's residue theorem.	1
3.10	Tutorial	2
4	**PARTIAL DIFFERENTIAL EQUATIONS**	
4.1	Formation of partial differential equations by eliminating arbitrary constants	1
4.2	Formation of partial differential equations by eliminating arbitrary functions	2
4.3	Tutorial	2
4.4	Non- linear partial differential equations of first order	2
4.5	Lagrange's linear equations	1
4.6	Application: Homogeneous Linear partial differential equations with constant coefficients.	2
4.7	Tutorial	2
5	**LAPLACE TRANSFORM**	
5.1	Conditions for existence	1
5.2	Transforms of elementary functions	1
5.3	Basic properties	1
5.5	Derivatives and integrals of transforms, Initial and final value theorem	1
5.6	Tutorial	1
5.7	Transform of periodic functions	2
5.8	Inverse Laplace transform	1
5.9	Convolution theorem (excluding proof)	1
5.10	Application: Solution of second order ordinary differential equation with constant co-efficient.	1
5.11	Tutorial	2

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	Total	60

List of MATLAB Programs:

1. Evaluating double and triple integrals.
2. Area as double integral.
3. Volume as triple integral.
4. Plotting and visualizing single variable functions.
5. Plotting and visualizing functions of two and three variables.
6. Evaluating Gradient, divergence and curl.
7. Evaluating Laplace & Inverse Laplace transforms.
8. Applying Laplace transform techniques to solve differential equations

Course Designers

1. Dr. C. Chandran – cchandran@ksrct.ac.in
2. Dr. K. Prabakaran – prabakaran@ksrct.ac.in

		Category	L	T	P	Credit
60 PH 004	**PHYSICS FOR COMPUTER TECHNOLOGY**	BS	3	0	0	3

Objective

- To instil knowledge on physics of semiconductors, determination of charge carriers and device applications
- To enable the students to correlate the theoretical principles with application oriented studies in optoelectronic materials
- To introduce the basics of laser, optical fiber and its applications in information science
- To understand the basic concepts of magnetic materials and its applications
- To inculcate an idea of significance of nano structures, ensuing nano device applications and quantum computing

Prerequisite

NIL

Course Outcomes

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

CO1	Acquire knowledge on basics of semiconductor physics and its applications in various devices	Understand
CO2	Apply the principles of LCD, photo detectors and optoelectronic devices for various engineering applications	Apply
CO3	Assess a strong foundational knowledge in lasers and fiber optics.	Understand
CO4	Impart knowledge on magnetic properties of materials and their storage.	Apply & Analyse applications in data
CO5	Recognize the basics of quantum structures and their applications and quantum computing	Understand basics of

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	3	3	2	3	2	2	3		2
CO2	3	3	3	2	2	3	2	-	2	2	2	2		2

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CO3	3	2	3	3	2	3	3	2	-	2	-	2		2
CO4	3	3	3	3	2	2	2	-	2	1	2	3		2
CO5	3	3	3	2	3	3	2	2	2	1	2	3	2	2
3- Strong; 2-Medium; 2-Low														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		End Sem Examination(Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	30	30
Analyse	0	0	10
Evaluate	0	0	0
Create	0	0	0

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K. S. Rangasamy College of Technology – Autonomous R2022								
60 PH 004– PHYSICS FOR COMPUTER TECHNOLOGY								
Common to (B.E. / B.Tech. CSE, IT, AI&DS & AI&ML)								
	Hours / Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total
II	3	0	0	45	3	40	60	100

SEMICONDUCTING MATERIALS* Intrinsic Semiconductors - Energy band diagram - direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors - extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion – Hall effect and devices – Ohmic contacts –Schottky diode.	[9]
OPTOELECTRONIC MATERIALS AND DEVICES* Photoconductive materials – Light Dependent Resistor – Working of LDR – Applications of LDR – Photovoltaic materials – Solar cell – Construction and working of a solar cell – Applications of solar cells – Liquid crystals – Liquid crystal Display (LCD) – Construction and advantages of LCD – Electro optic materials – Optoelectric effect - Electro-Optic Modulation.	[9]
PHOTONICS* Theory of laser - characteristics - Einstein's coefficients - population inversion - Nd-YAG laser, semiconductor laser - Applications of Lasers: Micro machining, measurement of long distances, IR Thermography, CD write devices and printers - Optical fibre- principle - types - material, mode, refractive index - Fibre loss - Expression for acceptance angle and numerical aperture. Application – Fiber Optic Communication.	[9]
MAGNETIC MATERIALS AND DEVICES* Origin of magnetic moment - Bohr magneton - Classification of magnetic materials - diamagnetism - paramagnetism - ferromagnetism - anti ferromagnetism - ferri magnetism - Domain theory - Hysteresis - soft and hard magnetic materials - examples and uses - Magnetic principle in computer data storage - Magnetic hard disc (Giant Magneto Resistance sensor).	[9]
NANOTECHNOLOGY AND QUANTUM COMPUTING* Introduction - Preparation of Nano materials: Top-down process: Ball Milling method - Bottom-up process: Vapour Phase Deposition method. Carbon Nano Tubes - structures, properties and preparation by electric arc method. MEMS/NEMS Devices and Applications- Quantum system for information processing - quantum states - classical bits - quantum bits - multiple qubits - quantum gates.	[9]
Total Hours	**45**

Text Book(s):

1. M. N. Avadhanulu, P. G. Kshirsagar, TVS Arun Murthy "A Text Book of Engineering Physics", S Chand Publications, New Delhi, 2022.
2. H. K. Malik, A. K. Singh "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2021
3. D. R. Joshi "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2010

Reference(s):

1. S.O. Pillai "A Textbook Of Engineering Physics" New Age International (P) Limited, New Delhi, 2014
2. B. B. Laud " Lasers and Non-Linear Optics" New Age International Publications, New Delhi, 2015
3. Palanisamy, P.K., "Physics of Materials", Scitech Publications, Chennai. 2012

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S. No.	Topic
1.0	**SEMICONDUCTING MATERIALS**

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1.1	Intrinsic Semiconductors

Course Contents and Lecture Schedule

1.2	Energy band diagram - direct and indirect band gap semiconductors
1.3	Carrier concentration in intrinsic semiconductors
1.4	extrinsic semiconductors
1.5	Carrier concentration in N-type & P-type semiconductors
1.6	Carrier transport in Semiconductor: random motion
1.7	Carrier transport in Semiconductor drift, mobility and diffusion
1.8	Hall effect and devices
1.9	Ohmic contacts –Schottky diode
2.0	**OPTOELECTRONIC MATERIALS AND DEVICES**
2.1	Photoconductive materials.
2.2	Light Dependent Resistor – Working of LDR – Applications of LDR
2.3	Photovoltaic materials
2.4	Solar cell – Construction and working of a solar cell
2.5	Applications of solar cells
2.6	Liquid crystals – Liquid crystal Display (LCD)
2.7	Construction and advantages of LCD
2.8	Electro optic materials – Optoelectric effect
2.9	Electro-Optic Modulation
3.0	**PHOTONICS**
3.1	Theory of laser - characteristics
3.2	Einstein's coefficients - population inversion
3.3	Nd-YAG laser, semiconductor laser
3.4	Applications of Lasers: Micro machining, measurement of long distances
3.5	Applications of Lasers IR Thermography, CD write devices and printers
3.6	Optical fibre- principle
3.7	Types - material, mode, refractive index - Fibre loss
3.8	Expression for acceptance angle and numerical aperture
3.9	Application – Fiber Optic Communication
4.0	**MAGNETIC MATERIALS AND DEVICES**
4.1	Origin of magnetic moment
4.2	Bohr magneton - Classification of magnetic materials
4.3	Diamagnetism - paramagnetism -
4.4	Ferromagnetism - anti ferromagnetism
4.5	Ferri magnetism - Domain theory
4.6	Domain theory - Hysteresis
4.7	Soft and hard magnetic materials - examples and uses
4.8	Magnetic principle in computer data storage
4.9	Magnetic hard disc (Giant Magneto Resistance sensor).
5.0	**NANOTECHNOLOGY AND QUANTUM COMPUTING**
5.1	Introduction

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5.8	Quantum system for information processing
5.9	Quantum states - classical bits - quantum bits - multiple qubits - quantum gates
5.2	Preparation of Nano materials
5.3	Top-down process: Ball Milling method
5.4	Bottom-up process: Vapour Phase Deposition method
5.5	Carbon Nano Tubes - structures, properties
5.6	Preparation by electric arc method
5.7	MEMS/NEMS Devices and Applications

Course Designers

1. Dr. V. Vasudevan - vasudevanv@ksrct.ac.in
2. Mr.S. Vanchinathan - vanchinathan@ksrct.ac.in
3. Dr. M. Malarvizhi - malarvizhi@ksrct.ac.in

60 CH 004	**ENGINEERING CHEMISTRY**	Category	L	T	P	Credit
		BS	3	0	0	3

Objective

- To help the learners, analyze the hardness of water and its removal.
- To analyze the concepts of electrochemistry and its applications.
- To recall the basics and application of chemical sensors.
- To endow an overview of smart materials
- To analyze the concepts of cheminformatics

Prerequisite

NIL

Course Outcomes

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

CO1	Identify the types of hardness of water and its removal.	Understand Apply & Analyse
CO2	Understand the concept of electrochemistry and its applications	Understand
CO3	Interpret the principles of sensors in various applications	Apply
CO4	Recognize the types of smart materials.	Understand
CO5	Interpret the structures by cheminformatics.	Understand & Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	1	2	3	-	2	-	2	-	-	2		2
CO2	2	2	3	2	2	2	-	-	2	2	2	2	2	
CO3	3	3	3	3	3	3	3	2	2	3	3	3	3	3
CO4	3	3	2	2	2	2	3	2	3	2	3	3	2	2
CO5	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3- Strong; 2-Medium; 1-Low														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests	

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	1	2	End Semester Examination(Marks)
Remember	10	10	20
Understand	20	20	40
Apply	20	20	20
Analyze	10	10	20
Evaluate	-	-	-
Create	-	-	-

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K. S. Rangasamy College of Technology – Autonomous R2022								
60CH004– ENGINEERING CHEMISTRY								
Common to (CSE, IT, AIDS & AIML)								
	Hours / Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total
II	3	0	0	45	3	40	60	100

WATER TECHNOLOGY* Introduction – Commercial and industrial uses of water - hardness - types – estimation of hardness by EDTA method- Internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) – external conditioning (Zeolite process, demineralization process) - Desalination methods (Reverse Osmosis and Electro dialysis). Flash evaporation.	[7]
ELECTROCHEMISTRY** Electrode potential - Nernst Equation - derivation and problems - reversible and irreversible cells - Types of Electrodes and its applications - reference electrodes - pH, conductometric and Potentiometric titrations - Principles of electro plating and electro less plating- fabrication process of Printed Circuit Board.	[9]
CHEMICAL SENSORS** Sensors – Chemical Sensors – Characteristics – Elements and Characterization - Potentiometric Sensors - Amperometric Sensors – Sensors Based on Electrochemical Methods – Electrochemical Biosensors – Optical Biosensors : Enzyme Sensors – Bio affinity Sensors - DNA Sensors. Chemical Sensors as Detectors and Indicators: Indicators for Titration Processes – Separation Methods. Nano technology in chemical sensors.	[10]
SMART MATERIALS** Liquid crystal polymers - Organic Light Emitting Diode (OLED) - [polythiopene] - working and applications – Conductive polymers and Semi conducting polymers: principle and applications- organic: Organic dielectric material [Polystyrene, PMMA]. Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium] - Conductive components: Indium tin oxide [properties and applications] - touch screen [resistive and capacitive] - magnetic storage [Iron oxide, cobalt alloy] – optical storage [photo chromic materials] - solid storage	[9]
CHEMINFORMATICS** Definition – coordinate –bonds –bond length – bond angles – torsional angles – chemical structure – definition - conformation – representation of structural information – linear format – SMILEYF notation – MOL format – PDB format – storage of structural data in a database - structural keys – finger print canonical structure using chemdraw – similarity search –sub structure search - application of cheminformatics in drugs designing.	[10]
Total Hours	**45**

Text Book(s):

1.	O.G. Palanna “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.

Reference(s):

1.	Jain. P.C. and Monica Jain, “Engineering Chemistry”, Dhanpatrai publishing co. New Delhi, 14th edition, 2015.
2.	Peter Grundler “Chemical Sensors” ISBN 978-3-540-45742-8 Springer Berlin Heidelberg New York, 2007
3.	O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.
4.	Shikha Agarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, 2nd Edition, 2019.

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*** SDG 6: Improve Clean Water and Sanitation**
**** SDG 9 Industry, innovation and infrastructure**

Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Water Technology**	
1.1	Introduction - Commercial and Industrial uses of water	1
1.2	Hardness - types	1
1.3	Estimation of Hardness of ater by EDTA method	1
1.4	Internal conditioning (Colloidal, Phosphate, Calgon and Carbonate)	1
1.5	External conditioning (Zoelite process & Demineralization process)	1
1.6	Desalination methods (Reverse Osmosis and Electrodialysis)	1
1.7	Flash Evaporation	1
2.0	**ELECTROCHEMISTRY**	
2.1	Electrode potential - Nernst Equation - derivation and problems	2
2.2	Reversible and irreversible cells	1
2.3	Types of Electrodes and its applications	1
2.4	Reference electrodes - pH	1
2.5	Conductometric and Potentiometric titrations	1
2.6	Principles of electro plating and electro less plating-	2
2.7	Fabrication process of Printed Circuit Board.	1
3.0	**CHEMICAL SENSORS**	
3.1	Sensors - Chemical Sensors - Characteristics	1
3.2	Elements and Characterization	1
3.3	Potentiometric Sensors, Amperometric Sensors	1
3.4	Sensors Based on Electrochemical Methods	1
3.5	Electrochemical Biosensors	1
3.6	Optical Biosensors : Enzyme Sensors - Bio affinity Sensors	1
3.7	DNA Sensors. Chemical Sensors as Detectors and Indicators	1
3.8	Indicators for Titration Processes	1
3.9	Separation Methods. Nano technology in chemical sensors.	2
4.0	**SMART MATERIALS**	
4.1	Liquid crystal polymers - Organic Light Emitting Diode (OLED) - [polythiopene] - working and applications	2
4.2	Conductive polymers and Semi conducting polymers: principle and applications	2
4.3	Organic: Organic dielectric material [Polystyrene, PMMA].	1
4.4	Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium]	2
4.5	Conductive components: Indium tin oxide [properties and applications] - touch screen [resistive and capacitive]	1
4.6	Magnetic storage [Iron oxide, cobalt alloy]	1
4.7	Optical storage [photo chromic materials] - solid storage.	1
5.0	**CHEMINFORMATICS**	
5.1	Definition - coordinate -bonds -bond length - bond angles - torsional angles - chemical structure	2

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5.2	Definition - conformation - representation of structural information	2
5.3	Linear format - SMILEYF notation - MOL format - PDB format -	1
5.4	Storage of structural data in a database - structural keys	2
5.5	Finger print -canonical structure using chemdraw	1
5.6	Similarity search -sub structure search	1
5.7	Application of chem-informatics in drugs designing	1

Course Designers

1. Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
2. Dr.K.PRABHA – prabhak@ksrct.ac.in
3. Dr.S.MEENACHI – meenachi@ksrct.ac.in

60 IT 001	**PYTHON**	Category	L	T	P	Credit
		PC	3	2	0	4

Objective

- To know the basics of programming in Python
- To understand modules and functions To study files and exception handling To recognize the basic concepts of NumPy
- To create layouts using graphical tools

Prerequisite

Basic Knowledge of mathematics and programming

Course Outcomes

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

CO1	Apply the basics of Python Programming for problem-solving	Apply
CO2	Develop programs using modules and functions	Apply
CO3	Implement programs using file and exception handling	Apply
CO4	Create a solution for real world problems using NumPy arrays	Apply
CO5	Design layouts with GUI toolkits using Tkinter	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3					2	2	2	2	3	3
CO2	3	2	3	2					2	2	2	2	3	3
CO3	3	2	3	3					2	2	2	2	3	3
CO4	3	2	3	3					2	2	2	2	3	3
CO5	3	2	3	3					2	2	2	2	3	3

3- Strong;2-Medium;1-Some

Assessment Pattern

	Continuous Assessment Tests	

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Cognitive Levels	1	2	End Semester Examination(Marks)
Remember (Re)	10	10	10
Understand (Un)	20	10	20
Apply (Ap)	30	30	60
Analyse (An)	00	00	00
Evaluate (Ev)	00	00	00
Create (Cr)	00	10	10

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60 IT 001 – Python Programming

Common to CS , IT, AD

Semester	Hours / Week L	T	P	Total hrs	Credit C	Maximum Marks CA	E	Total
II	3	1	0	60	4	40	S60	100

Introduction Introduction to Python – Strings – List – Tuples - Dictionaries – Basic Operators – Decision Making – Loops	[9]
Modular Design Modules – Python module – Namespaces – Importing modules – Loading and Execution – Program Routine – Functions – Parameter Passing - Types – Recursion	[9]
Files and Exception Handling Introduction - Data Streams - Creating own data Streams - Access Modes - Writing Data to a File – Reading Data From a File - Additional File Methods- Exceptions – Types, Handling Exceptions, User Defined Exceptions	[9]
NumPy Basics NumPy Data Types – NumPy Arrays - Creating, Adding items, Removing items, Printing Items, Sorting items, Reshaping, Indexing and Slicing	[10]
GUI Programming and Graphics GUI Programming toolkits – Introduction to Tkinter – Creating GUI widgets – Resizing – Configuring widget options – Creating Layouts – Radio buttons – Check boxes – Dialog boxes – Drawing using Turtle	[8]
Total Hours:45	45

Text Book(s):

1. John Paul Mueller, “Beginning Programming with Python”, 2nd Edition, Wiley India Pvt Ltd, 2014
2. Usman Malik, “Python NumPy for Beginners: NumPy Specialization for data Scientists”, AI Publishing, 2021

Reference(s):

1. Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education, 2013
2. Allen B. Downey, “Think Python: How to Think like a Computer Scientist”, 2nd Edition, O’Reilly Publishers, 2016.
3. Charles Dierbach, “Introduction to Computer Science using Python”, 2nd Edition, Wiley India Pvt Ltd, 2015
4. Dr. R.Nageswara Rao “Core Python Programming”, DreamTech Press, 2nd Edition, 2018

Course Contents and Lecture Schedule

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S.No.	Topic	No.of Hours
1	**Introduction**	
1.1	Introduction to Python	1
1.2	Basic Data Types	1
1.3	Strings	1
1.4	List	1
1.5	Tuples	1
1.6	Dictionaries	1
1.7	Basic Operators	1
1.8	Decision Making Statements	1
1.9	Looping Statements	1
2	**Modular Design**	
2.1	Modules	1
2.2	Python module	1
2.3	Namespaces	1
2.4	Importing modules	1
2.5	Loading and Execution	1
2.6	Program Routine	1
2.7	Functions	1
2.8	Parameter Passing Types	1
2.9	Recursion	1
3	**Files and Exception Handling**	
3.1	Introduction	1
3.2	Data Streams	1
3.3	Creating own data Streams	1
3.4	Access Modes	1
3.5	Writing Data to a File, Reading Data From a File	1
3.6	Additional File Methods	1
3.7	Exceptions and Types	1
3.8	Handling Exceptions	1
3.9	User Defined Exceptions	1
4	**NumPy Basics**	
4.1	NumPy Data Types	1
4.2	NumPy Arrays	1
4.3	Creating Arrays	1
4.4	Adding items into Arrays	1
4.5	Removing items	1
4.6	Printing Items	1
4.7	Sorting items	1

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4.8	Reshaping	1
4.9	Indexing and Slicing	1
5	**GUI Programming and Graphics**	
5.1	GUI Programming toolkits	1
5.2	Introduction to Tkinter	1
5.3	Creating GUI widgets	1
5.4	Resizing	1
5.5	Configuring Widget options	1
5.6	Creating Layouts	1
5.7	Radio buttons & Check boxes	1
5.8	Dialog boxes	1
5.9	Drawing using Turtle	1
	Total	**45**

Course Designers

1. Dr.C,Nallusamy - nallusamyc@ksrct.ac.in
2. Mr.R.T.Dinesh Kumar – dineshkumarrt@ksrct.ac.in

60 AB 001	National Cadet Corps - AIR WING	Category	L	T	P	Credit
		-	2	0	2	3

Objective

- To designed especially for NCC Cadets to educate basic military knowledge
- 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

Prerequisite

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

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						3	3	3	3	3				
CO2					3									
CO3	3	2	1	1										

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CO4	3	2	1	1										
CO5	3	2	1	1										
1 - Slight, 2 - Moderate, 3 - Substantial, BT- Bloom‟s Taxonomy														

Assessment Pattern

Bloom's Category	Continuous Assessment (Marks)			End Sem Examination (Marks)
	DST(20)	AM(20)	SBM(10)	
Remember	10	10	00	40
Understand	10	10	10	60
Apply	00	00	00	00
Analyse	00	00	00	00
Evaluate	00	00	00	00
Create	00	20	00	00

DST - Drill Square Test AM - Aero Modeling SBM - Swachh Bharat Mission

K.S.Rangasamy College of Technology – Autonomous R2022								
60 AB 001 - National Cadet Corps - AIR WING								
Common to ALL Branches								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	2	0	2	45	3	50	50	100
Objective(s)	• 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							
Course Outcomes	**At the end of the course, the student 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. **CO2:** Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling **CO3:** Illustrate various forces and moments acting on aircraft **CO4:** Outline the concepts of aircraft engine and rocket propulsion **CO5:** Design, build and fly chuck gliders/model airplanes and display static models.							
Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.								
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.								[9]
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)								[9]
Principles of Flight Laws of motion- Forces acting on aircraft- Bernoulli‟s theorem- Stalling-Primary control surfaces- Secondary control surfaces- Aircraft recognition.								[9]

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Aero Engines Introduction of Aero engine- Types of engine- Piston engine- Jet engines- Turboprop engines- Basic Flight Instruments- Modern trends.	[9]
Aero Modeling History of Aero modeling- Materials used in Aero modeling- Types of Aero models – Static Models- GlidersControl line models- Radio Control Models- Building and Flying of Aero models.	[9]
Total Hours	45

Text Books:	
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.

ASSESSMENT PATTERN - THEORY					
Test / Bloom's Category*	**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 Designers

1. Flt Lt V.R.SADASIVAM - sadasivam@ksrct.ac.in

		Category	L	T	P	Credit
60 AB 002	National Cadet Corps - Army Wing	-	2	0	2	3

Objective

- 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.

Prerequisite

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

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CO2	Demonstrate Health Exercises, the sense of discipline, improve bearing, smartness, turn out, 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	Analyse
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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)		End Sem Examination(Marks)
	1	2	
Remember	10	10	20
Understand	20	10	20
Apply	20	20	20
Analyse	10	10	20
Evaluate	0	0	20
Create	0	0	20

Syllabus

K.S.Rangasamy College of Technology – Autonomous R2022								
60 AB 002 – National Cadet Corps (Army Wing)								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	2	0	2	45	3	50	50	100

NCC Organization & 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. National Integration - Unity in diversity- contribution of youth in nation building- national integration council- Images and Slogans on National Integration	[09]
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 arms- ceremonial drill- guard mounting.(WITH DEMONSTRATION).	[09]

Passed in BoS Meeting held on 02/12/2023

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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.	[09]
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 - MGNREGA-SGSYJGSY-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	[09]
Specialized Subject (ARMY) Basic structure of Armed Forces- Military History – War heroes- battles of Indo-Pak war- Param Vir Chakra- Career in the Defence forces- Service tests and interviews.	[09]
Total Hours	**45**

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

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**NCC Organization & National Integration**	
1.1	NCC Organization	1
1.2	History of NCC and NCC Organization	1
1.3	NCC Training and NCC Uniform	1
1.4	Promotion of NCC cadet, Aim and advantages of NCC Training	1
1.5	NCC badges of Rank, Honors' and Awards, Incentives for NCC cadets by central and state govt	2
1.6	National Integration, Unity in diversity	1
1.7	Contribution of youth in nation building	2
1.8	National integration council	1
1.9	Images and Slogans on National Integration	2
2	**Basic Physical Training & Drill**	
2.1	Basic physical Training – various exercises for fitness (with Demonstration)-	3
2.2	Food – Hygiene and Cleanliness .	1
2.3	Drill- Words of commands- position and commands- sizing and forming-	3
2.4	saluting- marching- turning on the march and wheeling-	3

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2.5	saluting on the march- side pace, pace forward and to the rear- marking time-	3
2.6	Drill with arms- ceremonial drill- guard mounting.(WITH DEMONSTRATION)	3
3	**Weapon Training Main Parts of a Rifle**	
3.1	Characteristics of .303 rifle	1
3.2	Characteristics of .22 rifle	2
3.3	Loading and unloading, position and holding safety precautions	2
3.4	Range procedure, MPI and Elevation-	2
3.5	Group and Snap shooting Long/Short range firing (WITH PRACTICE SESSION)	3
3.6	Characteristics of 5.56 mm rifle	1
3.7	Characteristics of 7.62mm	1
4	**Social Awareness and Community Development**	
4.1	Aims of Social service, Various Means and ways of social services	1
4.2	Family planning , HIV and AIDS	1
4.3	Cancer its causes and preventive measures	1
4.4	NGO and their activities, Drug trafficking	1
4.5	Rural development programmes	1
4.6	MGNREGA, SGSY, JGSY, NSAP, PMGSY	2
4.7	Terrorism and counter terrorism, Corruption	1
4.8	female foeticide, dowry, child abuse	1
4.9	RTI Act, RTE Act	1
4.10	Protection of children from sexual offences act	1
4.11	Civic sense and responsibility	1
5	**Specialized Subject (ARMY)**	
5.1	Basic structure of Armed Forces	1
5.2	Military History, War heroes	1
5.3	battles of Indo - Pak war	1
5.4	Param Vir Chakra,	1
5.5	Career in the Defence forces	2
5.6	Service tests and interviews.	2
	Total	60

Course Designer

CT E CHANDRA KUMAR - chandrakumar@ksrct.ac.in

60 GE 001	**Heritage of Tamils** (Common to all Branches)	Category	L	T	P	Credit
		GE	1	0	0	1

Objectives:

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

- 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.

Prerequisite:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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-Low

Syllabus

K. S. Rangasamy College of Technology – Autonomous R2022

60 GE 001 - Heritage of Tamils

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

Language and Literature*

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. 3

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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
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.	தமிழக வரலாறு - மக்களும் பண்பாடும் கக. கக . பிள்ளை (வவியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் - முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி - ளவளக நதிக்களரயில் சங்ககால நகர நாகாீகம் (வதால்லியல் துளை வவியீடு).
4.	வபாருளந - ஆற்ைங்களர நாகாீகம் (வதால்லியல் துளை வவியீடு).
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).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

* SDG:4- Quality Education

60 GE 001	தமிழர் மரபு (அளனத்து துளைகளுக்கும் வபாதுவானது)

Category	L	T	P	Credit
GE	1	0	0	1

பாடத்தின் கநாக்கங்கள்:

- தமிழ் வமாழியின் இலக்கணச் வசிளவக் கற்றுணர்தல்.
- தமிழர் பண்பாட்டின் நுண்களலகள் பற்ைிய ஒரு மீள்பார்ளவ.

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

- இந்திய சுதந்திரப் கபாராட்டத்தில் தமிழர்கின் பங்கிப்ளப உணருதல்.

முன்கூட்டிய துளைசார் அிவு:

கதளவ இல்ளல

பாடம் கற்ைதின் விளைவுகள்:

பாடத்ளத வவற்ைிகரமாக கற்று முடித்த பின்பு, மாணவர்கால் முடியும் விளைவுகள்

CO1	தமிழ் வமாழியின் வசந்தண்ளம மற்றும் இலக்கியம் குைித்த வதரிதல்.	புரிதல்
CO2	தமிழர்கின் சிற்பக்களல, ஓவியக்களல மற்றும் இளசக்கருவிகள் குைித்த வதிவு.	புரிதல்
CO3	தமிழர்கின் நாட்டுப்புைக்களலகள் மற்றும் வீரவிளையாட்டுகள் குைித்த வதிவு.	புரிதல்
CO4	தமிழர்கின் திளணக் ககாட்பாடுகள், சங்ககால வணிகம் மற்றும் கசாழர்கின் வவற்ைிகள் குைித்த தகவல்கள்.	புரிதல்
CO5	இந்திய கதசிய இயக்கம், சுயமரியாளதளய இயக்கம் மற்றும் சித்த மருத்துவம் பற்ைிய புரிதல்.	புரிதல்

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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-Low														

Syllabus

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60 GE 001 - தமிழர் மரபு

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

வமாழி மற்றும் இலக்கியம்:
இந்திய வமாழிக் குடும்பங்கள் – திராவிட வமாழிகள் – தமிழ் ஒரு வசம்வமாழி – தமிழ் வசவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ை தன்ளம – சங்க இலக்கியத்தில் பகிர்தல் அைம் – திருக்குைளில் கமலாண்ளமக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள் - தமிழகத்தில் சமண வபௌத்த சமயங்கின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்ைிலக்கியங்கள் 3 - தமிழில் நவீன இலக்கியத்தின் வைர்ச்சி – தமிழ் இலக்கிய வைர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகிகயாரின் பங்கிப்பு.

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

மரபு – பாளை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வளர–சிற்பக் களல: நடுகல் முதல் நவீன சிற்பங்கள் வளர – ஐம்வபான் சிளலகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் ளகவிளனப் வபாருட்கள், வபாம்ளமகள் - கதர் வசய்யும் களல – சுடுமண் சிற்பங்கள் – நாட்டுப்புைத் வதய்வங்கள் – குமரிமுளனயில் திருவள்ளுவர் சிளல – இளசக் கருவிகள் – மிருதங்கம், பளை, வீளண, யாழ், நாதஸ்வரம் – தமிழர்கினின் சமூக வபாருைாதார வாழ்வில் ககாவில்கினின் பங்கு.	3
நாட்டுப்புைக் களலகள் மற்றும் வீர விளையாட்டுகள்: வதருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், கதால்பாளவக் கூத்து, சிலம்பாட்டம், வைரி, புலியாட்டம், தமிழர்கினின் விளையாட்டுகள்.	3
தமிழர்கினின் திளணக் ககாட்பாடுகள்: தமிழகத்தின் தாவரங்களும், விலங்குகளும் – வதால்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புைக் ககாட்பாடுகள் - தமிழர்கள் கபாற்ைிய அைக்ககாட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்திவும், கல்வியும் - சங்ககால நகரங்களும் துளை முகங்களும் - சங்க காலத்தில் ஏற்றுமதி மற்றும் இைக்குமதி – கடல்கடந்த நாடுகில் கசாழர்கினின் வவற்ைி.	3
இந்திய கதசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்கினின் பங்கிப்பு: இந்திய விடுதளலப்கபாரில் தமிழர்கினின் பங்கு – இந்தியாவின் பிைப்பகுதிகில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாளத இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வவட்டுகள், ளகவயழுத்துப்படிகள் - தமிழ்ப் புத்தகங்கினின் அச்சு வரலாறு.	3
Total Hours	**15**

Text Book(s):

1.	தமிழக வரலாறு - மக்களும் பண்பாடும் கக. கக . பிள்ளை (வவியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் - முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி - ளவளக நதிக்களரயில் சங்ககால நகர நாகாீகம் (வதால்லியல் துளை வவியீடு).
4.	(வதால்லியல் துளை வவியீடு). வபாருளந - ஆற்ைங்களர நாகாீகம்
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).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

		Category	L	T	P	Credit
60 CP 0P2	**ENGINEERING PH LABORATOR**	BS	0	0	4	2

Objective

- 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 analyze the behavior and characteristics of various materials for its optimum utilization

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- Test the knowledge of theoretical concepts and develop the experimental skills of the learners.
- To facilitate data interpretation and expose the learners to various industrial and environmental applications

Prerequisite

NIL

Course Outcomes

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

CO1	Analyze the properties of semiconducting materials for its potential applications	Analyze
CO2	Realize the interference and diffraction phenomena by Air wedge and laser experiments	Apply
CO3	Recognize the magnetic properties by experimental verification	Apply
CO4	Apply different techniques of qualitative and quantitative chemical analysis to generate experimental skills and apply these skills to various analyses	Apply
CO5	Explain and analyze instrumental techniques for chemical analysis	Analyze

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	3	3	2	3	2	2	3		2
CO2	3	3	3	2	2	2	2	2	1	3	2	1		
CO3	3	2	3	3	3	2	3	2	2	2	1	2		2
CO4	3	2	2	2	3	2	2	-	-	-	-	2	3	2
CO5	3	2	2	-	3	2	2	-	-	-	-	2	2	
3- Strong; 2-Medium; 1-Low														

PHYSICS LABORATORY (CSE, IT, EEE, ECE)

List of Experiments*

1. Determination of Hall coefficient of a given semiconductor and its charge carrier density
2. V-I Characteristics of Zener diode and Solar cell
3. Air wedge - Determination of thickness of a thin sheet/wire
4. a) Laser- Determination of the wave length of the laser using grating
   b) Optical fibre -Determination of numerical aperture and acceptance angle 5.

Magnetic field along the axis of current carrying coil – Stewart and Gee.

*** SDG: 4- Quality Education**

Course Designers

Dr. V. Vasudevan
Mr.S. Vanchinathan
Dr. M. Malarvizhi

CHEMISTRY LABORATORY (CSE, IT, EEE, ECE)

List of Experiments*

1. Estimation of HCl by pH meter.
2. Estimation of mixture of acids by conductivity meter
3. Determination of ferrous ion by Potentiometric titration.

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4. Determination of corrosion by weight loss method.
5. Estimation of ferrous ion by spectrophotometer.

*** SDG 6: Improve Clean Water and Sanitation**
*** SDG 9: Industry, Innovation, and Infrastructure**
*** SDG 8: Decent Work and Economic Growth**

Case studies/Activity report

1. Activity using chemdraw software.
2. Activity report on cheminformatic structure.
3. Case study on ion selective electrodes.
4. Assembling of cell or battery.

Course Designers

1. Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
2. Dr.B.SRIVIDHYA – srividhyaab@ksrct.ac.in
3. Dr.K.PRABHA – prabhak@ksrct.ac.in
4. Dr.S.MEENACHI – meenachi@ksrct.ac.in

60 IT 0P1	**PYTHON PROGR**	Category	L	T	P	Credit
		PC	0	0	4	2

Objective

- To gain the knowledge in Python Programming Language
- To understand the concepts decision making and looping statements
- To implement functions with the aid of modules using exception handling
- To implement the concepts of NumPy Arrays
- To create layouts using graphical modules such as Tkinter and Turtle

Prerequisite

Basic knowledge of mathematics and programming

Course Outcomes

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

CO1	Implement the basics and data structures of Python programming	Apply
CO2	Implement the concepts of decision making and looping statements	Apply
CO3	Develop programs using functions and modules with exception handling	Apply
CO4	Create programs using NumPy arrays	Apply
CO5	Design layouts with GUI toolkits using Tkinter	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3					2	2	2	2	3	3

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CO2	3	2	3	2					2	2	2	2	3	3
CO3	3	2	3	3					2	2	2	2	3	3
CO4	3	2	3	3					2	2	2	2	3	3
CO5	3	2	3	3					2	2	2	2	3	3
3- Strong; 2-Medium; 1-Low														

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60 IT 0P1–Python Programming Laboratory							
Common to CS, IT, AD							
Semester	Hours / Week			Total hrs.	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
II	0	0	4	60	2	60	40	100

1. Implement the basic concepts of Python
2. Implement List, Tuples, Dictionary, and String
3. Implement the concept of decision-making and looping statements.
4. Working with functions and modules
5. Implement File operations
6. Build a program with Exception handling
7. Perform various NumPy operations and special functions
8. Design windows using Tkinter
9. Draw shapes and images using Turtle
10. Mini Project

Course Designers

1. Dr.C,Nallusamy - nallusamyc@ksrct.ac.in
2. Mr.R.T.Dinesh Kumar – dineshkumarrt@ksrct.ac.in

60 CS 2P1	**WEB D**	Category	L	T	P	Credit
		PC	0	0	2	1

Objective

- To introduce the fundamentals of HTML and the principles of web design
- To construct basic websites using HTML and Cascading Style Sheets
- To develop modern interactive web applications using ReactJS

Prerequisite

Basic knowledge of programming

Course Outcomes

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

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CO1	Describe the concepts of HTML	Apply
CO2	Develop the web pages using HTML	Apply
CO3	Apply CSS features with different layouts	Apply
CO4	Use the ReactJS to develop the dynamic web pages	Apply
CO5	Develop interactive web applications	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3					2	2	2	2	3	3
CO2	3	2	3	2					2	2	2	2	3	3
CO3	3	2	3	3					2	2	2	2	3	3
CO4	3	2	3	3					2	2	2	2	3	3
CO5	3	2	3	3					2	2	2	2	3	3

3- Strong;2-Medium;1-Some

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember (Re)	00	00	00
Understand (Un)	00	00	00
Apply (Ap)	60	50	50
Analyse (An)	00	00	00
Evaluate (Ev)	00	00	00
Create (Cr)	00	10	10

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60 CS 2P1 – Web Development

CS

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	2	15	1	60	40	100

HTML* Web Programming Introduction – HTML Introduction – Basic Formatting Tags - Lists – Images- Hyperlink – Table –Iframe - Form – Headers	[5]
Cascading Style Sheets* CSS Introduction - Syntax - Selectors - Color Background Cursor - Text Fonts – Lists - Tables - Box Model - Display Positioning - CSS Floats	[5]
React JS* React JS – Introduction – Installation – Architecture – Components – Styling - Properties (props) - Event management - State Management - Http Client Programming - Form Programming	[5]
Total Hours	15
Text Book(s):	

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1.	Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India Private Limited, 2011
2.	Robert W.Sebesta, Programming the World Wide Web, 7th edition, Pearson Education, 2013
3.	Alex Banks, Eve Porcello, "Learning React", O'Reilly Media, Inc, 2nd Edition, 2020

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Reference(s):	
1.	Kogent Learning Solutions Inc., Web Technologies Black Book, Dreamtech Press, 2009
2.	Joel Sklar, Principles of Web Design, Cengage Learning, 6th Edition, 2015
3.	Internet and World Wide Web How to program, Paul J. Deitel, Harvey M. Deitel, and Abbey Deitel, 5th Edition, Pearson Education, 2011
4.	https://www.w3schools.com/js/

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction**	
1.1	Introduction to HTML	1
1.2	Basic Formatting Tags	1
1.3	Lists - Images	1
1.4	Hyperlink	1
1.5	Table - Iframe - Form – Headers	1
2	**Cascading Style Sheets**	
2.1	CSS Syntax	1
2.2	Selectors	1
2.3	Color Background Cursor - Text Fonts – Lists - Tables	1
2.4	Box Model - Display Positioning	1
2.5	CSS Floats	1
3	**React JS**	
3.1	React JS – Introduction – Installation	1
3.2	Architecture – Components	1
3.3	Styling - Properties (props)	1
3.4	Event management - State Management	1
3.5	Http Client Programming - Form Programming	1
	Total	**15**

Course Designers

1. Dr. K. Prasanth - prasanth@ksrct.ac.in

60 CG 0P1	**CAREER SK**	Category	L	T	P	Credit
		CG	0	0	2	1

Objective

- 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

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- 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

.

Prerequisite

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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		
CO5								2	3	3	2	3	2	2

3- Strong; 2-Medium; 1-Some

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60 CG 0P1 - Career Skill Development - I								
Common to All Branches								
	Hours / Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	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]

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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 & technical 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 / Notetaking; 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 – Error Detection – Spelling Test – Sentence Improvement - Preposition	[6]
Total Hours	**30**

Text Book(s):

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**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1		
1.1	Listening for general information and Specific details	1
1.2	Listening to podcasts, documentaries and interviews with celebrities	2
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	1
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

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2.5	Group discussions	1
3	**Reading**	
3.1	Loud reading vs Silent reading, Skimming & Scanning of passages	2
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	1
3.5	Reading newspaper articles and journal reports	1
4	**Writing**	
4.1	Writing letters – informal and formal	2
4.2	Paragraph Texting	1
4.3	Definitions and instructions	1
4.4	Note-making / Note-taking	1
4.5	Essay texting	1
5	**Verbal Ability**	
5.1	Reading Comprehension (MCQs) and Cloze Test	2
5.2	Sequencing of sentences	1
5.3	Paraphrasing and Summarizing	1
5.4	Error Detection and Spelling Test	1
5.5	Prepositions	1
	Total	**30**

Course Designer

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

60 MA 010	MATHEMATICAL STATISTICS AND NUMERICAL METHODS	Category	L	T	P	Credit
		BS	3	1	0	4

Objective

- To learn basic concepts of descriptive statistics
- To familiarize various methods in hypothesis testing
- To get exposed to the fundamentals of analysis of variances
- To get exposed to various techniques to solve equations numerically
- To understand the concepts of interpolation and numerical integration

Prerequisite

NIL

Course Outcomes

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

CO1	Compute measures of central tendency, measures of dispersion and correlation coefficient.	Remember, Understand, Apply
CO2	Apply Student's t test, F test and Chi-square test for testing the statistical hypothesis.	Remember, Understand, Apply
CO3	Apply the concepts of ANOVA to test the equality of means for more than two populations.	Remember, Understand, Apply

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CO4	Employ the various iteration techniques for solving algebraic, transcendental and system of linear equations.	Remember, Understand, Apply
CO5	Apply different techniques to find the intermediate values and to evaluate definite integrals.	Remember, Understand, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2						2	2		3
CO2	3	3	3	3	2						2	2		3
CO3	3	3	3	3	2						2	2		3
CO4	3	3	2	3	2							2		2
CO5	3	3	2	3	2							2		2

Assessment Pattern

Bloom'sCategory	Continuous Assessment			End Sem
	Tests (Marks)		Model Exam (Marks)	Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	20	20
Apply (Ap)	40	40	70	70
Analyze (An)	0	0	0	0
Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

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60 MA 010 – Mathematical Statistics and Numerical Methods

Common to CSE & IT

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

Empirical Statistics **Measures of central tendency***: Mean, Median and Mode – Measures of dispersion: Range, Quartile deviation and Standard deviation – Measures of skewness: Bowley's co-efficient of skewness and Pearson's co-efficient of skewness – Karl Pearson's co-efficient of correlation.	[9]
Testing of Hypothesis* Type I and Type II errors - Test of significance of small samples : Student's 't' test for single mean - Difference of means – F- test – Chi-square test - Goodness of fit - Independence of attributes.	[9]
Design of Experiments* Analysis of variance: One way classification – Completely randomized design – Two way classification – Randomized block design – Latin square design.	[9]
Solution of Equations and Eigen Value Problems Algebraic and Transcendental equations - Newton Raphson method –Regula Falsi method- Gauss elimination method – GaussJordan method– Iterative methods: GaussJacobi method – GaussSeidel method – Eigen value of a matrix by Power method. .	[9]

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Interpolation and Numerical Integration **Lagrange's and Newton's divided difference interpolation (unequal intervals)- Newton's forward and backward interpolation (equal intervals)** **- Numerical integration: Two point and three point Gaussian quadrature –Trapezoidal, Simpson's1/3 and 3/8 rule (single integral).	[9]
Total Hours: 45 + 15(Tutorial)	**60**

Text Book(s):	
1.	Gupta S P, "Statistical Methods", Sultan Chand & son 46th Revised Edition, New Delhi, 2021.
2	Faires, J.D. and Burden, R., "Numerical Methods", Brookes / Cole (Thomson Publications), 4th Edition, New Delhi, 2011.
Reference(s):	
1.	V. K. Kapoor and S.C.Gupta , "Fundamentals of Mathematical Statistics ", Sultan Chand & sons 12th Edition, New Delhi, 2020.
2.	Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, 8th Edition, Asia, 2023
3.	Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
4.	P Kandasamy, K Thilagavathy and K Gunavathi, 'Numerical Methods', S.Chand & Company Ltd, New Delhi, 3rd Edition, 2003

*** SDG: 4-Quality Education,**

****SDG:9 Industry, Innovation, and Infrastructure**

List of MATLAB Programs:

1. Calculate mean, median, mode and range for discrete frequency distribution.
2. Apply Student's t - test, F- test and Chi-square test to real dataset.
3. Perform One-Way ANOVA.
4. Visualize the iterative methods for solving linear system of equations.
5. Numerical integration by Trapezoidal and Simpson's rules.

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Course Contents and Lecture Schedule

S. No.	Topic	No. of Hours
1	**Empirical Statistics**	
1.1	Measures of central tendency: Mean and Median	2
1.2	Measures of central tendency Mode	1
1.3	Measures of dispersion: Range	1
1.4	Measures of dispersion: Quartile deviation and Standard deviation	2
1.5	Measures of skewness: Bowley's co-efficient of skewness	1
1.6	Measures of skewness: Pearson's co-efficient of skewness	1
1.7	Karl Pearson's co-efficient of correlation.	1
1.8	Tutorial	3
2	**Testing of Hypothesis**	
2.1	Type I and Type II errors	1
2.2	Test of significance of small samples: Student's 't' test for single mean	2
2.3	Test of significance of small samples: Student's 't' test for difference of means	2
2.4	F- test	1
2.5	Chi-square test for Goodness of fit	1
2.6	Chi-square test for Independence of attributes	2
2.7	Tutorial	3
3	**Design of Experiments**	
3.1	Analysis of variance: One way classification	2
3.2	Completely randomized design	1
3.3	Two-way classification	2
3.4	Randomized block design	2
3.5	Latin square design.	2
3.6	Tutorial	3
4	**System of Linear equations and Eigen value problems**	
4.1	Algebraic and transcendental equations	1
4.2	Newton Raphson method	1
4.3	Regula-Falsi method	2
4.4	Gauss Elimination method	1
4.5	Gauss Jordan method	1
4.6	Iterative methods of Gauss Jacobi and Gauss Seidel	2
4.7	Eigen values of a matrix by power method	1
4.8	Tutorial	3
5	**Interpolation and Numerical Integration**	
5.1	Lagrange's interpolation	1
5.2	Newton's divided difference interpolation	1
5.3	Newton's forward and backward interpolation	2
5.4	Numerical integration:Two point and three point Gaussian quadratures	1
5.5	Trapezoidal rule	1
5.6	Simpson's 1/3 rule,	1
5.7	Simpson's 3/8 rule	2
5.8	Tutorial	3
	Total	60

Course Designer

1. Dr. S.Muthukumar –muthukumar@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023

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BoS Chairman

60 CS 003	DATA STRUCTURES	Category	L	T	P	Credit
		PC	3	0	0	3

Objective

- To choose the appropriate data structure for a specified application
- To design and implement abstract datatypes such as Linked List, Stack, Queue and Trees
- To Learn and implement the Hashing techniques
- To design a Priority Queue ADT and its applications
- To demonstrate various Sorting, Searching and Graph algorithms

Prerequisite

Basic knowledge of mathematics and programming language in C

Course Outcomes

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

CO1	Apply linear data structures to solve real time applications	Apply
CO2	Experiment with trees and its operations	Apply
CO3	Apply algorithm for solving problems like Sorting and Searching	Apply
CO4	Implement Priority Queue with its operations and Hashing Techniques	Apply
CO5	Explain Shortest Path and Minimum Spanning Tree algorithms and Biconnectivity	Apply, Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2			2	2			2	3	3
CO2	3	3	2	3	2			2	3			2	3	3
CO3	3	3	2	2	2	2		2	3	2		2	3	3
CO4	3	3	2	3	2			3	2	2		2	3	3
CO5	3	3	2	3	2	2	2	3	3	2		2	3	3
3- Strong;2-Medium;1-Some														

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	30	30	40
Analyse	10	10	20
Evaluate	-	-	-
Create	-	-	-

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BoS Chairman

K.S. Rangasamy College of Technology–Autonomous R2022								
60 CS 003 – DATA STRUCTURES								
Common to CS, IT, AD, AM, EE								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

Lists, Stacks and Queues* Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT.	[12]
Trees* Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – B–Trees – B+ Trees.	[9]
Sorting and Searching* Preliminaries – Insertion Sort – Shell Sort – Heap Sort – Merge Sort – Quick Sort – External Sorting – Searching: Sequential Search - Binary Search – Hashed List Searches.	[8]
Hashing and Priority Queues (Heaps) **Hashing – Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – Priority Queues (Heaps)*** – Model – Simple Implementations –Binary Heap–Applications of Priority Queues – d-Heaps.	[7]
Graphs* Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm, Kruskal's Algorithm – Applications of DepthFirst Search – Undirected Graphs – Biconnectivity.	[9]
Total Hours	45

Text Book(s):

1.	M.A.Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education Asia, 2008.
2.	Y.Langsam, M.J.Augenstein and A.M.Tenenbaum, "Data Structures using C", Pearson Education Asia, 2009.

Reference(s):

1.	Rajesh K.Sukla, "Data Structure using C & C++", Wiley India, 2012.
2.	A.Tannenbaum, "Data Structure using C", Pearson Education, 2003.
3.	Goodrich and Tamassia, "Data Structures and Algorithms in C++", Second Edition, John Wiley and Sons, 2011
4.	Reema Thareja, "Data Structures using C", Second Edition, Oxford Higher Education, 2014.

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Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**Lists, Stacks and Queues**	

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1.1	Abstract Data Type (ADT)	2
1.2	List ADT	4
1.3	Stack ADT	3
1.4	Queue ADT	3
2	**Trees**	
2.1	Preliminaries	1
2.2	Binary Trees	1
2.3	The Search Tree ADT	1
2.4	Binary Search Trees	1

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2.5	AVL Trees	1
2.6	Tree Traversals	1
2.7	B-Trees	2
2.8	B+ Trees	1
3	**Sorting and Searching**	
3.1	Preliminaries, Insertion Sort	1
3.2	Shell Sort, Heap sort	1
3.3	Merge Sort, Quick sort	1
3.4	External Sorting	1
3.5	Sequential Searching	1
3.6	Binary Searching	1
3.7	Hashed List Searches	1
4	**Hashing and Priority Queues (Heaps)**	
4.1	Hashing, Hash Function	1
4.2	Separate Chaining, Open Addressing	1
4.3	Rehashing, Extendible Hashing	1
4.4	Priority Queues (Heaps)	1
4.5	Simple Implementations, Binary Heap	1
4.6	Applications of Priority Queues	1
4.7	d –Heaps	1
5	**Graphs**	
5.1	Graph Definitions - Topological Sort	1
5.2	Shortest-Path Algorithms	1
5.3	Unweighted Shortest Paths	1
5.4	Dijkstra’s Algorithm	1
5.5	Minimum Spanning Tree	1
5.6	Prim’s Algorithm	1
5.7	Kruskal’s Algorithm	1
5.8	Applications of Depth-First Search	1
5.9	Undirected Graphs	1

5.10	Biconnectivity	1
	Total Hours	**45**

Course Designers

1. Ms.J.MYTHILI- mythili@ksrct.ac.in

		Category	L	T	P	Credit
60 CS 004	**JAVA PROGRAMMING**	PC	3	0	0	3

Objective

- To learn object oriented programming concepts
- To understand Java fundamentals and String Methods
- To implement code reduction through packages and collection methods
- To apply the knowledge of Threads and IO streams
- To build applications with JDBC technology for real world problems

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

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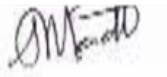

BoS Chairman

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2		3				3	3	2	3	3	
CO2	3	3	2		3			2	3	3	2	3	3	2
CO3	2	3	3		3			2	3	3	2	3	3	2
CO4	3	3	3	2	3				3	3	2	3	3	2
CO5	2	3	3	2	3				3	3	2	3	3	
3- Strong;2-Medium;1-Some														

Assessment Pattern

CO1	Apply Java fundamentals to construct functional programs to solve realworld problems	Apply
CO2	Implement object-oriented principles, exception handling and string operations to solve real world problems	Apply
CO3	Design packages and utilize collections to achieve reusability	Apply
CO4	Apply multithreading concepts and IO Streams in various real world scenario	Apply
CO5	Explore database using regular expression with JDBC	Analyze

Bloom's Category	**Continuous Assessment Tests (Marks)**		**Model Exam**	**End Semester Examination(Marks)**
	1	**2**		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	40	40	60	70
Analyze (An)	-	-	20	10
Evaluate (Ev)	-	-	-	-
Create (Cr)	-	-	-	-

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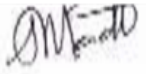


BoS Chairman

K.S. Rangasamy College of Technology–Autonomous R2022								
60 CS 004 – JAVA PROGRAMMING								
Common to CS, IT, AD, AM								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	40	60	100

INTRODUCTION OF JAVA FUNDAMENTALS AND OOP* Features of Java, The Java Environment, Java Source File Compilation, Structure of Java, Data Types, Variables, Operators, Control Flow, Arrays, Concepts of Object-Oriented Programming - OOP in Java, Defining classes and methods in Java, constructors, access specifiers, final and static keywords.	[9]
JAVA OOP CONCEPTS AND STRINGS* Java Inheritance, Polymorphism, Interfaces, Abstract class, Exception handling - exception hierarchy, throwing and catching exceptions, built-in exceptions, creating own exceptions, String handling with String and String Buffer classes.	[9]
PACKAGES AND COLLECTION FRAMEWORK* Packages – Pre defined and user defined Packages, Boxing and Unboxing, Wrapper classes, Introduction to Collection, The Collection Interfaces – List, Set, Map, Generic Class, Vector, Iterator and ListIterator, String Tokenizer.	[9]
JAVA MULTITHREAD AND I/O STREAMS Multithreaded programming-The Java Thread Model-Lifecycle, The Main Thread, creating a Thread, Creating multiple Threads, Thread priority, Input / Output Basics, Streams, The Byte Streams, The Character Streams, Reading and Writing Console, Reading and Writing Files, Object Serialization and Object De-Serialization.	[9]
JAVA DATABASE CONNECTIVITY AND REGEX **Database Programming – Introduction, SQL queries, JDBC, Statement, Prepared Statement****, Regular Expression: Matcher Class, Pattern class and Pattern Syntax, Exception class, Regex Character Classes and Quantifiers, Metacharacters.	[9]
Total Hours	45

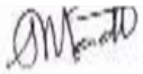
Text Book(s):	
1.	Herbert Schildt, “Java : The complete Reference”, Comprehensive coverage of the Java language, Oracle press, 12th Edition, Tata McGraw-Hill, 2021.
2.	Vivian Siahaan, Rismon Hasiholan Sianipar, “Java In Practice: JDBC And Database Applications” Sparta Publishing, Kindle 1st Edition, 2019
Reference(s):	
1.	Kathy Sierra ,Bert Bates, “Head First Java”, A Brain Friendly Guide, O’Reilly, 3nd Edition, 2022
2.	Cay S.Horstmann, “ Core Java Volume – I Fundamentals”,’ 11th Edition, 2018
3.	Y.Daniel Liang, “Introduction to Java Programming”, Comprehensive Version,10th Edition, Pearson Education,2015 [JDBC only]
4.	Jeffrey E. F. Friedl, "Mastering Regular Expressions", 3rdEdition, O'Reilly Media, Inc.,2006

***SDG:4- Quality Education**

****SDGs – 17 : Global Partnership**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1.0	**Introduction to OOP and Java Fundamentals**	
1.1	Features of Java , The Java Environment	1



BoS Chairman

1.2	Structure of Java, Data Types, Variables	1
1.3	Operators, Control Flow	1
1.4	Arrays	1
1.5	Object Oriented Programming - Objects and Classes	1
1.6	OOP in Java	1
1.7	Defining classes and methods in Java	1
1.8	Constructors	1
1.9	Access specifiers, Final, Static Keywords	1
2.0	**Java Concepts and Strings**	
2.1	Java Inheritance	1
2.2	Polymorphism	1
2.3	Interfaces, Abstract class	1
2.4	Exception handling- built-in exceptions	1
2.5	Try, Catch, Finally	1
2.6	Throw, Throws	1
2.7	Creating own exceptions	1
2.8	String Methods	1
2.9	String Buffer	1
3.0	**Packages And Collection Framework**	
3.1	Packages	1
3.2	User defined Packages	1
3.3	Boxing and Unboxing	1
3.4	Wrapper classes	1
3.5	Introduction to Collection	1
3.6	Set, List, Map	2
3.7	Vector	1
3.8	Iterator	1
4.0	**Java Mutltithreading and Stream IO**	
4.1	The Java Thread Model-Lifecycle	1
4.2	The Main Thread	1
4.3	Creating a thread	1
4.4	Creating Multiple Thread	1
4.5	Thread Priority	1
4.6	IO Basics	1
4.7	Reading and Writing Console	1
4.8	Reading and Writing Files	1
4.9	Object Serialization and Object De-Serialization.	1
5.0	**Regex and Java Database Connectivity**	
5.1	Database Programming – Introduction	1
5.2	SQL queries	1
5.3	JDBC	1
5.4	Statement	1
5.5	Prepared Statement	1
5.6	Regular Expression: Matcher Class, Pattern class	1
5.7	Pattern Syntax, Exception class	1

5.8	Regex Character Classes and Quantifiers	1
5.9	Meta characters	1
	Total	**45**

Course Designers

1. Mr.S.Vadivel - vadivels@ksrct.ac.in

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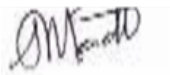

BoS Chairman

60 EC 001	DIGITAL LOGIC AND MICROPROCESSOR	Category	L	T	P	Credit
		ES	2	0	2	3

Objectives

- To learn Boolean algebra and simplification of Boolean functions
- To design and analyze different combinational circuits
- To study the basics of synchronous sequential logic, analyze and design sequential circuits
- To introduce the architecture and programming of 8086 microprocessors
- To perform the interfacing of peripheral devices with 8086 microprocessors

Prerequisite

Basic knowledge of Electrical and Electronics Engineering

Course Outcomes

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

CO1	Simplify complex Boolean functions and design digital systems	Apply
CO2	Design and analyze combinational logic circuits	Analyze
CO3	Design and analyze synchronous sequential logic circuits	Analyze
CO4	Illustrate the architecture of 8086 microprocessor	Understand
CO5	Analyze the interfacing techniques of various peripheral devices	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2					1	1	1	3	2
CO2	3	3	3	3	2					1	1	1	3	2
CO3	3	3	3	3	2					1	1	1	3	2
CO4	3	3	3	3	2					1	1	1	3	2
CO5	3	3	3	3	2					1	1	1	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)	-	-	10
Understand (Un)	10	20	30
Apply (Ap)	20	10	20
Analyse (An)	20	20	20
Evaluate (Ev)	-	-	-
Create (Cr)	10	10	20

Passed in BoS Meeting held on 02/12/2023

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BoS Chairman

K.S.Rangasamy College of Technology–Autonomous R2022								
60 EC 001 - Digital Logic and Microprocessor								
COMMON TO CS, IT, AD								
	Hours/Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total
III	2	0	2	60	3	50	50	100

Digital Fundamentals Review of Number Systems –Binary codes - Boolean postulates and laws – Boolean function - Logic Gates- Universal Gates - Canonical and Standard Forms – Minterms and Maxterms – Sum of Products and Product of Sums - Simplification of Boolean Functions –Karnaugh Map	**[6]**
Combinational Circuits Design procedure – Adders - Subtractors – Serial, Parallel adder- BCD adder - Magnitude Comparator – Multiplexer / Demultiplexer - Encoder / Decoder – Code Converters	**[6]**
Sequential Circuits Flip flops SR, JK, T, D and Master Slave – Characteristic table and equation – Analysis of clocked sequential circuits - Ripple counters – Synchronous counters – Modulo-n counters – Registers : Shift registers - Universal shift register– Shift counters	**[6]**
8086 Microprocessor Architecture of 8086 – Execution unit – Bus Interface unit- Addressing modes – Instruction set of 8086: Data transfer Instructions – Branch Instructions - Logical Instructions - Arithmetic Instructions – Shift and rotate Instructions - Simple Assembly Language Programs of 8086	**[6]**
Peripherals Interfacing Programmable Peripheral Interface (PPI 8255) – Programmable Interval Timer (PIT 8253) – Programmable Interrupt Controller (8259) – Keyboard & Display controller (8279) - Interfacing Serial I /O (8251)- ADC/DAC Interfacing	**[6]**
PRACTICAL EXERCISES: 1. Verification of Boolean theorems using logic gates 2. Implementation of combinational circuits using gates for arbitrary functions 3. Implementation of binary adder/subtractor circuits 4. Implementation of code converters 5. Implementation of synchronous counters 6. Implementation of basic arithmetic operations using 8086 7. Implementation of sorting and searching using 8086 8. Interfacing and programming of Programmable Peripheral Interface using 8086	**[30]**
Total Hours	**60**

Textbook(s):

1. M. Morris Mano, Michael D. Ciletti, “Digital Design”, 5th Edition, Pearson Education, New Delhi, 2016.
2. Soumitra Kumar Mandal, “Microprocessors and Microcontrollers Architecture, Programming & Interfacing Using 8085, 8086 and 8051”, 7th Edition, McGraw Hill India, 2013.

Reference(s):

1. Donald P.Leach and Albert Paul Malvino, GoutamSaha, “Digital Principles and Applications” , 7th Edition, Tata McGraw-Hill, New Delhi, 2016.
2. Charles H.Roth, “Fundamentals of Logic Design”, 5th Edition, Brooks/cole, 2016.
3. Yu-Cheng Liu, Glenn A. Gibson, “Microcomputer Systems: The 8086/8088 Family- Architecture Programming and Design” , 2nd Edition, Pearson, 2015.
4. Krishna Kant, “Microprocessors and microcontrollers Architecture , Programming and System design 8085,8086,8051,8096”,PHI-Third Printing, 2010

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Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1.0	**Digital Fundamentals**	
1.1	Review of Number Systems, Binary codes	1
1.2	Boolean postulates and laws, Logic Gates- Universal Gates	1
1.3	Canonical and Standard Forms – Minterms and Maxterms, SOP, POS	1
1.4	Simplification of Boolean Functions	1
1.5	Karnaugh Map	2
2.0	**Combinational Circuits**	
2.1	Design procedure , Adders, Serial,Parallel adder	1
2.2	Subtractors, BCD adder	1
2.3	Magnitude Comparator	1
2.4	Multiplexer / Demultiplexer	1
2.5	Encoder / Decoder	1
2.6	Code Converters	1
3.0	**Sequential Circuits**	
3.1	Flip flops SR, JK, T, D, Master Slave, Characteristic table and equation	1
3.2	Analysis of clocked sequential circuits	1
3.3	Ripple counters, Modulo-n counters	1
3.4	Synchronous counters	1
3.5	Registers, Shift registers - Universal shift register	1
3.6	Shift counters	1
4.0	**8086 Microprocessor**	
4.1	Architecture of 8086	1
4.2	Execution unit – Bus Interface unit	1
4.3	Addressing modes	1
4.4	Instruction set of 8086: Data transfer Instructions	1
4.5	Branch, Logical, Arithmetic, Shift and rotate Instructions,	1
4.6	Simple Assembly Language Programs of 8086	1
5.0	**Peripherals Interfacing**	
5.1	Programmable Peripheral Interface (PPI 8255)	1
5.2	Programmable Interval Timer (PIT 8253)	1
5.3	Programmable Interrupt Controller (8259)	1
5.4	Keyboard & Display controller (8279)	1
5.5	Interfacing Serial I /O (8251)	1
5.6	ADC/DAC Interfacing	1
	Total	**30**

Course Designers

1.Dr.J.Nithya- nithyaj@ksrct.ac.in

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BoS Chairman

60 CS 301	COMPUTER NETWORKS	Category	L	T	P	Credit
		PC	3	0	2	4

Objective

- 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

Prerequisite

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	Analyze
CO3	Compare the concept of Circuit switching and Packet switching	Apply
CO4	Gain the knowledge of Congestion control and QoS Techniques.	Apply
CO5	Identify the Purpose of Domain Name Space, Email and FTP	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2									2		
CO2	3	3	3	2								2	3	2
CO3	3	3	3	2	3			3	3	3		2	3	2
CO4	3	3	3		2		2					2		2
CO5	3	2	3		2			2	2	2		2	2	
3- Strong;2-Medium;1-Some														

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	

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Remember	10	10	20
Understand	10	10	20
Apply	20	20	30
Analyse	20	20	30
Evaluate	-	-	-
Create	-	-	-

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K.S. Rangasamy College of Technology–Autonomous R2022								
60 CS 301 – COMPUTER NETWORKS								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	E	Total
III	3	0	2	75	4	50	50S	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 - Connecting devices - Repeaters-Hubs-Bridges	[12]
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 –	[9]
Network Layer Internetworks – Circuit Switching – Packet Switching– IP addressing methods- Classification of IP Address – Sub netting – Problem Solving using IP Addressing –Super netting–Routers-Routing Algorithms – Distance Vector Routing – Link State Routing- ICMP / Frame format, Query Messages.	[7]
Transport Layer Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) –Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS)-Techniques	[7]
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.	[10]
Hands On: 1. Analyze the performance of various configurations and protocols in LAN 2. Construct a VLAN and make the PC's communicate among a VLAN 3. Construct an Inter-VLAN and make the PC's communicate among a VLAN 4. Construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP) 5. Understand the concept and operation of Routing Information Protocol (RIP) 6. Construct multiple router networks and understand the operation of OSPF protocol 7. Understand the operation of SSH by accessing the routers remotely by PCs **Case Study*:** Structural Health Monitoring, Traffic Control, Health Care, Pipeline Monitoring, Precision Agriculture.	[30]
Total Hours	75

Text Book(s):	
1.	Behrouz A.Forouzan,"Data communication and Networking Update", Tata McGraw-Hill, Third Edition, 2006.
2.	James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2003
Refere nce(s):	
1.	John Mark Comer, "Internetworking with TCP/IP", 6th Edition, Pearson Education, 2015.
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.

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4.	William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000

***SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topics	No. of Hours
1	**Data Communications**	
1.1	Networks ,Components and Categories	1
1.2	Line Configuration ,Topologies	1
1.3	Protocols and Standards	1
1.4	ISO/OSI model	2
1.5	Transmission Media	1
1.6	Coaxial Cable	1
1.7	Fiber Optics	1
1.8	Interfaces (RS232 Standard) and Modems	1
2	**Data Link Layer**	
2.1	Error – detection and correction	1
2.2	Parity ,LRC ,CRC ,Hamming code	2
2.3	Flow Control and Error control	1
2.4	Stop and wait ,go back-N ARQ , selective repeat ARQ	2
2.5	sliding window ,HDLC, LAN	2
2.6	Ethernet IEEE 802.3	1
2.7	Connecting devices-Repeaters-Hubs-Bridges	1
3	**Network Layer**	
3.1	Internetworks , Circuit Switching, Packet Switching	1
3.2	IP addressing methods ,Sub netting ,Super netting, Routers	2
3.3	Routers ,Routing Algorithms	2
3.4	Distance Vector Routing	2
3.5	Link State Routing ,ICMP / Frame format,	1
3.6	Query Messages.	1

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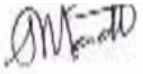

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4	**Transport Layer**	
4.1	Duties of transport layer	1
4.2	Multiplexing, Demultiplexing	1
4.3	Sockets	2
4.4	User Datagram Protocol (UDP)	1
4.5	Transmission Control Protocol (TCP)	1
4.6	Congestion Control	1
4.7	Quality of services (QOS)-Techniques	2
5	**Application Layer**	
5.1	Domain Name Space(DNS)	2
5.2	Email(SMTP)	1
5.3	File Transfer protocol(FTP)	2
5.4	HTTP,HTTPS	2
5.5	World Wide Web	1
	Total	**45**

Course Designers

1. Dr. P.Senthilraja - senthilraja@ksrct.ac.in

60 MY 002	**UNIVERSAL HUMAN VALUES**	Category	L	T	P	Credit
		MY	3	0	0	3

Objective

- 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

Prerequisite

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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.	Analyze
CO3	Identify and evaluate the role of harmony in family, society and universal order.	Analyze
CO4	Classify and associate the holistic perception of harmony at all levels of existence and Nature	Analyze
CO5	Develop appropriate human conduct and management patterns to create harmony in professional and personal lives.	Create

Mapping with Programme Outcomes

Bloom's Category	Continuous Assessment Tests(Marks)			End Semester Examination(Marks)
	1	2	Model	
Remember	10	10	20	No End Semester Examination
Understand	10	10	20	
Apply	20	20	30	
Analyse	20	20	30	
Evaluate	0	0	0	
Create	0	0	0	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO
CO1								3	2		2	3		
CO2						3		3	3			3		
CO3						3	3	3	3			3		
CO4						3	3	3	3			3		
CO5						3	3	3	3	3		3		
3- Strong; 2-Medium; 1-Some														

Assessment Pattern

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K. S. Rangasamy College of Technology – Autonomous R2022								
60 MY 002 - UNIVERSAL HUMAN VALUES								
Common to all								
	Hours / Week			**Branches**	Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total
III	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:5 – Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**INTRODUCTION TO VALUE EDUCATION**	
1.1	Discussion on Present Education System and Skill Based Education	1

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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	**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
2.7	My Participation (Value) regarding Self and my Body - Correct Appraisal of our Physical needs	1
3	**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 Bases for 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	**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
4.5	Recyclability and self-regulation in Nature	1
4.6	Relationship of Mutual Fulfillment	1

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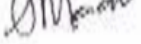

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4.7	An Introduction to space, Co-existence of Units in Space	1
4.8	Harmony in Existence – Understanding Existence as Co- Existence	1
4.9	Natural Characteristic of Human Living with Human Consciousness	1
5	**IMPLICATIONS OF THE HOLISTIC UNDERSTANDING**	
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
	Total	45

Course Designers

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

60 GE 002	**Tamils and Technology** (Common to all Branches)	**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.

Prerequisite:

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

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CO5	Apply the knowledge of scientific Tamil and Tamil computing.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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-Lo v												

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K. S. Rangasamy College of Technology – Autonomous R2022

60 GE 002 - Tamils and Technology

(Common to all Branches)

Semester	Hours/Week			Total hrs	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 3 Potteries.

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 other worship places – Temples of Nayaka Period - 3 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 3 beads/bone beats – Archeological evidences -Gem stone types described in Silappathikaram.

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 3 Knowledge of Ocean – Knowledge Specific Society.

SCIENTIFIC TAMIL & TAMIL COMPUTING*

Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books – Development of Tamil Software 3 – Tamil Virtual Academy- Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

Total Hours 15

Text Book(s):

1. தமிழக வரலாறு - மக்களும் பண்பாடும் கக. கக . பிள்ளை (வவிையீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

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2. கணினித்தமிழ் - முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - ளவளக நதிக்களரயில் சங்ககால நகர நாகாீகம் (வதால்லியல் துளை வவிியீடு).
4. வபாருளந - ஆற்ைங்களர நாகாீகம் (வதால்லியல் துளை வவிியீடு).
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).
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

*SDG:4- Quality Education

60 GE 002	தமிழரும் வதாழில்நுட்பமும் (அளனத்து துளைகளுக்கும் வபாதுவானது)	Category	L	T	P	Credit
		GE	1	0	0	1

பாடத்தின் கநாக்கங்கள்:

- தமிழர்கின் சங்ககால வநசவு, பளன வளனதல் மற்றும் கட்டிட வதாழில் நுட்பம் குைித்து ைஅிதல்.
- தமிழர்கின் சங்ககால கவைாண்ளம, நீர்ப்பாசனம் மற்றும் உற்பத்தி முளைகள் குைித்த கற்ைல். □ நவீன ைஅிவியல் தமிழ் மற்றும் கணித்தமிழ் குைித்த புரிதல்.

முன்கூட்டிய துளைசார் ைஅிவு:

கதளவ இல்ளல

பாடம் கற்ைதின் விளைவுகள்:

பாடத்ளத வவற்ைிகரமாக கற்று முடித்த பின்பு, மாணவர்கால் முடியும் விளைவுகள்

CO1	சங்ககாலத் தமிழர்கின் வநசவு மற்றும் பாளன வளனதல் வதாழில்நுட்பம் குைித்த கற்றுணர்தல்	புரிதல்
CO2	சங்ககாலத் தமிழர்கின் கட்டிட வதாழில்நுட்பம் கட்டுமானப் வபாருட்கள் மற்றும் அவற்ளை விைக்கும் தைங்கள் குைித்த ைஅிவு.	புரிதல்
CO3	சங்ககாலத் தமிழர்கின் உகலாகத் வதாழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த வதால்லியல் சான்றுகள் பற்ைிய ைஅிவு.	புரிதல்

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CO4	சங்ககாலத் தமிழர்கின் கவாண்ளம, நீர்ப்பாசன முளைகள் மற்றும் முத்து குைித்தல் குைித்த வதிவு.	புரிதல்
CO5	நவீன அிவியல் தமிழ் மற்றும் கணித்தமிழ் குைித்த புரிந்துவகாள்ைலும் மற்றும் பயன்படுத்துதலும்.	பகுப்பாய்வு

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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-Low												

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60 GE 002 – தமிழரும் வதாழில்நுட்பமும்

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

வநசவு மற்றும் பாளனத் வதாழில்நுட்பம்: சங்க காலத்தில் வநசவுத் வதாழில் - பாளனத் வதாழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்கில் கீைல் குைியீடுகள்.	3
வடிவளமப்பு மற்றும் கட்டிடத் வதாழில்நுட்பம்: சங்க காலத்தில் வடிவளமப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் வபாருட்கில் வடிவளமப்பு - சங்க காலத்தில்	3
கட்டுமானப் வபாருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் கமளட அளமப்பு பற்ைிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், ககாவில்களும் - கசாழர் காலத்துப் வபருங்ககாயில்கள் மற்றும் பிை வழிபாட்டுத் தலங்கல் - நாயக்கர் காலக் ககாயில்கள் – மாதிரி கட்டளமப்புகள் பற்ைி அிதல், மதுளர மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமளல நாயக்கர் மஹால் - வசட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் வசன்ளனயில் இந்கதா - சாகராவசனிக் கட்டிடக் களல.	
உற்பத்தித் வதாழில் நுட்பம்: கப்பல் கட்டும் களல – உகலாகவியல் - இரும்புத் வதாழிற்சாளல - இரும்பள உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகைாக வசம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் வதாழிற்சாளலகள் - கல்மணிகள் , கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - வதால்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகிைன் வளககள்.	3

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கவொண்ளம மற்றும் நீர்பாசனத் வதாழில் நுட்பம்: அளண, ஏரி, குைங்கள், மதகு - கசாழர்காலக் குமுழித் தூம்பின் முக்கியத்துவம் - கால்நளட பராமரிப்பு - கால்நளடகளுக்கான வடிவளமக்கப்பட்ட கிணறுகள் – கவொண்ளம மற்றும் கவொண்ளம சார்ந்த வசயல்பாடுகள் - கடல்சார் அைிவு - மீன்வைம் - முத்து மற்றும் முத்துக்குைித்தல் - வபருங்கடல் குைித்த பண்ளடய அைிவு - அைிவுசார் சமூகம்.	3
அைிவியல் தமிழ் மற்றும் கணித்தமிழ் அைிவியல் தமிழின் வைர்ச்சி - கணித்தமிழ் வைர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு வசய்தல் - தமிழ் வமன்வபாருட்கள் உருவாக்கம் - தமிழ் இளணயக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இளணயத்தில் தமிழ் அகராதிகள் - வசாற்குளவத் திட்டம்.	3
Total Hours	**15**

Text Book(s):	
1.	தமிழக வரலாறு - மக்களும் பண்பாடும் கக. கக . பிள்ளை (வவிியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் - முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி - ளவளக நதிக்களரயில் சங்ககால நகர நாகாீகம் (வதால்லியல் துளை வவிியீடு).
4.	வபாருளந - ஆற்ைங்களர நாகாீகம் (வதால்லியல் துளை வவிியீடு).
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).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

60 CS 0P3	**DATA STRUCTUI**	Category	L	T	P	Credit
		CS	0	0	4	2

Objective

- To design and implement simple linear and nonlinear data structures
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To program for storing data as tree structure and implementation of various traversal techniques
- To implement sorting and searching techniques To gain knowledge of graph applications

Prerequisite

Programming knowledge in C language

Course Outcomes

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

CO1	Demonstrate the implementation of Linear Data structures and its applications	Apply

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CO2	Investigate Balanced Parenthesis and Postfix expressions with the help of Stack ADT	Apply
CO3	Implement Non-Linear Data Structure	Apply
CO4	Implement sorting and searching techniques	Apply
CO5	Implement Shortest Path and Minimum Spanning Tree Algorithm	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2						2			2	3	3
CO2	3	3	2	3					3			2	3	3
CO3	3	3	2	2	2	2			3	2		2	3	3
CO4	3	3	2	3	2			3	2	2		2	3	3
CO5	3	3	2		2	2	2	3	3	2		2	3	3
3- Strong; 2-Medium; 1-Low														

List of Experiments

1. Implementation of List Abstract Data Type (ADT)*
2. Implementation of Stack ADT*
3. Implementation of Queue ADT*
4. Implementation of stack applications: *
   (a) Program for ‘Balanced Parenthesis’
   (b) Program for ‘Evaluating Postfix Expressions’
5. Implementation Search Tree ADT*
6. Implementation of Internal Sorting*
7. Develop a program for external sorting*
8. Develop a program for various Searching Techniques*
9. Implementation of Shortest Path Algorithm*
10. Implementation of Minimum Spanning Tree Algorithm*

*** SDG:4- Quality Education**

Course Designers

1. K.Poongodi - poongodik@ksrct.ac.in

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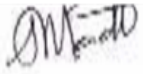

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60 CS 0P4	JAVA PROGRAMM

Category	L	T	P	Credit
PC	0	0	4	2

Objective

- To apply core Java concepts to solve real-world problems
- To implement object-oriented programming (OOP) principles
- To apply exception Handling, Strings, and Collections to manipulate strings and data efficiently
- To apply the knowledge of Threads and IO streams
- To create a JDBC-integrated mini project that applies a wide range of Java concepts

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

CO1	Demonstrate Java fundamentals to solve real world problems	Apply
CO2	Design applications involving Object Oriented Programming concepts such as inheritance, polymorphism, abstract classes and interfaces	Apply
CO3	Implement Java Applications using Strings, Collections and exception Handling	Apply
CO4	Develop concurrent and input/output-intensive applications using Threads and IO streams	Apply
CO5	Develop a JDBC-integrated mini project to provide extensible software solutions	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2		3				3	3	2	3	3	
CO2	3	3	2		3			2	3	3	2	3	3	2
CO3	2	3	3		3			2	3	3	2	3	3	2
CO4	3	3	3	2	3				3	3	2	3	3	2
CO5	2	3	3	2	3				3	3	2	3	3	
3- Strong; 2-Medium; 1-Low														

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS 0P4–Java Programming Laboratory								
Common to CS, IT, AD, AM								
Semester	Hours / Week			Total hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	4	60	2	60	40	100

1. Implementation of java fundamentals to solve real world problems*
2. Demonstrate Class and method, Constructor and Inheritance *
3. Demonstrate Polymorphism, Abstract and Interface*
4. Implementation of Exception Handling to check abnormal condition*
5. Implementation of String and String Buffer*
6. Demonstrate various methods of Collection and Iterator*
7. Implementation of multithreading and IO Streams*
8. Implementation of Database Connectivity using JDBC**

Mini project: Develop an application using the concepts of Inheritance, Polymorphism, Interfaces, Packages, Exception handling and collections along with JDBC.

***SDGs – 4 : Quality education**
****SDGs – 17 : Global Partnership**

Course Designers

1. Mr. S. Vadivel - vadivels@ksrct.ac.in

60 CG 0P2	CAREER SKILL DEVELOPMENT II

Category	L	T	P	Credit
CG	0	0	2	1

Objective

- 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

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Prerequisite

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 orally and in the written format.	Analyze them
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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	2	
CO5								2	3	3	2	3		2

3- Strong; 2-Medium; 1-Some

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60 CG 0P2 - Career Skill Development II

Common to All Branches

Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	2	2	15	1	100	00	100

Listening* **[6]**

Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (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

Speaking* **[6]**

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

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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 II* Reading Comprehension (Inferential fillups) – Spotting Errors – Verbal Analogies – Theme Detection – Change of Voice – Change of Speech – One word substitution	**[6]**
Total Hours	**30**

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**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours	Mode of content Delivery
1	**Listening**		
1.1	Evaluative Listening: Advertisements, Product Descriptions	1	Activity Based
1.2	Listening to longer technical talks and completing– gap filling exercises.	1	Activity Based
1.3	Listening technical information from podcasts	1	Activity Based
1.4	Listening to process/event descriptions to identify cause & effects and documentaries depicting a technical problem and suggesting solutions	2	Activity Based
1.5	Listening to TED Talks	1	Activity Based
2	**Speaking**		
2.1	Marketing a product, persuasive speech techniques	1	Activity Based
2.2	Describing and discussing the reasons of accidents or disasters based on news reports,	2	Activity Based
2.3	Group Discussion (based on case studies)	1	Activity Based

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2.4	Presenting oral reports, Mini presentations on select topics with visual aids	1	Activity Based
2.5	participating in role plays and virtual interviews	1	Activity Based
3	**Reading**		
3.1	Reading advertisements, user manuals and brochures	1	Activity Based
3.2	Reading - longer technical texts– cause and effect essays, and letters / emails of complaint	2	Activity Based
3.3	Case Studies, excerpts from literary texts, news reports etc.	1	Activity Based
3.4	Company profiles	1	Activity Based
3.5	Statement of Purpose (SoPs)	1	Activity Based
4	**Writing**		
4.1	Professional emails, Email etiquette	1	Activity Based
4.2	Compare and contrast essay	1	Activity Based
4.3	Writing responses to complaints	1	Activity Based
4.4	Precis writing, Summarizing and Plagiarism	2	Activity Based
4.5	Job / Internship application – Cover letter & Résumé	1	Activity Based
5	**Verbal Ability II**		
5.1	Reading Comprehension (Inferential fillups) and Theme Detection	2	Activity Based
5.2	Spotting Errors	1	Activity Based
5.3	Verbal Analogies	1	Activity Based
5.4	Change of Voice and Change of Speech	1	Activity Based
5.5	One word substitution	1	Activity Based
	Total	**30**	

Course Designer

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

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60 MA 017	DISCRETE M	Category	L	T	P	Credit
		BS	3	1	0	4

Objective

- To get exposed to logical arguments and construct simple mathematical statements
- To familiarize the basic concepts of set theory
- To get exposed to different types of functions
- To provide fundamental principles of combinatorial counting techniques
- To familiarize the basic concepts of graph theory

Prerequisite

NIL

Course Outcomes

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

CO1	statements	Remember, Understand, Apply
CO2	Apply the basics of set theory to the situations involving inclusion and exclusion.	Remember, Understand, Apply
CO3	Understand the concepts of different types of functions.	Remember, Understand, Apply
CO4	Apply permutation and combination in real time situations and solve recurrence relations.	Remember, Understand, Apply
CO5	Employ the basics of graph theory in computer networks.	Remember, Understand, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2							3		3
CO2	3	3	2	2	2							2		3
CO3	3	3	2	3	2							2		3
CO4	3	3	2	3	2							2		3
CO5	3	3	2	3	3							3		3
3- Strong; 2-Medium; 1-Some														

Assessment Pattern

Understand the logical arguments and construct simple mathematical

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	20	20	30	30
Apply (Ap)	30	30	60	60
Analyze (An)	0	0	0	0

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Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

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60 MA 017 - Discrete Mathematics								
Common to CSE & IT								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	1	0	60	4	40	60	100

MATHEMATICAL LOGIC *, ** Propositional logic - Propositional equivalences - Predicates and quantifiers - Rules of inference.	[9]
SET THEORY *, ** Algebra of sets - The power set - Ordered pairs and Cartesian product - Principle of inclusion and Exclusion - Relations on sets -Types of relations and their properties - Equivalence relations - Relational matrix and the graph of relation - Operations on relations.	[9][9]
FUNCTIONS *, ** Functions -Types of functions - Injective, surjective and bijective functions - Composition of functions - Inverse functions - Primitive recursive functions - Permutation functions	[9]
COMBINATORICS *, ** Permutations and Combinations - Pigeonhole principle - Mathematical induction - Recurrence relations - Generating functions.	[9]
GRAPH THEORY *, *** Graphs - Types of graphs - Matrix representation of graphs - Graph isomorphism - Walk - Path - Cycles - Eulerian graphs - Hamiltonian graphs - Planar graphs - Euler formula - Shortest path algorithm: Dijkstra's Algorithm.	[9]
Total Hours: 45 + 15 (Tutorial)	**60**

Text Book(s):	
1.	R. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education Asia, Delhi, 2014.
2	J. P. Tremblay and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw–Hill Education Private Limited, New Delhi, 49th reprint 2016.
Reference(s):	
1.	K. H. Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2.	Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
3.	T. Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics" Fifth Reprint, Tata Mc Graw Hill Publishing Company Limited 2008
4.	S. Lipschutz, M. Lipson and V.H. Patil, "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

***SDG 4: Quality education.**

****SDG 9:** P**romote inclusive and sustainable industrialization. *****

SDG12: Production Patterns.

List of MATLAB Programs:

1. Introduction to MATLAB.
2. Generate the truth table for mathematical logic.
3. Compute various functions for set operations like union and intersection.
4. Find the composition of functions.

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5. Compute permutations and combinations.
6. Solve the problem about isomorphism of two graphs.

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**MATHEMATICAL LOGIC**	
1.1	Propositional logic	2
1.2	Propositional equivalences	2
1.3	Tutorial	2
1.4	Rules of inference	2
1.5	Predicate	1
1.6	Quantifiers	2
1.7	Tutorial	2
2	**SET THEORY**	
2.1	Algebra of sets	1
2.2	The power set , Ordered pairs and Cartesian product	1
2.3	Principle of inclusion and exclusion	2
2.4	Tutorial	2
2.5	Types of relations and their properties	1
2.6	Equivalence relations	2
2.7	Relational matrix and the graph of relation	1
2.8	Operations on relations	1
3	**FUNCTIONS**	
3.1	Functions	1
3.2	Types of functions	2
3.3	Composition of functions	2
3.4	Tutorial	2
3.5	Inverse functions	1
3.6	Primitive recursive functions	2
3.7	Permutation functions	1
3.8	Tutorial	2
4	**COMBINATORICS**	

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Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

4.1	Permutations and Combinations	2
4.2	Pigeonhole principle	1
4.3	Mathematical induction	2
4.4	Recurrence relations	2
4.5	Generating functions	2
4.6	Tutorial	2
5	**GRAPH THEORY**	
5.1	Types of graphs	1
5.2	Matrix representation of graphs	1
5.3	Graph isomorphism	2
5.4	Tutorial	2
5.5	Eulerian graphs and Hamiltonian graphs	1
5.6	Planar graphs and Euler formula	2
5.7	Shortest path algorithm: Dijkstra's Algorithm	1
5.8	Tutorial	2
	Total	60

Course Designer

Dr.K.Kiruthika – kiruthika@ksrct.ac.in

60 IT 002	**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 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.

Prerequisite

Passed in BoS Meeting held on 02/12/2023

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BoS Chairman

Basic knowledge of Data Structures and Computer programming

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 and inspect recursive and non-recursive algorithms by mathematical notations using sample algorithms.	Analyze
CO3	Apply 'Brute Force' and 'Divide and conquer' design techniques for sorting and searching problems	Analyze
CO4	Construct analogous algorithms for graph related problems.	Understand
CO5	Apply 'Backtracking' and 'Branch and bound' techniques to solve NP-hard problems.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2						2			3	2
CO2	3	3	3	2						2			3	2
CO3	3	3	3	2	3					2			3	2
CO4	3	3	3	2						2			3	2
CO5	3	3	3	2	3					2			3	2

Assessment Pattern

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

K.S.Rangasamy College of Technology–Autonomous R2022								
60 IT 002 - Design and Analysis of Algorithms								
Common to CS, IT								
	Hours/Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Basic Concepts of Algorithms * Introduction - Fundamentals of Algorithmic Problem Solving - Important Problem types Fundamentals of the analysis of algorithm efficiency - Analysis Framework - Asymptotic	**[9]**

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BoS Chairman

Notations and Basic Efficiency Classes - Recurrence relations: Methods for solving recurrence relations.	
Mathematical Analysis of Algorithms * Mathematical Analysis of Non-recursive Algorithms and Examples - Mathematical Analysis of Recursive Algorithms - Example: Fibonacci numbers - Empirical Analysis of Algorithms.	**[9]**
Brute Force and Divide & Conquer Techniques* Selection Sort and Bubble Sort - Brute-force string matching - Merge sort - Multiplication of Two n-Bit Numbers - Quick Sort - Binary Search - Binary tree Traversal and Related Properties.	**[9]**
Algorithm Design Paradigm* Decrease and Conquer Technique: Insertion Sort - Depth first Search and Breadth First Search – Transform and Conquer Technique: Presorting - Dynamic Programming: Computing a Binomial Coefficient - Warshall's and Floyd's Algorithm - The Knapsack Problem and Memory Functions - Optimal Binary Search trees – Greedy Technique: Huffman trees.	**[9]**
NP Hard and NP-Complete Problems* P and NP problems - NP complete problems - Backtracking: N-Queen's Problem - Hamiltonian Circuit Problem Branch and Bound Techniques: Traveling salesman problem.	**[9]**
Total Hours	**45**

	Textbook(s):
1.	Anany Levitin, "Introduction to the Design and Analysis of Algorithm", 3rd Edition, Tenth Impression, Pearson Education Asia, 2017.
2.	T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", 3rd Edition, PHI Pvt. Ltd., 2012.
	Reference(s):
1.	Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2010.
2.	A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Asia, 2003.
3.	Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Computer Algorithms/ C++", 2nd Edition, Universities Press, 2007.
4.	Anany Levitin, "Introduction to the Design & Analysis of Algorithms", 2nd Edition, Pearson Education, 2011.

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1.0	**Basic Concepts of Algorithms**	
1.1	Fundamentals of Algorithmic Problem Solving	1
1.2	Important Problem types	1
1.3	Fundamentals of the analysis of algorithm efficiency	1
1.4	Analysis Framework	1
1.5	Asymptotic Notations	1
1.6	Asymptotic Notations and Basic Efficiency Classes	1
1.7	Recurrence relations	1
1.8	Methods for solving recurrence relations.	2
2.0	**Mathematical Analysis of Algorithms**	
2.1	Mathematical Analysis of Non-recursive Algorithms	2

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2.2	Non-recursive Algorithms and Examples	2
2.3	Mathematical Analysis of Recursive Algorithms	2
2.4	Fibonacci numbers	1
2.5	Empirical Analysis of Algorithms.	2
3.0	**Brute Force and Divide & Conquer Techniques**	
3.1	Selection Sort	1
3.2	Bubble Sort	1
3.3	Brute-force string matching	1
3.4	Merge sort	1
3.5	Multiplication of Two n-Bit Numbers	1
3.6	Quick Sort	1
3.7	Binary Search	1
3.8	Binary tree Traversal	2
4.0	**Algorithm Design Paradigm**	
4.1	Decrease and Conquer Technique: Insertion Sort	1
4.2	Depth first Search and Breadth First Search	1
4.3	Transform and Conquer Technique: Presorting	1
4.4	Dynamic Programming: Computing a Binomial Coefficient	1
4.5	Warshall's and Floyd's Algorithm	1
4.6	The Knapsack Problem and Memory Functions	1
4.7	Optimal Binary Search trees	1
4.8	Greedy Technique: Huffman trees.	2
5.0	**NP Hard and NP-Complete Problems**	
5.1	P and NP problems	1
5.2	NP complete problems	1
5.3	Backtracking: N-Queen's Problem	2
5.4	Hamiltonian Circuit Problem	2
5.5	Branch and Bound Techniques	1
5.6	Traveling salesman problem.	2
	Total	**45**

Course Designers

1.Dr.C.Rajan- rajan@ksrct.ac.in

60 CS 401	Advanced Web Development	Category	L	T	P	Credit
		PC	3	0	0	3

Objective

- To learn the concepts of JavaScript
- To learn the concepts of jQuery

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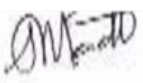

BoS Chairman

- To understand the concept of TypeScript
- To learn the concepts of Angular
- To learn the concepts of PHP and MySQL

Prerequisite

HTML, CSS

Course Outcomes

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

CO1	Describe the concepts of JavaScript to create a dynamic and interactive web page	Apply
CO2	Implement the concepts of jQuery	Apply
CO3	Device the concepts of TypeScript to create a dynamic and interactive web page	Apply
CO4	Describe the basics concepts of Angular	Apply
CO5	Develop dynamic web applications using PHP and MySQL	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3		3				3	3	2	3	3	
CO2	3	2	3		3				3	3	2	3	3	
CO3	3	2	3		3				3	3	2	3	3	
CO4	3	2	3		3				3	3	2	3	3	
CO5	3	2	3		3				3	3	2	3	3	
3- Strong;2-Medium;1-Some														

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	30	30	40
Analyse	10	10	20
Evaluate	-	-	-
Create	-	-	-

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BoS Chairman

K.S. Rangasamy College of Technology–Autonomous R2022								
60 CS 401 – Advanced Web Development								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

JAVASCRIPT* Introduction to JavaScript – Advantage - Syntax - Datatype - Variable - Arrays -Operator and Expression – Control Statements – Looping Statements - Constructor - Functions – Objects - Dialog box – Events – Asynchronous JS - JavaScript validation.	[9]
JQUERY * Introduction to HTML5 - Introduction to jQuery – jQuery Selectors – jQuery Events- jQuery Effects – jQuery HTML – jQuery AJAX.	[9]
TYPESCRIPT* Introduction – TS Types – Arrays – Tuples – Object Types – Union Types – Functions – Classes – Utility Types – TS Keyof	[9
ANGULAR* Introduction to Angular – Expressions – Modules – Directives - Data Binding - Angular controllers - Filters - Angular Tables - Angular Forms - Validations – Routing-Angular Services.	[9]
PHP and MySQL* Introduction to PHP - Installation of PHP – Variables – String – Array - Array Function - String Function Branching Statements - Looping Statements – Cookies – Session – Constructor – Inheritance - File Handling - DDL- DML - Join – DQL - order by – limit. **Case Study**** e-Business Models – Building an e-Business – e-Marketing – Database connectivity – Online Payments – Security.	[9]
Total Hours	45

Text Book(s):

1.	H. M. Deitel, P. Deitel, A. Deital, “Internet and World Wide Web How to Program”, Pearson education, 5th edition, 2023.
2.	Web Technologies –HTML, javascript, PHP KoGent Learning solutions inc, Dreamtech Press,2014

Reference(s):

1.	http:w3schools.com/
2.	Jeffrey c.Jackson.”web Technologies-A computer science Perspective”,pearson Education, 2007.
3.	Jeffy Dwight, Michael Erwin and Robert Nikes “USING CGI”, PHI Publications, 1997.
4.	N. P. Gopalan,” Web Technology: A Developer's Perspective”, 2nd edition PHI Learning 2014

*** SDG:4- Quality Education**

****SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**JAVASCRIPT**	
1.1	Introduction, Advantage and syntax of JavaScript	1
1.2	Datatype	1

1.3	Variable	1

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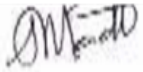

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1.4	Arrays	1
1.5	Operator and Expression, Control Statements	1
1.6	Looping Statements – Constructor	1
1.7	Functions	1
1.8	Objects, Dialog box	1
1.9	Events-JavaScript validation	1
2	**JQUERY**	
2.1	Introduction to HTML5	2
2.2	Introduction to jQuery, jQuery selectors	1
2.3	jQuery Events	2
2.4	jQuery Effects	2
2.5	jQuery HTML	1
2.6	jQuery AJAX	1
3	**TYPESCRIPT**	
3.1	Introduction – TS Types	1
3.2	Arrays	1
3.3	Tuples	1
3.4	Object Types	1
3.5	Union Types	1
3.6	Functions	1
3.7	Classes	1
3.8	Utility Types	1
3.9	TS Keyof	1
4	**ANJULAR**	
4.1	Introduction to Angular	1
4.2	Expressions-Modules	1
4.3	Directives	1
4.4	Data binding	1
4.5	Angular controllers	1
4.6	Filters	1
4.7	Angular Tables - Angular Forms	1
4.8	Validations – Routing	1
4.9	Angular Services	1
5	**PHP and Mysql**	
5.1	Introduction to the PHP - installation of PHP	1
5.2	Variables - String	1
5.3	Array - Array Function	1
5.4	String Function	1
5.5	Branching and Looping statements	1
5.6	Cookies Session	1
5.7	Constructor - Inheritance	1
5.8	File Handling	1
5.9	DDL-DML-join –DQL-order by –limit	1
	Total Hours	**45**

Course Designers

1. Ms.J.MYTHILI - mythili@ksrct.ac.in

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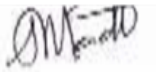

BoS Chairman

60 CS 402	DATABASE MANAGEMENT SYSTEMS	Category	L	T	P	Credit
		PC	3	0	0	3

Objective

- To familiarize the students with various data models and query language.
- Gain knowledge on data storage and indexing concepts.
- Toexposethefundamentalsoftransactionprocessingandrecoveryconcepts.
- To make the students aware of the various current trends in database system.
- To know the current trends of various databases

Prerequisite

NIL

Course Outcomes

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

CO1	Express the knowledge of database systems and analyze the various data models	Analyze
CO2	Employ the concept of Data Definition Language and Data Manipulation Language and apply the various Normal Forms in database design	Apply
CO3	Express the knowledge of secondary storage device and the concepts of hashing, BTree, B+Tree in indexing to retrieve the data	Apply
CO4	Apply the various concurrency control techniques in database transactions and recovery techniques	Apply
CO5	Classify the recent databases such and Express the knowledge of data ware housing and data mining	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO1	PSO2
CO1	3	3	2		2	2	2		3			2		2
CO2	3	3	2		2	2	2		3			2	3	3
CO3	3	3	2		2								2	3
CO4	3	3	2		2	2	2		3					3
CO5	3	3	2		2	2	2							3

3- Strong;2-Medium;1-Some

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests			End Semester Examination(Marks)
	1	2	3	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	20	20	20	40
Analyse	10	10	10	20
Evaluate	-	-	-	-
Create	-	-	-	-

Passed in BoS Meeting held on 02/12/2023

Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS 402 – Database Management Systems								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction and Conceptual Modeling* Introduction Database systems – DBMS Applications – Purpose of DBMS – Views of Data - Database System Architecture–Data Storage and Querying– DB Users and Administrators –Data Models–ER model–Relational Model – Relational Algebra and Calculus.	[9]
Relational Model* Introduction to SQL – Intermediate SQL – Advanced SQL – Triggers – Functions and Procedures – Embedded SQL - Normalization for Relational Databases (upto5NF).	[9]
Data Storage and Indexing Concepts* Record storage and Primary file organization – RAID – Operations on Files - Heap File - Sorted Files - Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree..	[9]
Transaction Management * Transaction – Transaction Concepts- Transaction Model- Desirable properties of Transaction- Schedule and Recoverability- Serializability – Concurrency Control – Types of Locks- Two Phase locking -Time stamp based concurrency control – Recovery Techniques – Concepts - Immediate Update - Deferred Update.	[9]
Current Trends* Object Oriented Databases –Distributed databases- Homogenous and Heterogeneous-Distributed data Storage – Distributed Transaction–Commit Protocols - Data Mining–Data Mining Applications–Data Warehousing	[9]
Total Hours	45

Text Book(s):	
1.	Abraham Silberschatz ,Henry F.Korth and S.Sudarshan -“Database System Concepts”, sixth Edition ,McGraw-Hill, 2011.
2.	Ramez Elmasri and Shamkant B.Navathe,“Fundamental Database Systems”, Fifth Edition, Pearson Education, 2009.
Reference(s):	
1.	Raghu Ramakrishnan,“Database Management System”,Tata McGraw-Hill Publishing Company, 2003.
2.	Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom, “Database System Implementation”, Pearson Education, 2003.
3.	Peter Rob and Corlos Coronel, “Database System,Design,Implementation and Management”, Thompson Learning Course Technology, Fifth edition, 2003.
4.	Rajiv Chopra,“Database Management System - a Practical Approach“, S.Chand & co

***SDG:9 - Industry Innovation and Infrastructure** **Course Contents and Lecture Schedule**

S.No	Topic	No. of Hours
1	**Introduction and Conceptual Modeling**	
1.1	Introduction to database, Applications of DBMS.	1
1.2	Different Views of Data, Database System Architecture	1
1.3	Database Administrator	1
1.4	Entity Relationship Model	1
1.5	Relational Model	1
1.6	Tuple and Domain Relational Calculus	1
1.7	E-R Diagram Banking application	1

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1.8	Hierarchical Model	1
1.9	Network Model	1
2	**Relational Model**	
2.1	Structure Query Language introduction	1
2.2	Data Definition Language	1
2.3	Data Manipulation Language – Select with where and order by	1
2.4	Select using aggregate function	1
2.5	Select using group by and having clause	1
2.6	Sub query and Views	1
2.7	Triggers	1
2.8	Function and Procedures	1
2.9	Normalization	1
3	**Data Storage and Indexing Concepts**	
3.1	Fixed and Variable length record structure	1
3.2	File Organization	1
3.3	RAID	2
3.4	Static and Dynamic Hashing	1
3.5	Indexing- Single, Multilevel and Mutable	1
3.6	Dense and Sparse Index	1
3.7	B and B+ Tree Index	1
3.8	Heap Organization	1
4	**Transaction Management**	
4.1	Transaction Concept and ACID properties	1
4.2	Transaction States and schedule	1
4.3	Conflict and View serializable schedule	1
4.4	Recoverability	1
4.5	Concurrency Control introduction- Share Lock, Exclusive Lock, Compatibility matrix, upgrade and downgrade	2
4.6	Two-Phase and Time stamp based locking protocol	1
4.7	Recovery Technique – Immediate Update	1
4.8	Recovery Technique – Deferred Update	1
5	**Current Trends**	
5.1	Object Oriented Database, Distributed Database Concept and Types	1
5.2	Distributed Transaction – Two-Phase Commit Protocol	1
5.3	Distributed Transaction – Three-Phase Commit Protocol	1
5.4	Distributed Data Storage	1
5.5	Data Mining Concept and Applications	1
5.6	Classification and Clustering Algorithms	2
5.7	Data Warehouse Concept and Preprocessing	1
5.8	Data Warehouse Schema Models	1
5.9	Designing three dimensional OLAP Cube with its operations	1
	Total	**45**

Course Designer

1. Dr A GNANABASKARAN gnanabaskarana@ksrct.ac.in

60 CS 403	SOFTWARE ENGINEERING	Category	L	T	P	Credit
		PC	2	0	2	3

Objective

- To understand the phases and process in a software Development
- 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 metrics and risk management

Prerequisite

NIL

Course Outcomes

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

CO1	Analyze the key activities in managing a software process and project	Analyze
CO2	Analyze the concepts of requirements engineering and Modeling.	Analyze
CO3	Apply systematic procedure for software design and deployment.	Apply
CO4	Compare and contrast the various testing and maintenance.	Analyze
CO5	Manage project schedule, estimate project cost and Identify Risk	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO1	PSO2
CO1	3	3	2	3						3	3		3	
CO2	3	3	3						2	2	3		3	
CO3	3	3	3								3		3	
CO4	3	3	3	2	3						3		3	
CO5	3	3	3	3	3		2	2	3	2	3	3	3	

3- Strong;2-Medium;1-Some

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests			End Semester
	1	2	3	Examination (Marks)
Remember	10	10	20	10
Understand	10	10	20	10
Apply	20	20	30	20
Analyse	20	20	30	20
Evaluate	-	-	-	-
Create	-	-	-	-

K.S.Rangasamy College of Technology–AutonomousR2022								
60 CS 403 – Software Engineering								
CS								
	Hours/Week				Credit	Maximum Marks		
Semester	L	T	P	Total hrs	C	CA	ES	Total

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BoS Chairman

IV	2	0	2	45	3	50	50	100

Software Process and Agile Development* Introduction to Software Engineering, Software Development Lifecycle Software Process, Perspective and Specialized Process Models–Introduction to Agility-Agile process-Extreme programming-XP Process.	8
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 managementClassical analysis: Structured system Analysis, Petri Nets-Data Dictionary.	**9**
Software Design* Design process–Design Concepts-Design Model–Design Heuristic–Architectural DesignArchitectural styles, Architectural Design, Architectural Mapping using Data Flow-User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components	**8**
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.	**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. **Hands on*:** 1) Develop UML Use case model using Visual Paradigm for UML 8.2 2) Develop sequence diagram using Visual Paradigm for UML 8.2 3) Develop Class diagram using Visual Paradigm for UML 8.2 4) Preparation of SRS for project of Air Ticket Reservation System 5) Develop structural design for project of admission in College Management 6) Write programs in C- Language to demonstrate the working of the following constructs: i) do...while ii) while….do iii) if…else iv) switch v) for 7) A program written in C- language for Matrix Addition, Introspect the Causes for its failure and write down the possible reasons for its failure.	11
Total Hours	45

Text Book(s):	
1.	Roger S. Pressman, Bruce R. Maxim, “Software Engineering – A Practitioner’s Approach”, 9th Edition, Mc Graw-Hill International Edition, 2019.
2.	Ian Sommerville, Software Engineering, 10th Edition, Pearson Education Asia, 2017.
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.

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Software Process and Agile Development**	
1.1	Introduction to Software Engineering	1
1.2	Software Development Lifecycle	1
1.3	Software Process, Perspective	1
1.4	Specialized Process Models	1
1.5	Specialized Process Models	1
1.6	Introduction to Agility-Agile process	1
1.7	Extreme programming	1
1.8	XP Process	1
2	**Requirements Analysis and Specification**	
2.1	Functional and Non-Functional, User requirements	1
2.2	System requirements, Software Requirements Document	1
2.3	Software Requirements Document	1
2.4	Requirement Engineering Process: Feasibility Studies	1
2.5	Requirements elicitation and analysis	1
2.6	Requirements elicitation and analysis	1
2.7	Requirements validation	1
2.8	requirements management	1
2.9	Classical analysis: Structured system	1
3	**Software Design**	
3.1	Design process and Concepts.	1
3.2	Design Model and Design Heuristic	1
3.3	Architectural Design and Architectural styles	1
3.4	Architectural Mapping using Data Flow	1
3.5	User Interface Design	1
3.6	Interface analysis	1
3.7	Component level Design: Designing Class based components	1
3.8	traditional Components	1
4	**Testing and Maintenance**	
4.1	Software testing fundamentals-Internal and external views of Testing	1
4.2	White box testing-basis path testing	1
4.3	White box testing- control structure testing	1
4.4	Black box testing-Regression Testing, Unit Testing , Integration Testing	1
4.5	Black box testing–Validation Testing, System Testing	1
4.6	Debugging, Software Implementation Techniques	1
4.7	Coding practices, Refactoring-Maintenance and Reengineering	1
4.8	BPR model, Reengineering process model	1
4.9	Reverse and Forward Engineering.	1
5	**Project Management**	
5.1	Estimation–LOC, FP Based Estimation	1
5.2	Make/Buy Decision COCOMO I & II Model	1
5.3	Make/Buy Decision COCOMO I & II Model	1
5.4	Scheduling and Earned Value Analysis Planning	1
5.5	Project Plan and Planning Process	1
5.6	Project Plan and Planning Process	1
5.7	RFP Risk Management–Identification	1
5.8	Projection-Risk Management	1
5.9	Risk Identification	1
5.10	RMMM Plan	1
5.11	CASE Tools	1

Course Designers

1. Dr.B.G.GEETHA – geetha@ksrct.ac.in

60 MY 003	STARTUPS AND ENTREPRENEURSHIP

Category	L	T	P	Credit
MY	2	0	0	-

Objective

- To provides practical proven tools for transforming an idea into a product or service that creates value for others.
- To build a winning strategy, how to shape a unique value proposition, prepare a business plan
- To impart practical knowledge on business opportunities
- To inculcate the habit of becoming entrepreneur
- To know the financing, growth and new venture & its problems

Prerequisite

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 Meaning and concept of Entrepreneurship	Understand
CO2	Identify the business opportunities and able prepare business plan	Analyze
CO3	Comprehend the process of innovation, incubation, prototyping and marketing	Understand
CO4	Executing a new venture through various financial resources	Apply
CO5	Grasp the managing growth and rewards in new venture	Understand

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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)		Case Study Report
	1 (25 Marks)	2 (25 Marks)	
Remember (Re)	10	10	50 Marks
Apply (Ap)	20	20	

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Analyse (An)	30	30	
Create (Cr)	0	0	

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60 MY 003 – Startups and Entrepreneurship

Common to all Branches

Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	2	0	0	30	-	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.	100 [6]
Business Opportunity Identification and Preparing a Business Plan* Business ideas, methods of generating ideas, and opportunity recognition, Idea Generation Process, Feasibility study, preparing a Business Plan: Meaning and significance of a business plan, components of a business plan.	[6]
Innovations** Innovation and Creativity - Introduction, Innovation in Current. Environment, Types of Innovation, School of Innovation, Analysing the Current Business Scenario, Challenges of Innovation, Steps of Innovation Management, Experimentation in Innovation Management, Participation for Innovation, Co-creation for Innovation, Proto typing to Incubation. Blue Ocean Strategy-I, Blue Ocean Strategy-II. Marketing of Innovation, Technology Innovation Process	[6]
Financing and Launching the New Venture* Importance of new venture financing, types of ownership, venture capital, types of debt securities, determining ideal debt-equity mix, and financial institutions and banks. Launching the New Venture: Choosing the legal form of new venture, protection of intellectual property, and formation of the new venture.	[6]
Managing Growth and Rewards in New Venture* Characteristics of high growth new ventures, strategies for growth, and building the new ventures. Managing Rewards: Exit strategies for Entrepreneurs, Mergers and Acquisition, Succession and exit strategy, managing failures– bankruptcy.	[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. Howard Love, “The Start-Up J Curve: The Six Steps to Entrepreneurial Success”, Book Group Press, 2011.

***SDG:8 – Decent Work and Economic Growth**

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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***SDG:12 – Responsible Consumption and Production**
****SDG:9 – Industry, Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No. of Periods
1	**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	**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	**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	**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

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4.6	Protection of intellectual property	1
4.7	Formation of the new venture	1
5	**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 Designers

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

60 CS 4P1	**ADVANCED WE LABO**	Category	L	T	P	Credit
		CS	0	0	4	2

Objective

- To learn the concepts of scripting languages and client side programming
- To learn the concepts of jQuery
- To learn the concepts of TypeScript
- To learn the concepts of Angular
- To learn the concepts of PHP and MySQL

Prerequisite

HTML, CSS

Course Outcomes

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

CO1	Describe the basics concepts of JavaScript and express various types events	understand
CO2	Describe the basics concepts of jQuery	understand
CO3	Implement the concepts of TypeScript	understand
CO4	Describe the basics concepts of Angular	Apply
CO5	Develop the dynamic website using PHP and MySQL	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	2	2	3		3				3	2	3
CO2	2	3	3	2	2	3		3				2	2	2

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CO3	2	2	3	2	2	3		3				2	2	2
CO4	2	2	3	3	2	2		3				2	2	2
CO5	2	3	3	3	3	3						1	2	3
3- Strong; 2-Medium; 1-Low														

List of Experiments *

1. JavaScript program implement
   (a) string handling function
   (b) array handing function
2. Form validation using JavaScript program
3. Write a program for JQuery animation
4. Implementation the concept of JQuery AJAX.
5. Implement the concepts of Typescript
6. Write a program for form validation using Angular
7. Implement the concepts of animation and routing using Angular.
8. PHP script implements
   (a) string handling function
   (b) Array handling function
   (c) File handling function
9. PHP script implements database connectivity
10. Write a program for Form validation using PHP script
11. Write a PHP program for GET and POST method
12. Write a PHP program to implement
    (a) Cookies and session
    (b) Inheritance concept

*** SDG:4- Quality Education**

Course Designers

1. Ms.J.MYTHILI - mythili@ksrct.ac.in

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60 CS 4P2	**Database Management Systems Laboratory**	Category	L	T	P	Credit
		PC	0	0	4	2

Objective

- To present SQL and procedural interfaces to SQL comprehensively
- To perform various commands in RDBMS
- To Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers
- To design the applications like payroll
- To apply procedures and functions in PL/SQL

Prerequisite

NIL

Course Outcomes

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

CO1	Implement the Data Definition Language, Data Manipulation Language and Data Control Language commands in RDBMS	Apply
CO2	Employ the Sub queries to retrieve data from multiple tables	Apply
CO3	Implement the High-level language extension with Cursors and Triggers	Apply
CO4	Implement the Procedures and Functions in PL/SQL	Apply
CO5	Demonstrate the views, joins and Embedded SQL In RDBMS	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3		3	2	2		3	3		2	2	2
CO2	3	3	3		3	2	2		3	3		2	2	2
CO3	3	3	3		3	2	2		3	3		2	2	2
CO4	3	3	3		3	2	2		3	3		2	2	2
CO5	3	3	3		3	2	2		3	3		2	2	2

3- Strong; 2-Medium; 1-Low

List of Experiments*

1. Data Definition Language(DDL) commands in RDBMS.
2. Data Manipulation Language(DML), Data Control Language(DCL)and Transaction Control Language (TCL) commands in RDBMS.
3. Implementation of Sub queries.

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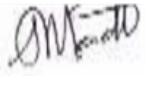

4. Creation of views and joins.
5. High-level language extension with Cursors. 6. High level language extension with Triggers
7. Procedures and Functions.
8. Embedded SQL.
9. Design and implementation of Payroll Processing System.
10. Design and implementation of Banking System.
11. Design and implementation of Railway Reservation System ***SDG:9 - Industry Innovation and Infrastructure**

Course Designer

1.Dr A Gnanabaskaran - gnanabaskarana@ksrct.ac.in

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60 CG 0P3	CAREER SKILL D

Category	L	T	P	Credit
CG	0	0	2	1

Objective

- 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

Prerequisite

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.	Analyze
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, proportions, and profit and loss effectively at the preintermediate 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3		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		3
CO5	3	3	3	3		2				2	3	3		3

3- Strong; 2-Medium; 1-Some

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60 CG 0P3 - Career Skill Development - III								
Common to All Branches								
Semester	Hours/Week			Total Hrs	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 interest 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. Warszaw

***SDG 4 – Quality Education**

***SDG 8 – Decent work and Economic growth**

***SDG 9 – Industry, innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	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	2

1.4	Order and Ranking – odd man out	1
1.5	Direction and distance	1
2	**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	**Critical Reasoning**	
3.1	Syllogism	1
3.2	Statements and Conclusions, Cause and Effect	2
3.3	Statements and Assumptions	1
3.4	identifying Strong Arguments and Weak Arguments	1
3.5	Cause and Action -Data sufficiency	1
4	**Quantitative Aptitude – Part 2**	
4.1	Average - Ratio and proportion	1
4.2	Ages – Partnership	1
4.3	Percentage	1
4.4	Profit & loss	1
4.5	Discount - Mixture and Allegation	2
5	**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	1
5.5	Simple interest and Compound interest	2
	Total	**30**

Course Designer

R. Poovarasan - poovarasan@ksrct.ac.in

60 CS 501	**Artificial In**	Category	L	T	P	Credit
		PC	3	0	0	3

Objective

- Understand the fundamentals of problem solving

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- Interpret the knowledge and reasoning in propositional logic and first order logic
- Gain knowledge on Planning and acting in the real world
- Learn to represent uncertain knowledge in solving AI problems and ML and deep learning algorithms and models
- Understand the different forms of learning and NLP, computer vision

Prerequisite

NIL

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.	Analyze
CO2	Interpret the knowledge of propositional logic and FOL.	Analyze
CO3	Understand the issues of planning problems.	Analyze
CO4	Describe the Uncertainty and probabilistic reasoning and ML and deep learning algorithms and models.	Remember, Understand, Apply
CO5	Summarize the types of learning methods and AI applications, NLP, Computer vision.	Remember, Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	2							2		
2	3	3	2	2	2							2		3
3	3	2	2	2	2	2						2		3
4	3	2	2	2	2	2						3		3
5	3	3	2	2	2							3		2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	30
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

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

Problem Solving Introduction - What is Artificial Intelligence? – Structure of Intelligent Agents –Problem formulation – Uninformed search strategies – Informed search strategies – Constraint satisfaction problems.	**[9]**
Knowledge and Reasoning Logical agents – Propositional logic – First-order logic – Inference in first order logic – Unification - Forward Chaining – Backward Chaining – Resolution.	**[9]**
Planning Planning Problem - Planning with state-space search – Partial-order planning – Planning graphs - Planning and acting in the real world - Conditional planning - Multi agent planningRobotics-Action	**[9]**
Uncertain Knowledge and Reasoning Uncertainty – Notations and Axioms of Probability – Probabilistic Reasoning – Bayesian networks (Semantics, Exact Inference, Approximate Inference) – Inference in Temporal models – Hidden Markov models- Knowledge representation and reasoning through fuzzy logic and Bayesian networks-**Introduction to ML-Machine learning fundamentalsDeep learning***	**[9]**
Learning and Applications Learning from observation –Inductive learning –Decision trees – Ensemble Learning – Explanation based learning – Statistical Learning methods. Applications of Artificial intelligence- Contemporary Issues: Recent Trends & Future of AI Real-world applications: **NLP and Computer Vision***	**[9]**
Total Hours	**45**

Text book(s):

1.	S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2022.
2.	Melanie Mitchell,” Artificial Intelligence: A Guide for Thinking Humans”, Farrar, Straus and Giroux Publisher,2019

Reference(s):

1.	Dan W. Patterson, “Introduction to AI and ES”, Third Edition, Pearson Education, 2007.
2.	Nils J. Nilsson, “The Quest for Artificial Intelligence”, Cambridge University Press, 2009.
3.	Nptel course, Artificial Intelligence, https://nptel.ac.in/courses/106106126/
4.	Stuart Russell,” Human Compatible – Artificial Intelligence and the Problem of Control”,Viking publisher,2019
5.	Carl Dennis,”Machine Learning And Artificial Intelligence: A Comprehensive Guide to Understanding and Implementing ML and AI (2023 Beginner Crash Course)”,Carl Dennis,2023

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Problem Solving**	

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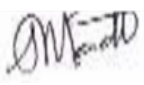

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1.1	Introduction – What is Artificial Intelligence?	2
1.2	Structure of Intelligent Agents	1
1.3	Problem formulation	2
1.4	Uninformed search strategies	1
1.5	Informed search strategies	1
1.6	Constraint satisfaction problems	2
2	**Knowledge and Reasoning**	
2.1	Logical agents	2
2.2	Propositional logic	1
2.3	First-order logic	1
2.4	Inference in first order logic	1
2.5	Unification	1
2.6	Forward Chaining	1
2.7	Backward Chaining	1
2.8	Resolution	1
3	**Planning**	
3.1	Planning Problem	1
3.2	Planning with state-space search	1
3.3	Partial-order planning	1
3.4	Planning graphs	1
3.5	Planning and acting in the real world	1
3.6	Conditional planning	2
3.7	Multi agent planning	1
3.8	Robotics-Action	1
4	**Uncertain Knowledge and Reasoning**	
4.1	Uncertainty	1
4.2	Notations and Axioms of Probability	1
4.3	Probabilistic Reasoning	1
4.4	Bayesian networks (Semantics, Exact Inference, Approximate Inference)	1
4.5	Inference in Temporal models	1
4.6	Hidden Markov models	1
4.7	knowledge representation and reasoning through fuzzy logic and Bayesian networks	1

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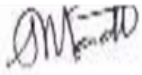

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4.8	Introduction to AI and ML-Machine learning fundamentals	1
4.9	Deep learning	
5	**Learning and Applications**	
5.1	Learning from observation	1
5.2	Inductive learning	1
5.3	Decision trees	1
5.4	Ensemble Learning	1
5.5.	Explanation based learning	1
5.6.	Statistical Learning methods	1
5.7.	Applications of Artificial intelligence	1
5.8.	Contemporary Issues: Recent Trends & Future of AI	1
5.9.	NLP and Computer vision	1
	Total	45

Course Designers

1. R.Vijay Sai -vijaysair@ksrct.ac.in

60 CS 502	Computer Architecture	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To gain the knowledge about basic structure, Instructions, and functional units of a digital computer
- To study the operation of the arithmetic unit including the algorithms and implementation of data manipulation.
- To understand the different types of control and the concept of pipelining and study the hierarchical memory system, cache memory
- To realize the communication with I/O devices and standard I/O interfaces
- To recognize the instruction and thread level parallelism concepts and multicore processors

Pre-requisites

Nil

Course Outcomes

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

CO1	Understand the basic structure of computer, Instruction sequencing and Addressing modes.	Apply
CO2	Design adders, subtractors for fixed point numbers, multipliers and divisors of fixed numbers and floating-point numbers	Apply

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CO3	Analyze instruction execution with control signals and pipelining operations	Analyze
CO4	Predict the cache memory and its performance, interrupts, buses, Direct Memory Access and Standard I/O Interfaces	Apply
CO5	Gain Knowledge about Parallelism concepts, compiler techniques, multiprocessor architecture and case studies on Intel's processors	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	2							2		2		2
2	3	3	2		2					2		2		2
3	3	3	2		2		2			2		2		2
4	2	2	2							2		2		2
5	3	2	2				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	10	10	20
Understand	10	10	20
Apply	20	20	30
Analyse	20	20	30
Evaluate	0	0	0
Create	0	0	0
Total	60	60	100

K. S. Rangasamy College of Technology – Autonomous R2022								
60 CS 502 - Computer Architecture								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Basic Structure of Computers* Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.	[9]
Arithmetic Unit* Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.	[9]

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BoS Chairman

Basic Processing Unit* Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.	[9]
Memory and I/O Systems* Speed, Size, Cost– Cache memories – Performance considerations – Accessing I/O Devices – Interrupts – Direct Memory Access – Buses– Interface Circuits– PCI, USB.	[9]
High Performance Computing* Instruction Level Parallelism: ILP concepts – Super pipelined and VLIW processor architectures- Array and vector processors - Dynamic Scheduling -Hardware Based Speculation – Static scheduling – Thread Level Parallelism: Symmetric and Distributed Shared Memory Architectures – Case studies: Intel core i7, Atom Processors	[9]
Total Hours:	45

Text Book(s):	
1.	Carl Hamacher, Zvonko Vranesic and SafwatZaky, 6th Edition "Computer Organization", McGraw-Hill, 2012.
2	David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software Interface", 5th Edition, Morgan Kaufmann, 2014.
Reference(s):	
1.	William Stallings, "Computer Organization and Architecture – Designing for Performance", 9th Edition, Pearson Education, 2012.
2.	John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 2012.
3.	http://www.ni.com/white-paper/11266/en/#toc1
4.	https://techreport.com/review/15818/intel-core-i7-processors https://www.intel.in/content/www/in/en/products/processors/atom.html

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S. No.	Topics	No. of hours
1.0	**Basic Structure of Computers**	
1.1	Functional units	1
1.2	Basic operational concepts, Bus Structures	2
1.3	Software performance	1
1.4	Memory locations, addresses and Memory operations	1
1.5	Instruction sequencing	1
1.6	Addressing modes	1
1.7	Assembly language	1
1.8	Basic I/O operations – Stacks and queues	1
2.0	**Arithmetic Unit**	
2.1	Addition and subtraction of signed numbers	2
2.2	Design of fast adders	2
2.3	Multiplication of positive numbers	1
2.4	Signed operand multiplication and fast multiplication	2

2.5	Integer division	1
2.6	Floating point numbers and operations	1
3.0	**Basic Processing Unit**	
3.1	Fundamental concepts	1
3.2	Execution of a complete Instruction	1
3.3	Multiple bus organization	1
3.4	Hardwired control and Micro programmed control	1
3.5	Basic concepts of Pipelining	1
3.6	Data hazards and Instruction hazards	1
3.7	Influence on Instruction sets	1
3.8	Data path and control consideration	1
3.9	Superscalar operation	1
4.0	**Memory and I/O Systems**	
4.1	Speed, Size, Cost	1
4.2	Cache memories	1
4.3	Performance considerations	1
4.4	Accessing I/O Devices	1
4.5	Interrupts	1
4.6	Direct Memory Access	1
4.7	Buses	1
4.8	Interface Circuits	1
4.9	PCI, USB	1
5.0	**High Performance Computing**	
5.1	Instruction Level Parallelism: ILP concepts	1
5.2	Super pipelined and VLIW processor architectures	1
5.3	Array and vector processors	1
5.4	Dynamic Scheduling	1
5.5	Hardware Based Speculation	1
5.6	Static scheduling	1
5.7	Thread Level Parallelism	1
5.8	Symmetric and Distributed Shared Memory Architectures	1
5.9	Case studies: Intel core i7, Atom Processors	1

Course Designers

1. Dr. R. CHITHRA – chithra@ksrct.ac.in

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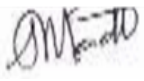

BoS Chairman

60 CS 503	OPERATING S

Category	L	T	P	Credit
PC	3	0	0	3

Objective

- To describe the services provided by and the design of an operating system.
- To understand the structure and organization of the file system, processes synchronization, process scheduling, system calls and different approaches to memory management.

Prerequisite

Basic Knowledge of Data Storage and Management

Course Outcomes

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

CO1	Recognize the basics of system software, operating systems and its structures	Understand
CO2	Analyze the process scheduling and synchronization problem	Analyze
CO3	Examine the deadlocks and memory management	Analyze
CO4	Comprehend the file concepts and directory structure	Analyze
CO5	Recognize the concepts of allocation methods and disk scheduling.	Analyze

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2									3	3	
CO2	3	3	3	3			2			2		2	3	2
CO3	3	3	3	3			2			2		2	3	
CO4	3	2	3									2	3	
CO5	3	3	3	3			2					2	3	2

3- Strong;2-Medium;1-Some

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests			End Semester Examination(Marks)
	1	2	3	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	20	20	20	40
Analyse	10	10	10	20
Evaluate	-	-	-	-
Create	-	-	-	-

K.S.Rangasamy College of Technology – Autonomous R2022				
60 CS 503 - Operating Systems				
CS				
	Hours/Week		Credit	Maximum Marks

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Semester	L	T	P	Total hrs	C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Concepts of Operating Systems* Computer system overview - concept of an operating system - batch system – multiprogramming – multiprocessing - multi user - time sharing - personal system - parallel system - real time system - simple monitors - general system architecture - System components - operating system services - system calls - system programs - system structure - Approaches to OS design and implementation: Microkernel, Layered, Kernel Approach- Mobile operating systems: Symbian OS, Android OS, iphone(iOS), iPhone OS (iOS)	[9]
Processes and Threads* Concept of process - process states - process state transitions - process control block - operations on processes – threads - concurrent processes - mutual exclusion and synchronization - principles of deadlocks - integrated deadlocks strategy - scheduling levels - scheduling criteria - Inter process synchronization - Inter process communication – Linux - IPC Mechanism - Remote procedure calls - RPC exception handling - security issue	[9]
Memory Management and Data Management* Logical and physical address space - storage allocation and management techniques - swapping concepts of multi programming – paging – segmentation - virtual storage management strategies - demand paging - page replacement algorithm – thrashing	[9]
Storage Management * File organization - record blocking - access method - directory structure - protection file system structure - allocation methods - free space management - directory implementation - disk structure - disk scheduling - disk management – buffering - swap space management - RAID levels	[9]
Case Studies and OS Abstractions * Installation of OS: Windows – Android – OS - Linux/Unix OS design and architecture - Unix shell - Unix operating system services - user perspective - representation of files in Unix system processes and their structure – input - output system - memory management in Unix - Processes: fork – wait – exec – exit – kill – getpid – brk – nice – sleep – trace - Files: open – close – read – write – lseek – stat – sync - Directories: mkdir – rmdir – link – unlink – mount - umount users + - Security: chown – chmod – getuid – setuid - Inter process communication: signals – pipe - Networking: socket – accept – snd – recv - connect	[9]
Total Hours	45

Text Book(s):

1. Galvin & Silberschatz – “Operating System”, 7th Edition, John Willey 2015.
2. Dhamdhare, “Operating Systems-A Concept Based Approach” - TMH 2006.

Reference(s):

1. EktaWalia, “Operating System Concepts”, Khanna Book Publishing - 2020.
2. William Stallings, “Operating systems Internals and design principles” ,Pearson Education- 2012
3. Crowley, “Operating Systems –A Design Oriented Approach”, TMH -2001
4. Andrew S. Tanenbaum, “Operating systems Design and Implementation” - Pearson Education - 2009

***SDG:9 - Industry Innovation and Infrastructure**

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Concepts of Operating Systems**	
1.1	Computer system overview-concept of an operating system	1
1.2	Batch system-multiprogramming	1
1.3	Multiprocessing-multi user	1
1.4	Time sharing-personal system	1
1.5	Parallel system-real time system	1
1.6	Simple monitors-general system architecture	2
1.7	System components	1
1.8	Operating system services-system calls	1
1.9	System programs-system structure	1
1.10	Approaches to OS design and implementation: Microkernel	1
1.11	Mobile operating systems	1
2	**Processes and Threads**	
2.1	Concept of process-process states	1
2.2	Process state transitions-process control block	1
2.3	Operations on processes-threads	1
2.4	Concurrent processes-mutual exclusion and synchronization	1
2.5	Principles of deadlocks-integrated deadlocks strategy	1
2.6	Scheduling levels-scheduling criteria	1
2.7	Inter process synchronization-Inter process communication	1
2.8	Linux-IPC Mechanism	1
2.9	Remote procedure calls-RPC exception handling-Security issues	2
3	**Memory Management and Data Management**	
3.1	Logical and physical address space-storage allocation and management techniques	1
3.2	swapping concepts of multi programming-paging-segmentation	1
3.3	virtual storage management strategies-demand paging,	1
3.4	page replacement algorithm-thrashing-File organization	1
3.5	record blocking-accessmethod-directory structure	1
3.6	protection file system structure-allocation methods-free space management	1
3.7	directory implementation-disk structure-disk scheduling	1
3.8	disk management-buffering-swap space management-RAID levels	1
4	**OS Security**	
4.1	Types of Threats in OS	1
4.2	Basic OS Security Mechanisms	1
4.3	Understanding the Threats: Malware Taxonomy: Viruses-Worms	1
4.4	Rootkits	1
4.5	Defence: An Overview	1
4.6	Logging	1
4.7	Auditing and Recovery	1

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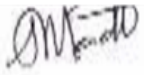

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4.8	OS-level Memory Protection	1
5	**Case Studies and OS Abstractions**	
5.1	Linux/Unix OS design and architecture- Unix shell	2
5.2	Unix operating system services	1
5.3	User perspective	1
5.4	Representation of files in Unix system processes and their structure	1
5.5	Input-output system	1
5.6	Memory management in Unix, Processes: fork, wait, exec, exit, kill, getpid, brk, nice, sleep, trace	1
5.7	Files: open, close, read, write, lseek, stat, sync,	2
5.8	Directories: mkdir, rmdir, link, unlink, mount, umount users +	1
5.9	Security: chown, chmod, getuid, setuid,	1
5.10	Inter process communication: signals, pipe,	1
5.11	Networking: socket, accept, snd, recv, connect	1
	Total	**50**

Course Designers

Mrs.R.KABILA- kabila@ksrct.ac.in

60 CS 504	**Formal Language an**	Category	L	T	P	Credit
		PC	3	1	0	4

Objective

- 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.

Prerequisite NIL

Course Outcomes

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

CO1	Understand the basic properties of formal language and finite automata.	Understand
CO2	Understand regular expressions and the properties of regular languages.	Understand
CO3	Construct grammars to produce strings from a specific language.	Apply

CO4	Construction of Push Down Automata.	Apply
CO5	Interpret the uses of Turing machine and Recognize the undecidability, and Interactable problems.	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3	2							1		3	3
2	3	3	2	2									3	3
3	3	3	2					2			2	2	3	3
4	3	3	3	2				2		1	2		3	3
5	3	3	2					2		1	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 (Re)	10	10	20
Understand (Un)	10	10	20
Apply (Ap)	20	30	40
Analyze (An)	20	10	20
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

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60 CS 504 – Formal Language and Automata Theory

CS

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

INTRODUCTION **[9]**

Alphabets, Strings and Languages, Automata and Grammars - Deterministic finite Automata (DFA)-Formal Definition, Simplified notation, State transition graph, Transition table, Language of DFA - Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA - Minimization of Finite Automata - MyhillNerode Theorem, FA with output - Moore and Mealy machine, Equivalence of Moore and Mealy Machine - **Applications and Limitation of FA***.

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REGULAR EXPRESSION Definition, Operators of regular expression and their precedence - Algebraic laws for Regular expressions, Kleen's Theorem - Regular expression to FA, DFA to Regular expression - Arden Theorem, Non Regular Languages - Pumping Lemma for regular Languages - Application of Pumping Lemma - Closure properties of Regular Languages - Decision properties of Regular Languages.	**[9]**
GRAMMAR FORMALISM Regular grammars - Right linear and left linear grammars - Equivalence between regular linear grammar and FA - Context Free Grammar, Definition, Examples, Derivation - Derivation trees, Ambiguity in Grammar - Inherent ambiguity, Ambiguous to Unambiguous CFG -	**[9]**
Simplification of CFGs - Normal forms for CFGs - CNF and GNF - Closure properties of CFLs; Decision Properties of CFLs- Emptiness, Finiteness and Membership - Pumping lemma for CFLs.	
PUSH DOWN AUTOMATA (PDA) Description and definition, Instantaneous Description - Language of PDA, Acceptance by Final state, Acceptance by empty stack - Deterministic PDA, Equivalence of PDA and CFG - CFG to PDA and PDA to CFG - Two stack PDA.	**[9]**
TURING MACHINES Basic model, Definition and representation, Instantaneous Description - Language acceptance by TM - Computable functions, Types of Turing machines - Recursive and recursively enumerable languages - Halting problem.	**[9]**
Total Hours	**45**

Text book(s):	
1.	S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2022.
2.	Melanie Mitchell," Artificial Intelligence: A Guide for Thinking Humans", Farrar, Straus and Giroux Publisher,2019
Reference(s):	
1.	Dan W. Patterson, "Introduction to AI and ES", Third Edition, Pearson Education, 2007.
2.	Nils J. Nilsson, "The Quest for Artificial Intelligence", Cambridge University Press, 2009.
3.	Nptel course, Artificial Intelligence, https://nptel.ac.in/courses/106106126/
4.	Stuart Russell," Human Compatible – Artificial Intelligence and the Problem of Control",Viking publisher,2019
5.	Carl Dennis,"Machine Learning And Artificial Intelligence: A Comprehensive Guide to Understanding and Implementing ML and AI (2023 Beginner Crash Course)",Carl Dennis,2023

***SDG:9 - Industry Innovation and Infrastructure Course Contents and Lecture Schedule**

S.No	Topic	No. of Hours
1	**INTRODUCTION**	
1.1	Alphabets, Strings and Languages, Automata and Grammars	1
1.2	Deterministic finite Automata (DFA)-Formal Definition, Simplified notation, State transition graph,Transition table, Language of DFA	1
1.3	Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA,	2

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1.4	Equivalence of NFA and DFA	1
1.5	Minimization of Finite Automata	1
1.6	Myhill-Nerode Theorem, FA with output	1
1.7	Moore and Mealy machine, Equivalence of Moore and Mealy Machine	1
1.8	Applications and Limitation of FA.	1
2	**REGULAR EXPRESSION**	
2.1	Definition, Operators of regular expression and their precedence	1
2.2	Algebraic laws for Regular expressions, Kleen's Theorem	2
2.3	Regular expression to FA, DFA to Regular expression	1
2.4	Arden Theorem, Non Regular Languages	1
2.5	Pumping Lemma for regular Languages	1
2.6	Application of Pumping Lemma	1
2.7	Closure properties of Regular Languages	1
2.8	Decision properties of Regular Languages.	1
3	**GRAMMAR FORMALISM**	
3.1	Regular grammars-Right linear and left linear grammars	1
3.2	Equivalence between regular linear grammar and FA	1
3.3	Context Free Grammar, Definition, Examples, Derivation	1
3.4	Derivation trees, Ambiguity in Grammar,	1
3.5	Inherent ambiguity, Ambiguous to Unambiguous CFG	1
3.6	Simplification of CFGs	1
3.7	Normal forms for CFGs - CNF and GNF	1
3.8	Closure properties of CFLs; Decision Properties of CFLs- Emptiness, Finiteness and Membership,	1
3.9	Pumping lemma for CFLs.	1
4	**PUSH DOWN AUTOMATA (PDA)**	
4.1	Description and definition, Instantaneous Description	1
4.2	Language of PDA, Acceptance by Final state, Acceptance by empty stack	2
4.3	Deterministic PDA,	2
4.4	Equivalence of PDA and CFG - CFG to PDA and PDA to CFG	2
4.5	Two stack PDA.	2
5	**TURING MACHINES**	
5.1	Basic model, Definition and representation, Instantaneous Description	1
5.2	Language acceptance by TM	1
5.3	Computable functions, Types of Turing machines	2

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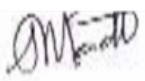

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5.4	Recursive and recursively enumerable languages	1
5.5	Halting problem	1
5.6	Introduction to Undecidability, Undecidable problems about TMs,	1
5.7	Post correspondence problem (PCP), Modified PCP.	2
	Total	**45**

Course Designers

1. Mr.P.THANGAMARIAPPAN – thangamariappan@ksrct.ac.in

60 CS 505	**Design T**

Category	L	T	P	Credit
PC	3	0	0	3

Objective

- Learn the innovation cycle of Design Thinking process for developing innovative products.
- Learn Design Thinking as a Problem Solving approach to tackle problems innovatively.
- Imbibe the knack of “Asking the Right Questions” to solve problems correctly. Imbibe and immerse into Design Tools to enhance user experience, prototype, etc., Apply Design Thinking Tools to visualize holistic development of budding idea.

Prerequisite

NIL

Course Outcomes

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

CO1	Compare and classify the various learning styles and memory techniques and Apply them in their engineering education	Understand
CO2	Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products	Understand
CO3	Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products	Apply
CO4	Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development	Apply
CO5	Perceive individual differences and its impact on everyday decisions and further Create a better customer experience	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	2	2	3	2	2	3	2	3	2
CO2	3	3	2	3	2	2		3	2	2	3	2	3	2

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CO3	3	3	2	3	2	2			3	2	3	2	3	2
CO4	3	3	2	3	2	2		3	3	2	3	3	3	3
CO5	3	3	2	3	2	2	2	3	3	2	3	3	3	3
3- Strong;2-Medium;1-Some														

Assessment Pattern

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

K.S.Rangasamy College of Technology – Autonomous R2022							
60 CS 505 Design Thinking							
CS							
Semester	Hours/Week			Total hrs.	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

An Insight to Learning and remembering memory Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting - Understanding the Memory process, Problems in retention, Memory enhancement techniques- Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers	**[9]**
Basics of Design Thinking Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test	**[9]**
Being Ingenious & Fixing Problem Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving - Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, Assignment – Engineering Product Design	**[9]**
Prototyping & Testing Prototype - Rapid Prototype Development process, Testing, Sample Example, Test Group Marketing - Understanding Individual differences & Uniqueness, Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences.	**[9]**
Design Thinking & Customer Centricity* Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design - Feedback, Re-Design & Re-Create - Feedback loop, Focus on User Experience, Address "ergonomic challenges, User focused design, rapid prototyping & testing, final product, Final Presentation.	**[9]**
Total Hours	**45**
Text book(s):	

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1.	Christian Mueller-Roterberg, Handbook of Design Thinking - Tips & Tools for how to design thinking
2.	Designing for Growth: a design thinking tool kit for managers By Jeanne Liedtka and Tim Ogilvie.
3.	Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation by Tim Brown.
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
3.	Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4.	http://ajjuliani.com/design-thinking-activities/
5	https://venturewell.org/class-exercises

***9 - Industry, Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**AN INSIGHT TO LEARNING AND REMEMBERING MEMORY**	
1.1	Understanding the Learning Process	1
1.2	Kolb’s Learning Styles	1
1.3	Assessing and Interpreting	1
1.4	Understanding the Memory process	1
1.5	Memory enhancement techniques	1
1.6	Understanding Emotions: Experience & Expression	2
1.7	Assessing Empathy	1
1.8	Application with Peers	1
2	**BASICS OF DESIGN THINKING**	
2.1	Need for Design Thinking	1
2.2	Objective of Design Thinking	1
2.3	Concepts &Brainstorming, Stages of Design Thinking Process	2
2.4	Empathize, Define	2
2.5	Ideate	1
2.6	Prototype	1
2.7	Test	1
3	**BEING INGENIOUS & FIXING PROBLEM**	
3.1	Understanding Creative thinking process	1
3.2	Understanding Problem Solving	1
3.3	Testing Creative Problem Solving	1

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3.4	Process of Engineering Product Design	1
3.5	Design Thinking Approach	1
3.6	Stages of Product Design	1
3.7	Examples of best product designs and functions	2
3.8	Engineering Product Design	1
4	**PROTOTYPING & TESTING**	
4.1	Prototype	1
4.2	Rapid Prototype Development process	2
4.3	Testing, Sample Example	2
4.4	Test Group Marketing	1
4.5	Understanding Individual differences & Uniqueness	1
4.6	Acceptance and appreciation of Individual differences.	2
5	**DESIGN THINKING & CUSTOMER CENTRICITY**	
5.1	Practical Examples of Customer Challenges	1
5.2	Use of Design Thinking to Enhance Customer Experience	1
5.3	Parameters of Product experience	1
5.4	Alignment of Customer Expectations with Product Design	1
5.5	Re-Design & Re-Create	1
5.6	Focus on User Experience	1
5.7	User focused design	1
5.8	Rapid prototyping & testing	1
5.9	Final Presentation	1
	Total	45

Course Designers

1. M. Varshana Devi- varshanadevi@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

60 CS 5P1	Operating Syste

Category	L	T	P	Credit
PC	0	0	4	2

Objective

- To identify and solve the issues related to Operating System Components.
- To learn different programming language in Linux editor environment
- To implement different operating system algorithm
- To implement the performance of different algorithms like CPU scheduling
- To implement the performance of different algorithms like page replacement, deadlock avoidance and detection

Prerequisite NIL

Course Outcomes

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

CO1	Learn the basics of Operating system installation and shell scripts and analyze the System calls for Process and inter process communications	Apply
CO2	Examine the Steps in process operation and examine the criteria involved in CPU scheduling algorithms.	Apply
CO3	Analyzing the different deadlock avoidance mechanism and implement Classic problem of Synchronization using semaphores	Apply
CO4	Classifying the Storage Management and outline the page replacement algorithms	Apply
CO5	Comprehend the File concept and its allocations and understand the factors in disk scheduling algorithms	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2						2			3		
2	3	3	3	3			2		2	2		2		3
3	3	3	3	3			2		2	2		2		3
4	3	2	3									2		3
5	3	3	3	3			2					2		2
3- Strong;2-Medium;1-Some														

K.S.Rangasamy College of Technology–Autonomous R2022
60 CS 5P1 – Operating Systems Laboratory

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	4	60	2	60	40	100

1. Installation of Operating system and implementation of Basic Shell Programming Concepts like Loops, Functions, Patterns, Substitutions*.
2. Familiarization with System calls for Process and inter process communications*.
3. Implement the operation on process*.
4. Implement and analyze the scheduling criteria's of CPU Scheduling Algorithms*.
5. Implement Deadlock avoidance mechanism from deadlock in a real time environment using C*.
6. Implement Classic problem of Synchronization using semaphores*.
7. Implement Contiguous Memory Allocation*.
8. Implement Page replacement algorithm*.
9. Implement various file allocation Methods*.
10. Implement Disk Scheduling to find the seek time of accessing the required information using different Scheduling algorithm*.

*** SDG:9 - Industry Innovation and Infrastructure**

Course Designers

1. Ms.R.KABILA – kabila@ksrct.ac.in

60 CS 5P2	DESIGN THINKI	Category	L	T	P	Credit
		PC	0	0	4	2

Objective

- To develop a deep understanding of users' perspectives, needs, and pain points through empathy.
- To embrace an iterative approach to problem-solving, where ideas, prototypes, and solutions are continually refined based on user feedback and testing, leading to improved outcomes.
- To move beyond theoretical discussions and drive action by taking tangible steps toward prototyping and implementing solutions in a real-world context.
- To embrace an iterative approach to problem-solving, where ideas, prototypes, and solutions are continually refined based on user feedback and testing, leading to improved outcomes.

Prerequisite

NIL

Course Outcomes

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

CO1	Compare and classify the various learning styles and memory techniques and Apply them in their engineering education
CO2	Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products

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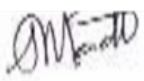

BoS Chairman

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	
CO1	3	3	2	3	2	2	2	3	2	2	3	2	3	2
CO2	3	3	2	3	2	2		3	2	2	3	2	3	2
CO3	3	3	2	3	2	2			3	2	3	2	3	2
CO4	3	3	2	3	2	2		3	3	2	3	3	3	3
CO5	3	3	2	3	2	2	2	3	3	2	3	3	3	3

3- Strong; 2-Medium; 1-Low

CO3	Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products
CO4	Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development
CO5	Perceive individual differences and its impact on everyday decisions and further Create a better customer experience

Mapping with Programme Outcomes

P

K.S.Rangasamy College of Technology–Autonomous R2022							
60 CS 5P2 – Design Thinking Laboratory							
CS							
Semester	Hours/Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
V	0	0	4	60	2	60	40	100

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1. Experimental activity on the product they like and dislike based on their experience -Identify the steps in the Design thinking process*.
2. Explanation of Stanford Model-D, Identifies the steps in Empathize phase and target activity*.
3. Immersion activity by groups - Define problem statement and recognize steps Ideate phase*. Idea on Six thinking hats.
4. Apply design thinking to create a prototype to improve any existing products or service*.
5. Peer Review Activity *
6. Six thinking hats Game- Combining Immersion and Persona creation to create prototype*.
7. Activity on Doodling*.
8. Story telling Activity-Agile thinking definition - Define customer perception and expectations - Define product and customer satisfaction*.
9. Test the Prototype*.

***9 - Industry, Innovation and Infrastructure**

Course Designers

1. M. Varshana Devi - varshanadevi@ksrct.ac.in

60 CG 0P4	**CAREER SKILL DE**	Category	L	T	P	Credit
		CS	0	0	2	1*

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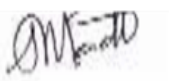

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Objective

- 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

Prerequisite

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 Analyze technical texts	
~~CO3 Analyze problems in order to arrive at feasible solutions and Analyze communicate~~ orally and in the written format.	them
~~CO4 Report events and the processes of technical and industrial nature. Apply CO5 Articulate their opinions in a planned and logical manner, and draft Apply effective résumés~~ in context of job search.	

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3		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		3
CO5	3	3	3	3		2				2	3	3		3
3- Strong; 2-Medium; 1-Some														

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CG 0P4 - Career Skill Development IV								
Common to All Branches								
Semester	Hours/Week			Total Hrs	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]**

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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**

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. Warszaw

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

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Verbal & Analytical Reasoning**	
1.1	Seating Arrangements	1
1.2	Analytical Reasoning (PUZZELS)	1
1.3	Machin input and output	1
1.4	Coded Inequality	1
1.5	Eligibility Test	2
2	**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	**Non-Verbal Reasoning**	
3.1	Series Completion of Figures – Classification	1
3.2	Courting of figure – Figure matrix	1

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3.3	Embedded Figure – Complete Figure	1
3.4	Paper Cutting and Folding	1
3.5	Mirror images and Water Images	2
4	**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	**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

R. Poovarasan - poovarasan@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

60 CS 601	CRYPTOGRAPHY AND SECURITY	Category	L	T	P	Credit
		HS	3	0	0	3

Objective

- To know about various encryption techniques.
- To understand the concept of Public key cryptography and number theory.
- To study about message authentication and hash functions To understand key management and user authentication
- To impart knowledge on Network security and web security

Prerequisite

Basic knowledge of Computer Networks.

Course Outcomes

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

CO1	Apply various Cryptographic Techniques and symmetric key cryptography techniques to solve real world problems	Understand
CO2	Apply various public key cryptography techniques to real case scenarios	Analyze
CO3	Make use of Hashing and Digital Signature techniques to solve the problems.	Apply
CO4	Demonstrate the various mutual trust and User authentication mechanisms.	Apply
CO5	Determine the appropriate Security Protocols and standards for the given application.	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3					2	3	3	2	3	2	3
CO2	3	3	3					2	3	3	2	3	2	3
CO3	3	2	3					2	3	3	2	3	2	3
CO4	3	2	3					2	3	3	2	3	2	3
CO5	3	2	3					2	3	3	2	3	2	3
3- Strong;2-Medium;1-Some														

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination(Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	30	30	60
Analyse	10	10	-
Evaluate	-	-	-

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Create	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS 601–Cryptography and Network Security								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction* Computer Security Concepts – The OSI Security Architecture – Security Attacks – services and mechanisms – Model for Network Security – Classical encryption techniques – Block ciphers and Data Encryption Standard – Advanced Encryption Standard – Block cipher operation	[9]
Public key cryptography* Public key cryptography and RSA – Other Public key cryptosystems – Diffie-Hellman Key Exchange - Elgamal Cryptographic System – Elliptic Curve Arithmetic – Elliptic Curve Cryptography.	[9]
Message authentication and integrity* Cryptographic hash functions – Message authentication codes: Message Authentication Requirements – Message Authentication Functions – Requirements for Message Authentication Codes – Security of MACs – MACs Based on Hash Functions: HMAC – Digital signatures: Elgamal Digital Signature Scheme – Schnorr Digital Signature Scheme – NIST Digital Signature Algorithm – Elliptic Curve Digital Signature Algorithm.	[9]
Key management and User authentication* Key management and distribution: symmetric key distribution using symmetric and asymmetric encryption – Distribution of public keys – X.509 Certificates – Public key infrastructure – Remote user authentication principles – Remote user authentication using symmetric and asymmetric encryption – Kerberos – Federated identity management – Personal identity verification.	[9]
Network and Internet Security* Network access control and cloud security – Transport level security – Wireless network security – Electronic mail security – IP security-Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.	[9]
Total Hours	**45**

Text Book(s):	
1.	William Stallings, "Cryptography and Network Security", 7th Edition, Pearson Education, 2017.
2	Behrouz A. Ferouzan & Debdeep Mukhopadhyay, "Cryptography and Network Security", 3rd Edition, Tata Mc Graw Hill, 2015.
Reference(s):	

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1.	Charles P Fleeger, "Security in Computing", 5th Edition, Prentice Hall of India, 2015.
2.	Niels Ferguson, “Cryptography Engineering: Design Principles and Practical Applications”, Wiley, First Edition, 2010
3.	Jean-Philippe Aumasson,” SERIOUS CRYPTOGRAPHY A Practical Introduction to Modern Encryption”, William Pollock publisher,1st Edition,2018
4.	Atul Kahate, Cryptography and Network Security, TMH. (2013)

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**Introduction**	
1.1	Computer Security Concepts	1
1.2	The OSI Security Architecture	1
1.3	Security Attacks	1
1.4	services and mechanisms	1
1.5	Model for Network Security	1
1.6	Classical encryption techniques	1
1.7	Block ciphers and Data Encryption Standard	1
1.8	Advanced Encryption Standard	1
1.9	Block cipher operation	
2	**Public key cryptography**	
2.1	Public key cryptography and RSA	2
2.2	Other Public key cryptosystems	1
2.3	Diffie-Hellman Key Exchange	2
2.4	Elgamal Cryptographic System	1
2.5	Elliptic Curve Arithmetic	1
2.6	Elliptic Curve Cryptography	2
3	**Message authentication and integrity**	
3.1	Cryptographic hash functions	1
3.2	Message authentication codes: Message Authentication Requirements	1
3.3	Message Authentication Functions	1
3.4	Requirements for Message Authentication Codes	1
3.5	Security of MACs – MACs Based on Hash Functions: HMAC	1
3.6	Digital signatures: Elgamal Digital Signature Scheme	1
3.7	Schnorr Digital Signature Scheme	2
3.8	NIST Digital Signature Algorithm	1
3.9	Elliptic Curve Digital Signature Algorithm.	
4	**Key management and User authentication**	
4.1	Key management and distribution: symmetric key distribution using symmetric and asymmetric encryption	1

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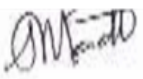

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4.2	Distribution of public keys	1
4.3	X.509 Certificates	1
4.4	Public key infrastructure	1
4.5	Remote user authentication principles	1
4.6	Remote user authentication using symmetric and asymmetric encryption	1
4.7	Kerberos	1
4.8	Federated identity management	1
4.9	Personal identity verification	1
5	**Network and Internet Security**	
5.1	Network access control and cloud security	1
5.2	Transport level security	1
5.3	Wireless network security	1
5.4	Electronic mail security – IP security	1
5.5	Intruders, Malicious Software	1
5.6	Viruses and Related Threats,	1
5.7	Counter Measures	1
5.8	Firewalls and its Design Principles.	2
	Total Hours	**45**

Course Designers

1. Ms. J. Mythili – mythili@ksrct.ac.in

		Category	L	T	P	Credit
60 CS 602	**Principles of Compiler Design**	PC	3	1	0	4

Objective

- To learn the various phases of compiler and lexical analysis.
- To understand the concepts of syntax analysis and its parsing techniques.
- To learn and understand the translation of statements processes involved in intermediate code generation.
- To understand the design issues of runtime environment and code generation. To know the importance of code optimization techniques.

Prerequisite

Formal Language and Automata Theory

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BoS Chairman

Course Outcomes

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

CO1	Understand the basics of compilers and the phases of a compiler.	Remember, Understand,
CO2	Interpret the role of the syntax analysis and parsing techniques	Understand Apply, Analyze
CO3	Examine the processes involved in intermediate code generation	Understand Apply, Analyze
CO4	Investigate the design issues of a code generator and target machine.	Understand Apply
CO5	Apply and analyze the code optimization techniques.	Understand Apply, Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3		2		3	3	1	3	3	3
CO2	3	3	3	3	3		2		3	2	3	2	3	3
CO3	3	3	2	2	3		2		3	2	1	2	3	2
CO4	3	2	2	1	2		2		2	3	2	3	3	2
CO5	3	3	3	2	2		2		2	2	1	3	3	3

3- Strong;2-Medium;1-Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Semester Examination (Marks)
	1	2	
Remember (Re)	5	5	10
Understand (Un)	15	15	20
Apply (Ap)	20	20	30
Analyse (An)	20	20	40
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

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BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS 602 – Principles of Compiler Design								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	1	0	60	4	40	60	100

VI	**COMPILER AND LEXICAL ANALYSIS*** Introduction to Compilers – Structure of Compiler – Phases of Compiler – Cousins of Compiler – Grouping of Phases – Compiler Construction Tools. Role of the Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – A Language for Specifying Lexical Analyzer.	[8]
	SYNTAX ANALYSIS* The Role of the Parser – Context-Free Grammars – Writing a Grammar – Top Down Parsing – Recursive Descent Parser –- Predictive Parser – LL(1) Parser – Bottom-Up Parsing – Shift Reduce Parser – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.	[10]
	INTERMEDIATE CODE GENERATION* Intermediate Languages – Three-Address Code – Types and Declarations –Translation of Expressions – Rules for Type Checking and Type Conversions –Control Flow –Back patching – Switch Statements – Procedures.	[9]
	RUN-TIME ENVIRONMENT AND CODE GENERATION* Runtime Environments – Source Language Issues - Storage Organization – Storage Allocation Strategies – Static, Stack and Heap Allocation – Parameter Passing – Symbol Tables – Dynamic Storage Allocation – Issues in the Design of a Code Generator – Basic Blocks and Flow graphs – Design of a Simple Code Generator – Optimal Code Generation for Expressions – Dynamic Programming Code Generation.	[9]
	CODE OPTIMIZATION* Principal Sources of Optimization – Peep-hole Optimization – DAG- Optimization of Basic Blocks – Global Data Flow Analysis – Efficient Data Flow Algorithm – Recent Trends in Compiler Design.	[9]
	Total Hours: 45 + 15 (Tutorial)	**60**

Text Book(s):

1.	Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, “Compilers Principles, Techniques and Tools”, Second Edition, Pearson Education, 2012.
2.	Santanu Chattopadhyay, “Compiler Design”, Second Edition, PHI Learning, 2011.

Reference(s):

1.	V. Raghavan, “Principles of Compiler Design”, Tata McGraw-Hill Education, 2010.
2.	Allen I. Holub, “Compiler Design in C”, Second Edition, Prentice Hall of India, 2003.

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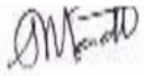

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3.	C.N. Fisher and R.J. LeBlanc, “Crafting a Compiler with C”, Second Edition Benjamin Cummings, 2008.
4.	J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.
5.	David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007.
6.	K.Muneeswaran, “Compiler Design”, Oxford University Press, 2013.

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**COMPILER AND LEXICAL ANALYSIS**	
1.1	Introduction to Compilers, Structure of Compiler	1
1.2	Phases of Compiler	1
1.3	Cousins of Compiler, Grouping of Phases	1
1.4	Compiler Construction Tools	1
1.5	Role of the Lexical Analyzer	1
1.6	Input Buffering	1
1.7	Specification of Tokens, Recognition of Tokens	1
1.8	A Language for Specifying Lexical Analyzer	1
2	**SYNTAX ANALYSIS**	
2.1	The Role of the Parser	1
2.2	Context-Free Grammars, Writing a Grammar	1
2.3	Top Down Parsing, Recursive Descent Parser	1
2.4	Predictive Parser, LL(1) Parser	2
2.5	Bottom-Up Parsing, Shift Reduce Parser	1
2.6	LR Parsers, SLR Parser	2
2.7	Canonical LR Parser	1
2.8	LALR Parser	1
3	**INTERMEDIATE CODE GENERATION**	
3.1	Intermediate Languages	1
3.2	Three-Address Code	1
3.3	Types and Declarations	1
3.4	Translation of Expressions	1
3.5	Rules for Type Checking and Type Conversions	1
3.6	Control Flow	1
3.7	Back patching	2
3.8	Switch Statements, Procedures	1
4	**RUN-TIME ENVIRONMENT AND CODE GENERATION**	
4.1	Runtime Environments, Source Language Issues	1
4.2	Storage Organization	1

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4.3	Storage Allocation Strategies, Static, Stack and Heap Allocation	1
4.4	Parameter Passing, Symbol Tables	1
4.5	Dynamic Storage Allocation	1
4.6	Issues in the Design of a Code Generator, Basic Blocks and	1
	Flow graphs	
4.7	Design of a Simple Code Generator	1
4.8	Optimal Code Generation for Expressions	1
4.9	Dynamic Programming Code Generation	1
5	**CODE OPTIMIZATION**	
5.1	Principal Sources of Optimization	1
5.2	Peephole Optimization	1
5.3	DAG, Optimization of Basic Blocks	2
5.4	Global Data Flow Analysis	2
5.5	Efficient Data Flow Algorithm	2
5.6	Recent Trends in Compiler Design	1
	Total Hours	**45**

Course Designers

1. Dr. R.GOPINATH – gopinath@ksrct.ac.in

60 CS 603	**Data S**	Category	L	T	P	Credit
		PC	3	0	0	3

Objective

- The objective of this course is to impart necessary knowledge of the mathematical foundations needed for data science and develop programming skills required to build data science applications.

Prerequisite

Fundamentals in linear algebra / statistics / probability

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

Course Outcomes

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

CO1	Understand the basics of Data Sciences	Remember, Understand
CO2	To know the mathematical foundations needed for Data Science and perform Exploratory Data Analysis	Remember, Apply, Analyze
CO3	Implement models such as k-nearest Neighbors, Naive Bayes, linear and logistic Regression, decision trees, neural networks and clustering	Remember, Understand, Apply Analyze
CO4	Create effective visualization of given data	Remember, Understand, Apply
CO5	Build data science applications	Remember, Apply

Mapping with Programme Outcomes

CO' s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3			2							1	2	3
2	3	3	3	2	3	3			2		2	2	2	3
3	3	3	3	3	3				2		2	2	2	3
4	3	3	3	2	3				2			3	2	3
5	2	3	3	3	3	3	3		2		2	3	2	3

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	20	20	40
Analyze (An)	15	15	30
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS 603 – Data Science								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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VI	3	0	0	45	3	40	60	100

Introduction to core concepts and technologies* Introduction, Terminology, Data-Properties of Data, Types of data, Why Data Science? Computer Science, Data Science, and Real Science, data science process, Data Acquisition and Data Science Life Cycle, Ethics in Data Science, data science toolkit, Example applications. Data wrangling: Sources of data, Data collection and API, Working with data: Reading Files, Cleaning Data.	**[8]**
Statistical Inference, Exploratory Data Analysis* Statistical thinking in Data Science, Statistical Inference, Statistical Analysis - Mean, Median, Mode, Standard Deviation, Range, Percentile, Modeling, Exploratory Data Analysis: Philosophy of Exploratory Data Analysis, Data visualization, Missing value analysis, The correction matrix, Outlier detection analysis.	**[9]**
Basic Machine Learning Algorithms:** Brief introduction, Linear / Polynomial Regression, Logistic Regression, Classification, Regularization, Support vector machines, Naive Bayes, Cross Validation, Label Encoding, Random Forests, Decision Trees, Clustering, Dimensionality reduction, Manifold learning, 2D/3D Convolution,	**[8]**
Data visualization** Introduction, Types of data visualization, Data Visualization - Basic principles, ideas and tools for basic data visualization tools (plots, graphs and summary statistics)- various visualization	**[12]**
techniques used in Data Science. Data visualization Tool: Overview of Power BI , Key features and capabilities ; Data Preparation -Connecting to Various Data Sources (SQL, Excel, Web.) , Data Transformation using Power Query, Data Cleaning and Data Profiling ; Data Visualization-Building Basic Visualizations (Bar charts, Line charts, etc.) , Designing Interactive Dashboards , Applying Filters and Slicers	
Applications of Data Science** Case Studies of Data Science Application, Recommender Systems on Real-World Data Sets, Weather forecasting, Stock market prediction, Object recognition, Matching Skills to Job.	**[8]**
Total Hours	**45**

Text book(s):

1.	Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from The Frontline. O'Reilly, 2013
2.	Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media

Reference(s):

1.	Jure Leskovek, Anand Rajaraman, Jeffrey Ullman, Mining of Massive Datasets. v2.1, Cambridge University Press, 2014.
2.	Aurélien Géron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow: Concepts, Tools, and Techniques to Build Intelligent Systems", 1st Edition, O'Reilly Media
3.	Jeeva Jose, "Machine Learning", Khanna Publishing House, Delhi.
4.	Jack A.Hyman,"Microsoft Power BI for Dummies", Wiley India,2023
5.	Jain V.K., "Data Sciences", Khanna Publishing House, Delhi.

*** SDG:12- Responsible Consumption and Production**

**** SDG:13- Climate Action**

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Introduction to core concepts and technologies**	
1.1	Importance of Subject, syllabus, COs, POs and PSOs	1
1.2	Introduction, Terminology, Data	1
1.3	Properties of Data, Types of data, Why Data Science?	
1.4	Computer Science, Data Science, and Real Science, data science process	1
1.5	Data Acquisition and Data Science Life Cycle	1
1.6	Ethics in Data Science	1
1.7	Data science toolkit, Example applications	1
1.8	Data wrangling	1
1.9	Sources of data, Data collection and API	1
1.10	Working with data: Reading Files, Cleaning Data	1
2	**Statistical Inference, Exploratory Data Analysis**	
2.1	Statistical thinking in Data Science	1
2.2	Statistical Inference	1
2.3	Statistical Analysis	
2.4	Modeling	1
2.5	Exploratory Data Analysis	1
2.6	Philosophy of Exploratory Data Analysis	1
2.7	Data visualization	1
2.8	Missing value analysis	1
2.9	The correction matrix	1
2.10	Outlier detection analysis	1
3	**Basic Machine Learning Algorithms**	
3.1	Brief introduction, Linear / Polynomial Regression	1
3.2	Logistic Regression, Classification, Regularization,	1
3.3	Support vector machines	1
3.4	Naive Bayes, Cross Validation	2
3.5	Label Encoding, Random Forests, Decision Trees	1
3.6	Clustering, Dimensionality reduction	2
3.7	Manifold learning	1
3.8	2D/3D Convolution,	1
3.9	Introduction to Neural Networks, Evaluation Metrics	
4	**Data visualization**	

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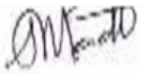

BoS Chairman

4.1	Introduction, Types of data visualization	1
4.2	Data Visualization	1
4.3	Basic principles	1
4.4	Ideas and tools for basic data visualization tools (plots)	1
4.5	Various visualization techniques used in Data Science	1
4.6	Overview of Power BI , Key features and capabilities Connecting to Various Data Sources (SQL, Excel, Web.)	2
4.7	Data Transformation using Power Query, Data Cleaning and Data Profiling	1
4.8	Create your own visualization of a complex dataset	1
4.9	Building Basic Visualizations (Bar charts, Line charts, etc.) , Designing Interactive Dashboards , Applying Filters and Slicers	2
5	**Applications of Data Science**	
5.1	Case Studies of Data Science Application	2
5.2	Recommender Systems on Real World Data Sets 01	1

Course Designers

1. Dr.B.G.Geetha : geetha@ksrct.ac.in

		Category	L	T	P	Credit
60 CS 6P1	**CRYPTOGRAPHY SECURITY L/**	PC	0	0	4	2

Objective

- To implement various encryption techniques.
- To understand the concept of Public key cryptography and number theory.
- To study about message authentication and hash functions To understand key management and user authentication
- To impart knowledge on Network security and web security

Prerequisite

Basic knowledge of Computer Networks

Course Outcomes

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

CO1	Apply various Cryptographic Techniques and symmetric key cryptography techniques to solve real world problems	Understand
CO2	Apply various public key cryptography techniques to real case scenarios	Analyze
CO3	Make use of Hashing and Digital Signature techniques to solve the problems.	Apply
CO4	Demonstrate the various mutual trust and User authentication mechanisms.	Apply

CO5	Determine the appropriate Security Protocols and standards for the given application.	Analyze

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3					2	3	3	2	3	3	3
2	3	3	3					2	3	3	2	3	3	3
3	3	2	3					2	3	3	2	3	3	2
4	3	2	3					2	3	3	2	3	3	2
5	3	2	3					2	3	3	2	3	3	2
3- Strong;2-Medium;1-Some														

K.S.Rangasamy College of Technology–Autonomous R2022

60 CS 6P1 – Cryptography and Network Security Laboratory

CS

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

1. Perform encryption, decryption using the following substitution techniques*
   i. Ceaser cipher ii. Playfair cipher iii. Hill Cipher iv. Vigenere cipher
2. Perform encryption and decryption using following transposition techniques* Rail fence - Row & Column Transformation
3. Apply DES algorithm for practical applications*
4. Apply AES algorithm for practical applications*
5. Implement RSA Algorithm using HTML and JavaScript*
6. Implement the Diffie-Hellman Key Exchange algorithm for a given problem*
7. Calculate the message digest of a text using the SHA-1 algorithm*
8. Implement the SIGNATURE SCHEME - Digital Signature Standard*
9. Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w*

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10. Automated Attack and Penetration Tools Exploring N-Stalker, a Vulnerability Assessment Tool*
11. Defeating Malware - Building Trojans, Rootkit Hunter*

****SDG:9 - Industry Innovation and Infrastructure**

Course Designers

1. Ms.J. Mythili – mythili@ksrct.ac.in

60 CS 6P2	**Data Scienc**	Category	L	T	P	Credit
		PC	0	0	4	2

Objective

- The objective of this course is to impart necessary knowledge of the mathematical foundations needed for data science and develop programming skills required to build data science applications

Prerequisite

Fundamentals in linear algebra / statistics / probability

Course Outcomes

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

CO1	Understand Data exploration and preprocessing	Apply
CO2	Implement models such as Linear and Logistic regression, Naive Bayes classifier model and regularized logistic regression.	Analyze
CO3	Implement models such as Ensemble techniques, Decision trees,	Apply
CO4	Build model using SVM with different kernels and kNN algorithm to classify a dataset.	Apply
CO5	Create effective visualization of given data.	Analyze

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3			2							1	2	3
2	3	3	3	2	3	3			2		2	2	2	3
3	3	3	3	3	3				2		2	2	2	3
4	3	3	3	2	3				2			3	2	3
5	2	3	3	3	3	3	3		2		2	3	2	3
3- Strong;2-Medium;1-Some														

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60 CS 6P2 – Data Science Laboratory							
CS							
Semester	Hours/Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
VI	0	0	4	60	2	60	40	100

1. Perform Data exploration and preprocessing*
2. Implement Linear and Logistic regression*
3. Implement Naive Bayes classifier for dataset stored as CSV file.*
4. Implement regularized logistic regression*
5. Build models using different Ensembling techniques*
6. Build models using Decision trees*
7. Build model using SVM with different kernels*
8. Implement K-NN algorithm to classify a dataset*
9. Connect to Various Data sources (SQL,EXCEL,WEB) using Power BI*
10. Perform Data Cleaning and Transformation Challenge by using Power BI*

Mini project to predict the time taken to solve a problem given the current status of the user.

*** SDG:13- Climate Action**

Course Designers

1. Dr.B.G.Geetha – geetha@ksrct.ac.in

60 CG 0P5	Comprehension Test*	Category	L	T	P	C	CA	ES	Total
Semester VI		CG	0	0	2	1*	100	-	100

Objectives

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 To evaluate the knowledge gained in core courses relevant to the programme of study. To assess the technical skill in solving complex engineering problems.

Prerequisite

Fundamental knowledge in all core subjects.

Course Outcomes

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

CO1	Infer knowledge in their respective programme domain.	Apply
CO2	Attend interviews for career progression	Apply
CO3	Exhibit professional standards to solve engineering problems	Apply
CO3	Promote holistic approach to problem solving	Apply
CO5	Examine the competency of graduates in specific programme domain	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2					1	2	2	3
CO2	3	3	2	2					1	2	2	3
CO3	3	3	2	2					1	2	2	3
CO4	3	3	2	2					1	2	2	3
CO5	3	3	2	2					1	2	2	3
3- Strong;2-Medium;1-Some												

Assessment Pattern

The overall knowledge of the candidate in various courses he/she studied shall be evaluated with multiple choice questions.

*SDG:4- Quality Education

60 CS E11	**Node.js ar**	Category	L	T	P	Credit
		PE	2	0	2	3

Objective

- To learn the runtime web development for easily building fast and scalable network applications.

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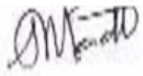


BoS Chairman

- To enhance the knowledge in event-driven and real-time applications that run across distributed devices.
- To learn the streams and file systems in Node Js
- To acquire the knowledge on web development and database connectivity
- To Acquire the knowledge of MVC template on user interfaces using React JS

Prerequisite

HTML, CSS, JavaScript

Course Outcomes

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

CO1	Examine the fundamental structure of Node.js platform	Remember,
CO2	Affirm the concepts of NPM	Understand
CO3	Gain the knowledge of database connectivity using node.js	Apply
CO4	Interpret the concepts of React JS	Apply
CO5	Annotate the various features of React js.	Analyze

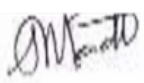
Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	2		3			2	3	2		3	2	
2	2	3	2		3			2	3	2		3	2	
3	2	3	2	2	3			2	3	2		3	2	
4	2	3	2	2	3			2	3	2		3	2	
5	2	3	2		3			2	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 (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	25	25	30
Analyze (An)	10	10	40
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

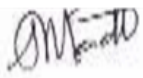


BoS Chairman

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E11 – Node.js and React.js								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	2	45	3	50	50	100

Introduction to Node.js* The environment of Node.js - Benefits and Features - Install Node.js on Windows - Console and Web programs - Node.js REPL Commands	**[9]**
NPM* Node.js Package Manager - Installing modules using NPM - Node.js Command Line Options - Node.js Errors - Node.js DNS - Node.js Net	**[9]**
Web Development** Node.js Web Module - Node.js html form handling - Node.js Database Connectivity	**[9]**
Introduction to React.js The environment of React.js - Benefits and Features – components – state – lifecycle – events – forms – CSS	**[9]**
React.js The React ES6 – React Render HTML - React JSX – React class – React Lists – React Router **Hands On*:** 1. Read the text file and print the content using file system module 2. Design the employee web page using html. Using node js program call the HTML file which display the output in browser. 3. Sample buffer program for different operations • Creating buffer • Concatenating the buffer • Copying buffer • Buffer length • Compare • Slice • Converting buffer to JSON file 4. Read the data from one text file and write the content to another text file using readerStream, writerStream. 5. Sample Node JS program using pipe and chaining using streams 6. Node JS program for various file operation using File System • Reading the file • Writing the file • Truncating the file • Deleting the file	**[9]**

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

7. Design the sample student registration form using html and call these html file using node.js, which will display output in browser. 8. Sample program using functional and class component in react.js 9. React Js program to style the html component using CSS Style sheet, Inline styling and CSS module. 10. Mini Project • Node JS database connectivity • React JS controlled Or Uncontrolled form design	
Total Hours	**45**

Text book(s):	
1.	Practical Node. Js Building Real-World Scalable Web Apps, AzatMardan, APRESS Publication, 2018.
2.	**Mastering Node.js,** Sandro Pasquali, Kevin Faaborg, Packt Publishing Limited; 2nd edition,2017
Reference(s):	
1.	Node.js in Action, Alex Young, Bradley Meck, Mike Cantelon, Manning Publications, 2017
2.	Learning React, Alex banks & Eve Porcello, O'Reilly Publications, 2017.
3.	https://www.w3schools.com/REACT/default.asp
4.	https://www.tutorialspoint.com/nodejs/nodejs_introduction.htm

*SDGs – 4: Quality Education

**SDGs – 8: Productive employment and decent work for all

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Introduction to Node.js**	
1.1	The environment of Node.js	1
1.2	Benefits and Features	1
1.3	Install Node.js on Windows	2
1.4	Console programs	1
1.5	Web programs	1
1.6	Node.js REPL Commands	2
2	**NPM**	
2.1	Node.js Package Manager	2
2.2	Installing modules using NPM	1
2.3	Node.js Command Line Options	2

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2.4	Node.js Errors	1
2.5	Node.js DNS	2
2.6	Node.js Net	1
3	**Web Development**	
3.1	Node.js Web Module	3
3.2	Node.js html form handling	3
3.3	Node.js Database Connectivity	5
4	**Introduction to React.js**	
4.1	The environment of React.js	2
4.2	Benefits and Features	1
4.3	components	1
4.4	state	1
4.5	lifecycle	1
4.6	events	1
4.7	forms	1
4.8	CSS	1
5	**React JS**	
5.1	The React ES6	2
5.2	React Render HTML	1
5.3	React JSX	2
5.4	React class	1
5.5.	React Lists	1
5.6	React Router	1
	Total	45

Course Designers

1. S Vadivel - vadivels@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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60 CS E12	C# and .N

Category	L	T	P	Credit
PE	2	0	2	3

Objective

- To gain the fundamental skills in C# programming Language
- To gain knowledge in object-oriented concepts in C#
- To understand the concepts of the .NET Core and its platform
- To implement data manipulation using Razor pages
- To enhance the knowledge in Model-View-Controller architecture

Prerequisite

NIL

Course Outcomes

At the end of the course, the students will be able to

CO1	Know the basic concepts of C#	Understand
CO2	Understand the Object-Oriented concepts in C#	Understand
CO3	Ability to develop web pages using ASP.NET Core platform	Apply
CO4	Implement the data manipulation concept using Razor Pages	Apply
CO5	Integrate the concept of MVC in ASP.NET Core platform	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	2					1		3	2	
2	3	3			2					2		1	3	
3	3	3		3	2					3		3	3	
4	3	2	2		2					3		3	3	
5	3	3		3	2					3		3	3	
3- Strong;2-Medium;1-Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)	End Sem Examination (Marks)

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BoS Chairman

	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	30
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E12 C# and .NET Core								
B.E. Computer Science and Engineering								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	2	45	3	50	50	100

Introduction to C#: Introducing C# – Understanding .NET – Overview of C# – Literals – Variables – Data Types – Operators –Expressions – Branching – Looping – Methods – Arrays – Strings – Structures – Enumerations.	**[8]**
Object-Oriented Programming in C#: Classes–Objects –Inheritance– Methods –Polymorphism –Interfaces –Operator Overloading – Delegates –Events–Errors–Exceptions–Collections–Managing File system	**[8]**
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 codebehind files..	**[10]**
Data Manipulation using Razor Pages:* Introduction to ADO.NET-Database connectivity concept using ADO.NET – Connection Class with Authentication – Command Class – DataReader Class –DataAdapter Class – DataSet – OnGet –OnPost – OnPostDelete – OnPostEdit – OnPostView – REST API –Model and Controller for REST API.	**[10]**
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. **Hands on:*** 1. Develop simple application using C#. 2. Implement inheritance and Operator overloading using C#. 3. Design an ASP.NET Webpage to work with Dropdown list and ListBox controls. 4. Write a C# programs to demonstrate the concepts of Label, Text Box and Button controls. 5. Create a ADO.NET application in C# to verify if the connection is established with	**[9]**

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	OLEDB and MS-ACCESS. 6. Create a ADO.NET applications in C# to demonstrate the Data Reader, Data Set, Data Adapter and Data View Objects 7. Develop a Registration Form with all Validation Controls. 8. Create a Web Service for all Arithmetic operations	
	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.	https://docs.microsoft.com/en-us/aspnet/core/	
2.	Christian Nagel, "Professional C# 7 and .NET Core 2.0", 1st Edition, Wiley Publication, 2018	
3.	Andrew Troelsen Phil Japikse," Pro C# 8 with .NET Core 3: Foundational Principles and Practices in Programming", Apress, 2020	
4.	Jon Skeet," C# in Depth",Fourth Edition, 2019	

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	Introduction to C#:	
1.1	Introducing C# - Understanding .NET	1
1.2	Overview of C# - Literals	1
1.3	Variables - Data Types - Operators -Expressions	1
1.4	Branching - Looping	1
1.5	Methods - Arrays	2
1.6	Strings	1
1.7	Structures - Enumerations	1
2	Object-Oriented Programming in C#:	
2.1	Object-Oriented Programming in C# -Classes - Objects	1
2.2	Inheritance	1
2.3	Methods - Polymorphism - Interfaces	1
2.4	Operator Overloading	1
2.5	Delegates -Events	1
2.6	Errors - Exceptions -	1
2.7	Collections	1

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2.8	Managing File system.	1
3	ASP.NET Core Web Application using Razor Pages:	
3.1	Introduction to ASP.NET Core Web Application	2
3.2	Environment Setup	1
3.3	Project Layout	1
3.4	Static and Default Files	1
3.5	Enabling and Defining Razor Pages	2
3.6	Shared Layouts	1
3.7	Shared Layouts Using code-Managing File system.	2
4	Data Manipulation using Razor Pages:	
4.1	Introduction to ADO.NET	1
4.2	Database connectivity concept using ADO.NET	1
4.3	Connection Class with Authentication	1
4.4	Command Class	1
4.5	DataReader Class	1
4.6	DataAdapter Class	1
4.7	DataSe	1
4.8	OnGet -OnPost – OnPostDelete	1
4.9	OnPostEdit – OnPostView	1
4.10	REST API -Model and Controller for REST API.	1
5	Model-View-Controller (MVC) in ASP.NET Core:	
5.1	Introduction to MVC	1
5.2	Setting up an ASP.NET Core MVC Website	1
5.3	MVC Routing	1
5.4	Controllers and Actions	1
5.5	Model – Views	1
5.6	Parameters Passing	1

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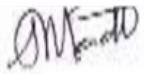

BoS Chairman

5.7	View Helpers	1
5.8	Model Validation.	1
	Total	45

CourseDesigners

1. K. Dineshkumar -dineshkumark@ksrct.ac.in

60 CS E13	Generative AI	Category	L	T	P	Credit
		PE	3	0	0	3

Objective

- To get an introduction to Generative AI
- To learn the language models and LLM architectures of generative AI
- To understand the Generative Pre-Trained Transformer
- To work with LangChain framework
- To learn about prompt engineering

Prerequisite

Knowledge on statistics, linear algebra, matrix, calculus, probability, programming languages and data modelling

Course Outcomes

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

CO1	Understand the generative AI basics	Understand
CO2	Apply the language models and LLM architectures in generative AI	Apply
CO3	Develop the ChatGPT from Generative Pre-trained Transformer	Apply
CO4	Recognize the concept of LangChain framework	Apply
CO5	Comprehend the concept of Prompt Engineering	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3	2	3				3	2			3	
2	3	2	3	2	3	2	2		3	2			3	

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3	3	2	3		3	2			3	2		3	3	
4	3	2	3		3			3	3	2		3	3	3
5	3	2	3	2	3	2	1	3	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 (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E13–Generative AI								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Introduction to Generative AI* Introduction to Artificial Intelligence – Machine Learning -Difference between AI and Machine Learning – Deep Learning – Deep Learning Model Types - Generative AI - Definition and scope of Generative AI - Overview of generative models and their applications - Importance of Generative AI in various domains - Ethical considerations and challenges	**[8]**
Generative AI: Language Models and LLM Architectures* Introduction to language models and their role in AI - Traditional approaches to language modeling - Deep learning-based language models and their advantages - Overview of popular LLM architectures: RNNs, LSTMs, and Transformers	**[9]**
Understanding GPT (Generative Pre-trained Transformer)** Introduction to GPT and its significance - Pre-training and fine-tuning processes in GPT - Architecture and working of GPT models - Overview of GPT variants and their use cases **ChatGPT: A Practical Application of GPT** Introduction to ChatGPT and its purpose - Training data and techniques for ChatGPT - Handling user queries and generating responses - Tips for improving ChatGPT's performance	**[10]**

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LangChain: Simplifying Development with Language Models** Introduction to LangChain and its objectives - Overview of the LangChain framework and its components - Streamlining application development using LangChain - Examples of applications built with LangChain	**[9]**
Prompt Engineering: Enhancing Model Outputs** Understanding the concept and significance of prompt engineering - Strategies for designing effective prompts - Techniques for controlling model behavior and output quality - Best practices for prompt engineering in generative AI.	**[9]**
Total Hours	**45**

Text Book(s):	
1.	Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", Illustrated edition, The MIT Press, 2016.
2.	Alger Fraley, "The Artificial Intelligence and Generative AI Bible", AlgoRay Publishing, 2023.
Reference(s):	
1.	David Foster, "Generative Deep Learning", O'Reilly Media, Inc, 2019
2.	Michael Negnevitsky, "Artificial Intelligence: A Guide to Intelligent Systems Paperback", 2011
3.	Jakub Langr, Vladimir Bok,"GANs in Action: Deep learning with Generative Adversarial Networks", First Edition, Manning, 2019.
4.	Joseph Babcock, Raghav Bali,"Generative AI with Python and TensorFlow 2: Create images,
	text, and music with VAEs, GANs, LSTMs, Transformer models", Packt Publishing Limited, 2021

***SDG:4 – Quality Education**

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction to Generative AI**	
1.1	Introduction to Artificial Intelligence	1
1.2	Machine Learning ,Difference between AI and Machine Learning	1
1.3	Deep Learning ,Deep Learning Model Types	1
1.4	Generative AI , Definition and scope of Generative AI ,Overview of generative models and their applications	2
1.5	Importance of Generative AI in various domains - Ethical considerations and challenges	2
1.6	Ethical considerations and challenges	1
2	**Generative AI: Language Models and LLM Architectures**	
2.1	Introduction to language models and their role in AI	3
2.2	Traditional approaches to language modeling	2
2.3	Deep learning-based language models and their advantages	2

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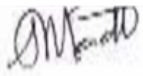

BoS Chairman

2.4	Overview of popular LLM architectures: RNNs, LSTMs, and Transformers	2
3	**Understanding GPT (Generative Pre-trained Transformer)**	
3.1	Introduction to GPT and its significance	1
3.2	Pre-training and fine-tuning processes in GPT	1
3.3	Architecture and working of GPT models	1
3.4	Overview of GPT variants and their use cases	1
3.5	Introduction to ChatGPT and its purpose	2
3.6	Training data and techniques for ChatGPT	1
3.7	Handling user queries and generating responses	1
3.8	Tips for improving ChatGPT's performance	1
4	**LangChain: Simplifying Development with Language Models**	
4.1	Introduction to LangChain and its objectives	2
4.2	Overview of the LangChain framework and its components	3
4.3	Streamlining application development using LangChain	3
4.4	Examples of applications built with LangChain	1
5	**Prompt Engineering: Enhancing Model Outputs**	
5.1	Understanding the concept and significance of prompt engineering	2
5.2	Strategies for designing effective prompts	3
5.3	Techniques for controlling model behavior and output quality	2
5.4	Best practices for prompt engineering in generative AI	2
	Total	45

Course Designers

1. Dr. K.Poongodi -poongodik@ksrct.ac.in

60 CS E14	**Ang**	Category	L	T	P	Credit
		PE	2	0	2	3

Objective

- Understanding Basic concept of Angular.
- Properly separate the model, view, and controller layers of your application and implement them using Angular.

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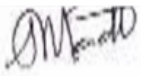

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- Master Angular expressions, filters, Angular directives and scopes.
- Build Angular forms.
- Understand the design of single-page applications and how AngularJS facilitates their development.

Prerequisite

NIL

Course Outcomes

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

CO1	Build an awesome User Interface	Apply
CO2	Create and bind controllers with JavaScript	Analyze
CO3	Validate user input data	Analyze
CO4	Write own filters, directives and controls	Apply
CO5	Create animation in web page and Create single page application	Apply

Mapping with Programme Outcomes

CO' s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2	2	3			2	2	2	3	3	3	2
2	3	2	2	2	3			2	2	2	3	3	3	2
3	3	2	2	2	3			2	2	2	3	3	3	2
4	3	2	2	2	3			2	2	2	3	3	3	2
5	3	2	2	2	3			2	2	2	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 (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	20	15	50
Analyze (An)	20	20	20
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

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60 CS E14 – ANGULAR								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	2	45	3	50	50	100

Introduction What is AngularJS?, Why AngularJS?, Features of AngularJS, AngularJS architecture, Setting up the Environment, Model-View-Controller explained, My first AngularJS app All about Angular expressions, How to use expressions, Number and String Expressions.	**[9]**
Data and Event Binding Object Binding and Expressions, Working with Arrays, Forgiving Behaviour, Angular expressions v/s Javascript expressions, Built-in filters, Uppercase and Lowercase Filters, Currency and Number Formatting Filters, OrderBy Filter, Filter Filter, Using AngularJS filters, Creating custom filters Introduction to AngularJS Modules, Module Loading and Dependencies, Creation vs Retrieval, Bootstrapping AngularJS Role of a Controller, Attaching properties and functions to scope, Nested Controllers.	**[9]**
Directives Introduction to Directives, Directive lifecycle, Using AngularJS built-in directives, Core Directives, Conditional Directives, Style Directives, Mouse and Keyboard Events Directives, Matching directives, Creating a custom directives.	**[9]**
Forms Working with Angular Forms, Model binding, Understanding Data Binding, Binding controls to data, Form controller, Validating Angular Forms, Form events, Updating models with a twist, $error object What is scope, Scope lifecycle, Two way data binding, Scope inheritance, Scope & controllers, Scope & directives, $apply and $watch, Rootscope, Scope broadcasting, Scope events	**[9]**
Single Page Application (SPA)* what is SPA, Pros & Cons of SPA, Installing the ngRoute module, Configure routes, Passing parameters, Changing location, Resolving promises, Create a Single Page Application AngularJS Animation - ngAnimate Module, CSS transforms, CSS transitions, Applying animations, Directives supporting animation. **Hands on:*** 1. Build an Angular Application and serve it on a server. 2. Create an Angular application. Build a component inside the application in order to implement a simple login form. 3. Create an Angular application. Create a component to implement two-way binding which is a combination of both property binding and event binding. 4. Create an Angular application. Create a component to define the switch structural directive. The user will enter their choice of course based on which the switch directive will choose an appropriate output. 5. Write a program to show thw responses while the Form is in the Submitted State and provide an Edit Button. 6. Create an Angular application. Create a component to inject a service into it. The component will also display the data provided by the service. The service will provide an array of employee details.	**[9]**
Total Hours	**45**
Text book(s):	

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1.	Learning Angular: A no-nonsense guide to building web applications with Angular 15, by Aristeidis Bampakos (Author), Pablo Deeleman (Author), 4th Edition,2023.
2.	Angular Form Essentials: Learn the essentials to get started creating forms with Angular, Authored by Google Developer Expert, Cory Rylan. 2019
Reference(s):	
1.	Pro Angular 9 4th edn Unknown Binding – 1 January 2020, by Adam Freeman
2.	Angular 8 for Enterprise-Ready Web Applications -: Build and deliver production-grade d an evergreen Angular apps at cloud-scale by Doguhan Uluca, 27 April 2020..

*** SDG:4- Quality Education**

Course Designers

1. **Ms. VARSHANA DEVI M** - varshanadevi@ksrct.ac.in

60 CS E15	**Parallel and Distri**	Category	L	T	P	Credit
		PE	3	0	0	3

Objective

- To understand the need and fundamentals of parallel computing paradigms
- To learn the nuances of parallel algorithm design
- To understand the programming principles in parallel computing architectures
- To learn few problems that are solved using parallel algorithms
- To learn fault tolerant techniques and various algorithms

Prerequisite NIL

Course Outcomes

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

CO1	Understanding the requirements of Parallel Computing	Understand
CO2	Apply the knowledge of different types of methodologies like mapping techniques	Apply
CO3	Recognize the concept of message passing and shared address space	Understand

CO4	Review the concepts of distributed computing paradigm with applications	Understand
CO5	Apply the knowledge of fault tolerant techniques	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3		1							2		3
2	2	1	3	3	2							1		3
3	2	3	1	3	3							1		3
4	3	3	2								1	2		3
5	2	3	3	2	1							1		3

Assessment Pattern

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

K.S.Rangasamy College of Technology–Autonomous R2022

60 CS E15-Parallel and Distributed Computing

CS

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

INTRODUCTION TO PARALLEL COMPUTING* Scope of Parallel Computing – Parallel Programming Platforms – Implicit Parallelism – Limitations of Memory System Performance – Control Structure of Parallel Platforms – Communication Model of Parallel Platforms –Physical Organization of Parallel Platforms – Communication Costs in Parallel Machines – Impact of Process -Processor Mapping and Mapping Techniques.	**[9]**

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PARALLEL ALGORITHM DESIGN* Preliminaries – Decomposition Techniques – Characteristics of Tasks and Interactions – Mapping Techniques for Load Balancing – Methods for Containing Interaction Overheads – Parallel Algorithm Models – Basic Communication Operations – One-to-All Broadcast and Allto-One Reduction – All-to-All Broadcast and Reduction – All-Reduce and Prefix Sum Operations – Scatter and Gather – All-to-All Personalized Communication- Circular Shift – Improving the Speed of some Communication Operations.	**[9]**
PROGRAMMING USING MESSAGE PASSING AND SHARED ADDRESS SPACE* Principles of Message Passing Programming – Building Blocks – Send and Receive Operations – MPI – Message Passing Interface – Topologies and Embedding – Overlapping Communication with Computation – Collective Communication and Computation Operations – Groups and Communicators – POSIX thread API – OpenMP: a Standard for Directive based Parallel Programming – Applications of Parallel Programming - Matrix-Matrix Multiplication – Solving Systems of Equations – Sorting Networks - Bubble Sort Variations – Parallel Depth First Search.	**[9]**
DISTRIBUTED COMPUTING PARADIGM* Paradigms for Distributed applications – Basic algorithms in Message passing Systems – Leader Election in Rings – Mutual Exclusion in Shared Memory.	**[9]**
FAULT TOLERANT DESIGN* Synchronous Systems with Crash Failures – Byzantine Failures – Impossibility in Asynchronous Systems - Formal Model for Simulation – Broadcast and Multicast – Specification of a Broadcast Service – Implementing a Broadcast Service – Multicast in Groups – Distributed Shared Memory – Linearizable – Sequentially Consistent Shared Memory – Algorithms	**[9]**
Total Hours	**45**

Text book(s):

1.	Ananth Grama, Anshul Gupta, George Karypis and Vipin Kumar, “Introduction to Parallel Computing”, Second Edition, Pearson Education, 2009.
2.	Haggit Attiya and Jennifer Welch, “Distributed Computing – Fundamentals, Simulations and
	Advanced Topics”, Second Edition, Wiley, 2012.

Reference(s):

1.	Michael Quinn, “Parallel Computing - Theory and Practice”, Second Edition, Tata McGraw Hill, 2002.
2.	Norman Matloff, “Parallel Computing for Data Science – With Examples in R, C++ and CUDA”, Chapman and Hall/CRC, 2015.
3.	Wan Fokkink, “Distributed Algorithms: An Intuitive Approach”, MIT Press, 2013.
4.	M.L. Liu, “Distributed Computing – Principles and Applications”, First Edition, Pearson Education, 2011.

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S. No.	Topic	No. of Hours

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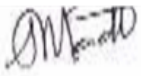

BoS Chairman

1	**INTRODUCTION TO PARALLEL COMPUTING**	
1.1	Scope of Parallel Computing – Parallel Programming Platforms	1
1.2	Implicit Parallelism – Limitations of Memory System Performance	2
1.3	Control Structure of Parallel Platforms	1
1.4	Communication Model of Parallel Platforms	1
1.5	Physical Organization of Parallel Platforms	1
1.6	Communication Costs in Parallel Machines	1
1.7	Impact of Process	1
1.8	Processor Mapping and Mapping Techniques	1
2	**PARALLEL ALGORITHM DESIGN**	
2.1	Preliminaries – Decomposition Techniques	1
2.2	Characteristics of Tasks and Interactions – Mapping Techniques for Load Balancing	1
2.3	Methods for Containing Interaction Overheads	1
2.4	Parallel Algorithm Models	1
2.5	Basic Communication Operations	1
2.6	One-to-All Broadcast and All-to-One Reduction – All-to-All Broadcast and Reduction	1
2.7	All-Reduce and Prefix Sum Operations – Scatter and Gather	1
2.8	All-to-All Personalized Communication- Circular Shift	1
2.9	Improving the Speed of some Communication Operations	1
3	**PROGRAMMING USING MESSAGE PASSING AND SHARED ADDRESS SPACE**	
3.1	Principles of Message Passing Programming – Building Blocks	1
3.2	Send and Receive Operations – MPI	1
3.3	Message Passing Interface – Topologies and Embedding	1
3.4	Overlapping Communication with Computation	1
3.5	Collective Communication and Computation Operations	1
3.6	Groups and Communicators – POSIX thread API	1
3.7	OpenMP: a Standard for Directive based Parallel Programming	1

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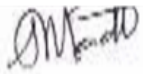

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3.8	Applications of Parallel Programming - Matrix-Matrix Multiplication – Solving Systems of Equations	1
3.9	Sorting Networks - Bubble Sort Variations – Parallel Depth First Search	1
4	**DISTRIBUTED COMPUTING PARADIGM**	
4.1	Paradigms for Distributed applications	2
4.2	Basic algorithms in Message passing Systems	3
4.3	Leader Election in Rings	2
4.4	Mutual Exclusion in Shared Memory	2
5	**FAULT TOLERANT DESIGN**	
5.1	Synchronous Systems with Crash Failures	1
5.2	Byzantine Failures	1
5.3	Impossibility in Asynchronous Systems	1
5.4	Formal Model for Simulation	1
5.5.	Explanation based learning	1
5.6.	Broadcast and Multicast	1
5.7.	Specification of a Broadcast Service – Implementing a Broadcast Service	1
5.8.	Multicast in Groups – Distributed Shared Memory	1
5.9.	Linearizable – Sequentially Consistent Shared Memory – Algorithms	1
	Total	45

Course Designers

1. Dr. K. Poongodi -poongodik@ksrct.ac.in

60 CS E16	**Data M**	Category	L	T	P	Credit
		PE	2	0	2	3

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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Objective

- To introduce basic concepts, tasks, methods, and techniques in data mining.
- To emphasis is on various data mining problems and their solutions.
- To understand the data mining process and issues, learn various data mining techniques
- To apply the techniques in solving data mining problems using data mining tools and systems
  To apply the clustering analysis and statistical approach

Prerequisite

Basic understanding of Linear Algebra, Statistics and programming

Course Outcomes

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

CO1	Explain the basic concept and issues of Data Mining	Understand
CO2	Explore the multidimensional model and cube operations	Apply
CO3	Interpret the steps of data preprocessing and multidimensional association rules	Apply
CO4	Implement different classification techniques and association rule mining and its applications	Apply
CO5	Apply different clustering techniques and outlier analysis in real time applications	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3										2	2	3
2	3	3	3		2	2			2			2	2	3
3	3	3	3		2				2			2	2	3
4	3	3	3		2	2			3			2	2	3
5	3	3	3		2	2			3			2	2	3

Assessment Pattern

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

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BoS Chairman

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E16 – Data Mining								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	2	45	3	50	50	100

Introduction to Data Mining* Motivation and importance - What is Data Mining - Relational Databases - Data Warehouses - Transactional Databases -Advanced Database Systems - Data Mining Functionalities - Interestingness of a pattern Classification of Data Mining Systems - Major issues in Data Mining.	**[7]**
Data Warehouse and OLAP Technology for Data Mining* What is a Data Warehouse - Multi-Dimensional Data Model - Data Warehouse Architecture – Data Warehouse Implementation - Development of Data Cube Technology - Data Warehousing to Data Mining.	**[9]**
Data Preprocessing* Why Pre-process the Data? - Data Cleaning - Data Integration and Transformation Data Reduction - Discretization and Concept Hierarchy Generation - Data Mining Primitives: Mining Association rule in large Databases - Association Rule Mining - Mining Singledimensional Boolean Association rules from Transactional Databases - Mining Multidimensional Association rules from relational databases & Data Warehouses.	**[10]**
Classification and Prediction** Concepts and Issues regarding Classification and Prediction - Classification by Decision Tree Induction – Bayesian Classification - Classification by SVM - Classification by Random Forest - Classification by K nearest neighbor - Classification Based on Concepts from Association Rule Mining.	**[10]**
Cluster Analysis** What is Cluster Analysis? - Types of Data in Cluster Analysis - A Categorization of Major clustering methods - partitioning methods - Hierarchial methods - Density-Based Methods: DBSCAN - Grid-based Method: STING - Model-based Clustering Method: Statistical approach - Outlier analysis. **Hands On**:**	**[9]**
1. Implementation of exploratory data analysis 2. Implementation of preprocessing phase 3. Implementation of feature selection techniques 4. Implementation of Association rule mining 5. Implementation of classification algorithm 6. Implementation of clustering mechanism	
Total Hours	**45**

Text book(s):

1. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, 3rd Edition, Morgan Kaufman Publications, 2011.
2. Pang-Ning Tan et.,” Introduction to Data Mining”, first edition,2006.

Reference(s):

1. Adriaan, “Introduction to Data Mining”, Addison Wesley Publication

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2.	A.K.Pujari, “Data Mining Techniques”, University Press.
3.	Mohammed J. Zaki and Wagner Meira, Jr,” Data Mining and Machine Learning: Fundamental Concepts and Algorithms”, Cambridge University Press, March 2020.
4.	Gordon S. Linoff, Michael J. A. Berry,” Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management”, Wiley publisher, third edition,2008

***SDG:4 – Quality Education**

****SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S. No.	Topic	No. of Hours
1	**Introduction to Data Mining**	
1.1	Motivation and importance - What is Data Mining	1
1.2	Relational Databases	1
1.3	Data Warehouses	1
1.4	Transactional Databases	1
1.5	Advanced Database Systems	1
1.6	Data Mining Functionalities	1
1.7	Interestingness of a pattern Classification of Data Mining Systems	2
1.8	Major issues in Data Mining	1
2	**Data Warehouse and OLAP Technology for Data Mining**	
2.1	What is a Data Warehouse	1
2.2	Multi-Dimensional Data Model	2
2.3	Data Warehouse Architecture	1
2.4	Data Warehouse Implementation	2
2.5	Development of Data Cube Technology	2
2.6	Data Warehousing to Data Mining	1
3	**Data Preprocessing**	
3.1	Why Pre-process the Data? - Data Cleaning	1
3.2	Data Integration and Transformation	1
3.3	Data Reduction	1
3.4	Discretization and Concept Hierarchy Generation	1

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3.5	Data Mining Primitives: Mining Association rule in large Databases	1
3.6	Association Rule Mining	1
3.7	Mining Single-dimensional Boolean Association rules from Transactional Databases	1
3.8	Mining Multi-dimensional Association rules from relational databases & Data Warehouses	2
4	**Classification and Prediction**	
4.1	Concepts and Issues regarding Classification and Prediction	1
4.2	Classification by Decision Tree Induction	1
4.3	Bayesian Classification	2
4.4	Classification by SVM	1
4.5	Classification by Random Forest	1
4.6	Classification by K nearest neighbor	1
4.7	Classification Based on Concepts from Association Rule Mining	2
5	**Cluster Analysis**	
5.1	What is Cluster Analysis?	1
5.2	Types of Data in Cluster Analysis	1
5.3	A Categorization of Major clustering methods	1
5.4	Partitioning methods	1
5.5.	Hierarchial methods	1
5.6.	Density-Based Methods: DBSCAN	1
5.7.	Grid-based Method: STING	1
5.8.	Model-based Clustering Method: Statistical approach	1
5.9.	Outlier analysis	1
	Total	45

Course Designers

1. Ms. T. Subalaxmi -subalakxmi@ksrct.ac.in

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60 CS E21	Cyber S

Category	L	T	P	Credit
PE	3	0	0	3

Objective

- To understand the basic concepts and challenges in cybercrime
- To impart the knowledge of cyber security challenges in modern devices
- To provide an ability to explore the tools and methods used in cybercrime
- To implement the various mobile platform security models
- To apply different mobile security testing in the mobile app development lifecycle

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the basic concepts of Cybercrime	Understand
CO2	Explore the cyber security challenges in modern devices	Apply
CO3	Interpret the tools and methods used in cybercrime	Apply
CO4	Implement different mobile platform security models	Apply
CO5	Apply different mobile security testing in the mobile app development lifecycle	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3			2	2		2				2	2	
2	2	3			2	2		2				2	2	
3	2	3			2	2		2				2	2	
4		2			2	2						2	2	
5		2			2	2						2	2	

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	30
Understand (Un)	20	20	30
Apply (Ap)	30	30	40
Analyze (An)	-	-	-

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Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E21 – Cyber Security								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

INTRODUCTION TO CYBERCRIME* Cybercrime- definition and origins of the word- Cybercrime and information security - Classifications of cybercrime- Cybercrime and the Indian ITA 2000 - A Global Perspective on cybercrimes- Cloud Computing-Proliferation of Mobile and Wireless Devices- Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era.	**[9]**
CYBER SECURITY CHALLENGES IN MODERN DEVICES** Security Challenges Posed by Mobile Devices- Registry Settings for Mobile Devices Authentication Service Security- Attacks on Mobile/Cell Phones - Mobile Devices: Security Implications for Organizations- Organizational Measures for Handling Mobile-DevicesRelated Security Issues - Organizational Security Policies and Measures in Mobile Computing Era, Laptops.	**[9]**
TOOLS AND METHODS** Tools and Methods Used in Cybercrime, Proxy Servers and Anonymizers- Phishing Password Cracking - Key loggers and Spywares, - Virus and Worms - Steganography – DoS and DDoS Attacks -SQL Injection, Buffer Over Flow - Attacks on Wireless Networks - Phishing, Identity Theft (ID Theft) - The Legal Perspectives - Cyberlaw: The Indian Context - The Indian IT Act. Introduction to Security Audit.	**[9]**
MOBILE PLATFORM SECURITY MODELS** Android – iOSMobile platform security models – Detecting Android malware in Android markets.	**[9]**
MOBILE SECURITY TESTING** Mobile platform internals – Security testing in the mobile app development lifecycle – Basic static and dynamic security testing – Mobile app reverse engineering and tampering– Assessing software protections.	**[9]**
Total Hours	**45**

Text book(s):

1. Nina Godbole, Sunit Belapure, “Cyber Security”, Wiley India, New Delhi 2012.
2. Harish Chander, “cyber laws & IT protection”, PHI learning pvt.ltd, 2012.

Reference(s):

1. Dhiren R Patel, “Information security theory &practice” ,PHI learning pvt ltd,2010
2. MS.M.K.Geetha & Ms. Swapne Raman,C”yber Crimes and Fraud Management”, MACMILLAN,2012.
3. Mayank Bhusan, Rajkumar Singh Rathore, Aatif Jamshed, “Fundamental of Cyber Security: Principles, Theory and Practices”, BPB Publishers, Delhi,2017.

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4.	William Stallings, “Network Security Essentials: Applications and Standards”, Prentice Hall, 4th edition, 2010.

***SDG:4 – Quality Education**

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Introduction To Cybercrime**	
1.1	Cybercrime- definition and origins of the word	1
1.2	Cybercrime and information security	1
1.3	Classifications of cybercrime	1
1.4	Cybercrime and the Indian ITA 2000	1
1.5	A Global Perspective on cybercrimes	1
1.6	Cloud Computing	1
1.7	Proliferation of Mobile and Wireless Devices	1
1.8	Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era	2
2	**Cyber Security Challenges in Modern Devices**	
2.1	Security Challenges Posed by Mobile Devices	1
2.2	Registry Settings for Mobile Devices Authentication Service Security	1
2.3	Attacks on Mobile/Cell Phones	2
2.4	Mobile Devices: Security Implications for Organizations	1
2.5	Organizational Measures for Handling Mobile-Devices-Related Security Issues	2
2.6	Organizational Security Policies and Measures in Mobile Computing Era, Laptops	2
3	**Tools and Methods**	
3.1	Tools and Methods Used in Cybercrime, Proxy Servers and Anonymizers	1
3.2	Phishing, Password Cracking	1
3.3	Key loggers and Spywares, Virus and Worms	

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3.4	Steganography, DoS and DDoS Attacks	1
3.5	SQL Injection, Buffer Over Flow	1
3.6	Attacks on Wireless Networks	1
3.7	Phishing, Identity Theft (ID Theft)	1
3.8	The Legal Perspectives - Cyberlaw: The Indian Context - The Indian IT Act	1
3.9	Introduction to Security Audit	1
4	**Mobile Platform Security Models**	
4.1	Introduction: platforms and attacks	1
4.2	Apple iOS security model	2
4.3	Android security model	2
4.4	Windows 7, 8 Mobile security model	2
4.5	Detecting Android malware in Android markets	2
5	**Mobile Security Testing**	
5.1	Mobile platform internals	1
5.2	Security testing in the mobile app development lifecycle	2
5.3	Basic static and dynamic security testing	2
5.4	Mobile app reverse engineering and tampering	2
5.5.	Assessing software protections	2
	Total	45

Course Designers

1. Ms. **B.Janani** - janani@ksrct.ac.in

60 CS E22	**Mobile Applicati**	Category	L	T	P	Credit
		PE	2	0	2	3

Objective

- To impart knowledge in Android Application Development

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- Understand the app idea and design user interface/wireframes of mobile app and set up the mobile app development environment
- Develop and debug mobile app components –User interface, services, notifications, broadcast receivers, data components
- Using emulator to deploy and run mobile apps
- Testing mobile app -unit testing, black box test

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the Mobility landscape and platforms	Understand
CO2	Demonstrate the interactive and feature-rich Android applications to address real-world challenges	Apply
CO3	Develop Android apps using native data handling, background tasks, and location awareness	Apply
CO4	Utilize graphics, animation, and multimedia to enhance the visual appeal and overall engagement of Android apps	Apply
CO5	Apply testing, signing, packaging, and distribution processes to successfully release and update Android apps	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2	3	3	3			2			2	3	
2	2	2	2	3	3	2			2			2	3	
3	3	3	3	3	3	3	3		2	3	3	2	3	
4	3	2	3	3	3				2	3	3	2	3	
5	3	3	3	3	3	3	3	3	2	3	3	2	3	

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	30
Understand (Un)	20	20	30

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Apply (Ap)	30	30	40
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022

60 CS E22 – Mobile Application Development

CS

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	2	0	2	45	3	50	50	100

GETTING STARTED WITH MOBILITY* Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development.	**[8]**
BUILDING BLOCKS OF MOBILE APPS* App user interface designing –mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity-states and life cycle, interaction amongst activities. App functionality beyond user interface -Threads, Async task, Services –states and lifecycle, Notifications, Broadcast receivers, Telephony and SMS APIs Native data handling –on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)	**[12]**
SPRUCING UP MOBILE APPS* Graphics and animation –custom views, canvas, animation APIs, multimedia –audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope).	**[10]**
TESTING MOBILE APPS* Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk.	**[9]**
TAKING APPSTO MARKET* Versioning, signing and packaging mobile apps, distributing apps on mobile market place **Hands on*:** 1. Create a simple Android app with a simple user interface. 2. Create a mobile app with various GUI components like buttons, text fields, and labels 3. Design an application that uses Layout Managers and event listeners. 4. Create a mobile app that allows users to draw basic shapes (lines, circles, rectangles) on the screen using touch or mouse input.	**[6]**
5. Implement an application that uses Multi-threading. 6. Implement an application that creates an alert upon receiving a message 7. Develop an application that makes use of databases. 8. Integrate audio/video playback using Android's animation APIs. 9. Write automated test cases for a mobile app using Robotium. 10. Write a mobile application that makes use of RSS feed 11. Develop a mobile application to send an email. * Develop a Mobile application for simple needs and publish the app on a mobile marketplace (Mini Project)	

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		Total Hours	**45**
Text book(s):		
1.	Anubhav Pradhan, Anil V. Deshpande, “Composing Mobile Apps: Learn/Explore/Apply/ Using Android”, Wiley India Private Limited, 1st Edition, 2014.	
2.	Dr. Madhu Goel, Chetna Sharma, ER. SHOBHIT,” Mobile Application Development”, ISHAN PUBLICATIONS,2020	
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.	

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**GETTING STARTED WITH MOBILITY**	
1.1	Introduction to Mobility Landscape	1
1.2	Overview of Mobile Platforms	1
1.3	Introduction to Mobile App Development	1
1.4	Overview of Android platform	1
1.5	Setting Up Mobile App Development Environment	2
1.6	Emulator Setup and Configuration	1
1.7	Case Study: Mobile App Development	1
2	**BUILDING BLOCKS OF MOBILE APPS**	
2.1	App user interface designing	1
2.2	Mobile UI resources (Layout, UI elements, Draw-able, Menu)	1
2.3	Activity-states and life cycle	1
2.4	Interaction amongst activities	1
2.5	App functionality beyond user interface	1
2.6	Threads, Async task	1
2.7	Services: states and lifecycle,	1
2.8	Notifications and Broadcast receivers, Telephony and SMS APIs	1
2.9	Native Data Handling: On-device File I/O	1

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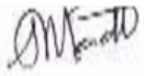

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2.10	Shared preferences	1
2.11	Mobile databases such as SQLite	1
2.12	Enterprise data access (via Internet/Intranet)	1
3	**SPRUCING UP MOBILE APPS**	
3.1	Graphics and animation	1
3.2	Custom Views and Canvas	1
3.3	Animation APIs	1
3.4	Multimedia: Audio/Video Playback and Record	2
3.5	Location Awareness	1
3.6	Native Hardware Access: Sensors (Accelerometer, Gyroscope)	1
3.7	Graphics and Animation: Advanced Concepts	1
3.8	Multimedia: Advanced Techniques	1
3.9	Interactive Project Session	1
4	**TESTING MOBILE APPS**	
4.1	Introduction to Testing Mobile Apps	1
4.2	Debugging Mobile Apps	1
4.3	White Box Testing	1
4.4	Black Box Testing	1
4.5	Test Automation of Mobile Apps	2
4.6	JUnit for Android	1
4.7	Robotium - Android UI Testing Framework	1
4.8	MonkeyTalk - Mobile App Testing Tool	1
5	**TAKING APPS TO MARKET**	
	Introduction to Taking Apps to Market	
5.1	Versioning and Its Importance	1
5.2	Signing and Security Considerations	1
5.3	Packaging Mobile Apps	1
5.4	Distributing Apps on Mobile Marketplaces	1
5.5	Monetization Strategies and Closing Remarks	1
5.6	APPs to Market	1

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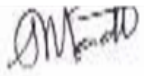

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		Total	45

Course Designers

1. K.Kaviarasu -kaviarasuk@ksrct.ac.in

60 CS E23	**Sales**	Category	L	T	P	Credit
		PE	2	0	2	3

Objective

- To Understand Salesforce Architecture and Features
- To know the customization process in Salesforce
- To Understand the security model
- To Understand the Sales Cloud and Cloud modules
- To Understand the business process automation options
- To Understand the reports and dashboard

Prerequisite

NIL

Course Outcomes

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

CO1	Apply data modeling techniques to design and configure custom objects, fields, and relationships in Salesforce.	Apply
CO2	Apply advanced data management and customization techniques in Salesforce to enhance data organization and user experience	Apply
CO3	Evaluate and recommend appropriate Salesforce user setup and security settings to control access and permissions	Analyze
CO4	Develop advanced automation solutions using Process Builder and Visual Workflow to meet complex business requirements	Apply
CO5	Evaluate and recommend appropriate reporting and analytics strategies based on business requirements.	Evaluate

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3		3						2			2	3	

2	3		3						2			2	3	
3	3		3						2			2	3	
4	3		3						2			2	3	3
5	3		3						2			2	3	3

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	40
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

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60 CS E23 – Salesforce								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	2	0	2	45	3	50	50	100

Salesforce Fundamentals Introduction to CRM- CRM Use Cases - Why Salesforce? - Overview of Salesforce platform and its Architecture - Advantage of Salesforce, Salesforce editions and licenses - Salesforce user interface and navigation - Salesforce Mobile App and Salesforce Lightning Experience -Signing up Developer Edition - Standard Objects - Creating Custom Objects - Fields and data types - Apps Creation.	**[8]**
Salesforce Data Management and Customization Essentials* Relationships and junction objects, Roll up Summary- Creating Formula Fields, Schema Builder. Data Validation - Validation rules. Working with Record Types and Page Layouts - Compact Layout- Lightning Record Pages – Home Page Customization -Path Settings. - List Views - Data import and data management tools.	**[10]**

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Security and Data Access* Organization Security Controls - Passwords, IP restrictions, Network Settings. User Setup and Security - User Creation- Security Model: Meta Data - Profile settings and permissions - Permission set- Salesforce Sharing model -Organization Wide Defaults (OWD) - Role Hierarchy- Sharing Rules- Manual Sharing - Sharing rules and public groups.	**[10]**
Business Process Automation Introduction to WorkFlow and Process Builder - Work flow rules – Work flow action - Flows: Types of Flow Screen Flow- Record Trigrrered Flow- Scheduled Trigger Flow- Auto Launched Flow. **uses cases of Process Automation. Email Alerts and Field Updates - Approval Processes**.**	**[10]**
Reports, Dashboards, and Analytics Creating or customizing a report - Summarizing data, report formats and filtering data, scheduling, Report Charts and Dashboard Components. Creating and modifying dashboards-custom report types - **Summary Report- Tabular Report- matrix Report- Dash Boards: Standard DashBoards & Dynamic DashBoards**.** Hands on: 1. Create Objects, Fields and App 2. Explore Data Types 3. Create Field Relationships 4. Create Record Types(create), Page Layout (adding section, field property settings), Page Layout Assignment (assign page layout based on Record types) 5. Create Lightning Record Page, List View, Path Settings 6. Validation Rule 7. **Automation I**** a. Screen Flow b. Auto Launched Flow 8. **Automation II**** a. Record Trigger Flow b. Scheduled Flow c. Approval Process 9. **Security*** a. Profiles and Permission Set b. Org Wide Default c. Roles d. Sharing Rules e. Manual Sharing 10. **Reports and Dashboards**** a. Custom Report Types b. Dynamic Dashboards c. Report and Dashboards Sharing	**[7]**
Total Hours	**45**

Text book(s):

1.	Sharif Shaalan, Timothy Royer, “Salesforce for Beginners, A step-by-step guide to optimize sales and marketing and automate business processes with the Salesforce platform”, 2nd Edition, Packt Publishing Limited, 2022.
2.	Sharif Shaalan, “Salesforce for Beginners: A step-by-step guide to creating, managing, and automating sales and marketing processes Paperback – Illustrated”, Packt Publishing Limited, 2020

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***SDG:4- Quality Education**

****SDG:8- sustainable economic growth, full and productive employment**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Salesforce Fundamentals**	
1.1	Introduction to CRM- CRM Use Cases - Why Salesforce?	1
1.2	Overview of Salesforce platform and its Architecture	1
1.3	Advantage of Salesforce, Salesforce editions and licenses	1
1.4	Salesforce user interface and navigation	1
1.5	Salesforce Mobile App and Salesforce Lightning Experience	1
1.6	Signing up Developer Edition - Standard Objects	1
1.7	Creating Custom Objects - Fields and data types - Apps Creation	1
2	**Salesforce Data Management and Customization Essentials**	
2.1	Relationships and junction objects	1
2.2	Roll up Summary	1
2.3	First-order logic	1
2.4	Creating Formula Fields	1
2.5	Schema Builder	1
2.6	Data Validation - Validation rules	1
2.7	Working with Record Types and Page Layouts	1
2.8	Compact Layout- Lightning Record Pages	1
2.9	Home Page Customization -Path Settings	1
2.10	List Views - Data import and data management tools	1
3	**Security and Data Access**	
3.1	Organization Security Controls	1
3.2	Passwords, IP restrictions, Network Settings	1
3.3	User Setup and Security	1
3.4	User Creation	1
3.5	Security Model: Meta Data	1
3.6	Profile settings and permissions	1

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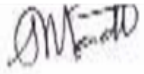

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3.7	Permission set	1
3.8	Salesforce Sharing model	1
3.9	Organization Wide Defaults (OWD)	1
3.10	Role Hierarchy- Sharing Rules- Manual Sharing - Sharing rules and public groups	1
4	**Business Process Automation**	
4.1	Introduction to WorkFlow and Process Builder	1
4.2	Work flow rules	1
4.3	Work flow action	1
4.4	Flows: Types of Flow	1
4.5	Screen Flow	1
4.6	Record Trigrrered Flow	1
4.7	Scheduled Trigger Flow	1
4.8	Auto Launched Flow	1
4.9	uses cases of Process Automation	1
4.10	Email Alerts and Field Updates - Approval Processes.	1
5	**Reports, Dashboards, and Analytics**	
5.1	Creating or customizing a report	1
5.2	Summarizing data, report formats and filtering data	1
5.3	scheduling, Report Charts and Dashboard Components	1
5.4	Creating and modifying dashboards	1
5.5.	custom report types	1
5.6.	Summary Report- Tabular Report- matrix Report	1
5.7.	Dash Boards: Standard DashBoards & Dynamic DashBoards	1
	Total	45

Course Designers

1. Dr. P. Kaladevi -kaladevi@ksrct.ac.in

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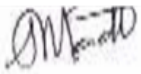


BoS Chairman

60 CS E24	User Interface

Category	L	T	P	Credit
PE	3	0	0	3

Objective

- To understand User Interface design and web languages
- To understand the web applications and and client server communication
- To program for web client and web server objects
- To understand web development environment and methodology
- To learn the reactive frameworks

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the User Interface Design essentials and scripting language	Understand
CO2	Develop Web Applications and Implement Client/Server Web programming	Apply
CO3	Recognize the Web servers and frameworks.	Apply
CO4	Understand MongoDB and Node JS applications	Understand
CO5	Apply Reactive Frameworks	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1			3	2	3							2	3	
2			3	2	3							2	3	
3			3	2	3							2	3	
4			3	2	3							2	3	2
5			3	2	3							2	3	2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

Remember (Re)	10	10	20
Understand (Un)	15	15	30
Apply (Ap)	25	25	50
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022

60 CS E24 – User Interface Technologies

CS

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

Introduction to UI Design and Client side scripting* Introduction-The process of UI design-Elements-Good Vs Bad UI –Web Design issues-HTML –XHTML-CSS-Javascript Basics –Arrays-Functions –Javascript objects –HTML DOM -DOM methods –Events-Regular Expressions –Form Validation-JSON-Jquery.	**[14]**
Web applications and Client-Server Communications* Web applications-Web Application Frameworks-MVC framework-Angular JS –Single Page Applications-Responsive Web Design-HTTP-Request/Response Model-HTTP MethodsRESTful APIs-AJAX-AJAX with JSON.	**[9]**
Webservers* Node.js- NPM-Callbacks –Events-Express framework-Cookies-Sessions-Scaling	**[7]**
Storage* MongoDB-Manipulating and Accessing MongoDB Documents from Node js	**[7]**
Reactive Frameworks* Meteor JS framework –Templates –Events –Sessions –Publish & Subscribe –Accounts	**[8]**
Total Hours	**45**

Text book(s):

1.	Brad Dayley, Node.js, MongoDB, and Angular JS Web Development, Addison Wesley, 2014.
2.	Jenifer Tidwell, Charles Brewer, Aynne Valencia “Designing Interfaces”, 3rd edition, O’rielly Publication, 2020

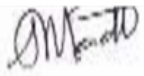
Reference(s):

1.	Jon Duckett,HTML & CSS Design and Build Websites, Wiley, 2011
2.	Jon Duckett,JavaScript and Jquery: Interactive Front-End Web Development,Wiley,2014
3.	Holdener, Ajax: The Definitive Guide,Oreilly,2010
4.	http://cfg.cit.cornell.edu/cfg/design/contents.html

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

S.No.	Topic	No. of Hours
1	**Introduction to UI Design and Client side scripting**	
1.1	Introduction-The process of UI design	1
1.2	Elements	1
1.3	Good Vs Bad UI	1
1.4	Web Design issues	1
1.5	HTML	1
1.6	XHTML	1
1.7	CSS	1
1.8	JavaScript Basics	1
1.9	Arrays	1
1.10	Functions	1
1.11	JavaScript objects	1
1.12	HTML DOM -DOM methods	1
1.13	Events-Regular Expressions	1
1.14	Form Validation-JSON-Jquery	1
2	**Web applications and Client-Server Communications**	
2.1	Web applications-Web Application Frameworks	1
2.2	MVC framework	1
2.3	Angular JS	1
2.4	Single Page Applications	1
2.5	Responsive Web Design	1
2.6	HTTP-Request/Response Model	1
2.7	HTTP Methods	1
2.8	RESTful APIs	1
2.9	AJAX - AJAX with JSON	1
3	**Webservers**	
3.1	Node.js	1
3.2	NPM	1
3.3	Callbacks	1

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3.4	Events	1
3.5	Express framework	1
3.6	Cookies	1
3.7	Sessions - Scaling	1
4	**Storage**	
4.1	MongoDB	1
4.2	Manipulating and Accessing MongoDB Documents from Node JS	3
4.3	Applications using MongoDB and Node JS	3
5	**Reactive Frameworks**	
5.1	Meteor JS framework	1
5.2	Templates	1
5.3	Decision trees	1
5.4	Events	1
5.5.	Sessions	1
5.6.	Publish & Subscribe - Accounts	2
	Total	45

Course Designers

1. Mr. R.Baskar -baskar@ksrct.ac.in

60 CS E25	**Computationa**	Category	L	T	P	Credit
		PE	3	0	0	3

Objective

To provide a strong foundation on fundamental concepts in Computational Intelligence.
To enable Problem-solving through various searching techniques.
To apply these techniques in applications which involve perception, reasoning and learning.
To apply Computational Intelligence techniques for information retrieval
To apply Computational Intelligence techniques primarily for machine learning

Prerequisite

NIL

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

Course Outcomes

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

CO1	Provide a basic exposition to the goals and methods of Computational Intelligence	Understand
CO2	Study of the design of intelligent computational techniques	Apply
CO3	Apply the Intelligent techniques for problem solving.	Apply
CO4	Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language.	Apply
CO5	Understand computer vision, automatic programming and machine learning.	Understand

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	2							2		
2	3	3	2	2	2							2		3
3	3	2	2	2	2	2						2		3
4	3	2	2	2	2	2						3		3
5	3	3	2	2	2							3		2

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)	30	30	50
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E25 – Computational Intelligence								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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VI	3	0	0	45	3	40	60	100

INTRODUCTION* Introduction to Artificial Intelligence-Search-Heuristic Search-A* algorithm-Game Playing-Alpha-Beta Pruning-Expert systems-Inference-Rules-Forward Chaining and Backward Chaining- Genetic Algorithms.	**[9]**
KNOWLEDGE REPRESENTATION AND REASONING* Proposition Logic – First Order Predicate Logic – Unification – Forward Chaining -Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering – Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories – Reasoning with Default Information – Prolog Programming.	**[9]**
UNCERTAINTY* Non monotonic reasoning-Fuzzy Logic-Fuzzy rules-fuzzy inference-Temporal LogicTemporal Reasoning-Neural Networks-Neuro-fuzzy Inference.	**[8]**
LEARNING** Probability basics – Bayes Rule and its Applications – Bayesian Networks – Exact and Approximate Inference in Bayesian Networks – Hidden Markov Models – Forms of Learning – Supervised Learning – Learning Decision Trees – Regression and Classification with Linear Models – Artificial Neural Networks – Nonparametric Models – Support Vector Machines – Statistical Learning– Learning with Complete Data – Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning	**[10]**
INTELLIGENCE AND APPLICATIONS** Natural language processing - Morphological Analysis-Syntax analysis-Semantic Analysis-All applications – Language Models – Information Retrieval – Information Extraction – Machine Translation – Machine Learning – Symbol-Based – Machine Learning: Connectionist – Machine Learning.	**[9]**
Total Hours	**45**

Text book(s):

1.	S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2022.
2.	Elaine Rich and Kevin Knight, “Artificial Intelligence”, Third Edition, Tata McGrawHill, 2010.

Reference(s):

1.	Dan W. Patterson, “Introduction to AI and ES”, Third Edition, Pearson Education, 2007.
2.	Nils J. Nilsson, “The Quest for Artificial Intelligence”, Cambridge University Press, 2009.
3.	Nptel course, Artificial Intelligence, https://nptel.ac.in/courses/106106126/
4.	Stuart Russell,” Human Compatible – Artificial Intelligence and the Problem of Control”,Viking publisher,2019

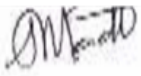
*** SDG:12- Responsible Consumption and Production**

**** SDG:13- Climate Action**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

1	**INTRODUCTION**	
1.1	Introduction to Artificial Intelligence	1
1.2	Search - Heuristic Search	1
1.3	A* algorithm	1
1.4	Game Playing	1
1.5	Alpha-Beta Pruning	1
1.6	Expert systems	1
1.7	Inference - Rules	1
1.8	Forward Chaining and Backward Chaining	1
1.9	Genetic Algorithms	1
2	**KNOWLEDGE REPRESENTATION AND REASONING**	
2.1	Proposition Logic – First Order Predicate Logic	1
2.2	Unification, First-order logic	1
2.3	Forward Chaining -Backward Chaining	1
2.4	Resolution	1
2.5	Ontological Engineering	1
2.6	Categories and Objects	1
2.7	Events - Mental Events and Mental Objects	1
2.8	Reasoning Systems for Categories – Reasoning with Default Information	1
2.9	Prolog Programming	1
3	**UNCERTAINTY**	
3.1	Non monotonic reasoning	1
3.2	Fuzzy Logic	1
3.3	Fuzzy rules	1
3.4	fuzzy inference	1
3.5	Temporal Logic	1
3.6	Temporal Reasoning	1
3.7	Neural Networks	1
3.8	Neuro-fuzzy Inference	1

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4	**LEARNING**	
4.1	Probability basics	1
4.2	Bayes Rule and its Applications – Bayesian Networks	1
4.3	Exact and Approximate Inference in Bayesian Networks	1
4.4	Hidden Markov Models	1
4.5	Forms of Learning – Supervised Learning	1
4.6	Learning Decision Trees – Regression and Classification with Linear Models	1
4.7	Artificial Neural Networks	1
4.8	Nonparametric Models – Support Vector Machines	1
4.9	Statistical Learning– Learning with Complete Data, Learning with Hidden Variables	1
4.10	The EM Algorithm – Reinforcement Learning	1
5	**INTELLIGENCE AND APPLICATIONS**	
5.1	Natural language processing	1
5.2	Morphological Analysis	1
5.3	Syntax analysis-Semantic Analysis	1
5.4	All applications – Language Models	1
5.5.	Information Retrieval	1
5.6.	Information Extraction	1
5.7.	Machine Translation	1
5.8.	Machine Learning – Symbol-Based	1
5.9.	Machine Learning: Connectionist – Machine Learning.	1
	Total	45

Course Designers

1. Ms. M. Saradha -saradha@ksrct.ac.in

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BoS Chairman

60 CS E26	Graph

Category	L	T	P	Credit
PC	3	0	0	3

Objective

- To know and apply the fundamental concepts in graph theory.
- To learn the model problems using graphs and to solve these problems algorithmically.
- To acquire knowledge about trees in graph theory.
- To understand the concepts of sets, coverings and matchings and apply practically.
- To get exposed about the fundamentals of vertex colouring.

Prerequisite

NIL

Course Outcomes

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

CO1	Know the basic terminology and some of the theory associated with graphs.	Remember, Understand, Apply
CO2	Formulate graph theoretic models to solve real world problems.	Remember, Understand, Apply
CO3	Implement the concept of tree and graphs in real time applications.	Remember, Understand, Apply
CO4	Apply the concepts of sets and coverings in various engineering problems.	Remember, Understand, Apply
CO5	Evaluate the vertex colouring and edge colouring in the applications of graph theory.	Remember, Understand, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2							3		3
CO2	3	3	3	3	2							3		3
CO3	3	3	3	3	2							3		3
CO4	3	3	3	2	2							3		3
CO5	3	3	3	2	2							3		3
3- Strong;2-Medium;1-Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	20	20	30	30
Apply (Ap)	30	30	60	60
Analyze (An)	0	0	0	0

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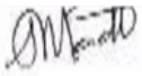

BoS Chairman

Evaluate (Ev)	0	0	0	0
Create (Cr)	0	0	0	0
Total	60	60	100	100

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E26 – Graph Theory								
CS								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Basic Concepts in Graph Theory * Undirected graph – Degree of a vertex – Degree sequence – Sub graphs – Vertex induced sub graphs – Complement of a graph – Self complementary graphs – Walk – Path – Connectivity – Eccentricity – Radius – Diameter – Vertex and edge cuts – Vertex partition – Independent set – Clique. Digraph – Orientation – Strongly connected digraphs – Weekly connected digraphs – Unilaterally connected digraphs – Directed acyclic graph. Adjacency matrix –Incidence matrix of graphs.	**[9]**
Connected graphs and shortest paths ** Walks – trails – paths – cycles – Connected graphs – Distance – Cut-vertices and cut-edges – Blocks – Connectivity – Weighted graphs and shortest paths – Dijkstra's shortest path algorithm – Floyd-Marshall shortest path algorithm.	**[9]**
Trees Definitions and characterizations – Number of trees – Cayley's formula – Kircho-matrix tree theorem – Minimum spanning trees – Kruskal's algorithm – Prim's algorithm –Special classes of graphs – Bipartite Graphs– Line Graphs– Chordal Graphs– Eulerian Graphs – Fleury's algorithm– Chinese Postman problem – Hamilton Graphs– Introduction – Necessary conditions and sufficient conditions.	**[9]**
Independent sets, coverings and matchings Introduction – Independent sets and coverings – Basic equation – Matchings in bipartite graphs – Hall's Theorem – Konig's Theorem – Perfect matchings in graphs– Greedy and approximation algorithms.	**[9]**
Vertex Colorings Basic definitions – Cliques and chromatic number – Mycielski's theorem – Greedy coloring algorithm – Coloring of chordal graphs – Brooks theorem – Edge Colorings – Introduction and Basics – Gupta-Vizing theorem – Class-1 and Class-2 graphs – Edge-coloring of bipartite graphs – Class-2 graphs – Hajos union and Class-2 graphs – A scheduling problem and equitable edge-coloring.	**[9]**
Total Hours	**45**

Text book(s):	
1.	J. A. Bondy and U. S. R. Murty. Graph Theory, volume 244 of Graduate Texts in Mathematics. Springer, 1st edition, 2008.
2.	Jonathan L Gross and Jay Yellen, 'Graph Theory and its Applications', Chapman & Hall, New York, 2005.
Reference(s):	
1.	West D B, 'Introduction To Graph Theory', Pearson Education, New Delhi, 2007.

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2.	Narsing Deo , 'Graph Theory with Applications to Engineering And Computer Science', Prentice Hall of India, New Delhi, 2005.
3.	Robin J. Wilson, 'Introduction to Graph Theory', Pearson Education Limited, 5th edition, 2010.
4.	Geetha P, 'Graph Theory', Scitech Publications(INDIA) Pvt.Ltd, Chennai,2012.

*SDG 4: Quality education and lifelong learning.

** SDG 12: Production Patterns.

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Basic Concepts In Graph Theory**	
1.1	Undirected graph, Degree of a vertex and Degree sequence	2
1.2	Sub graphs, Vertex induced sub graphs and Complement of a graph	1
1.3	Self complementary graphs, Walk, Path and Connectivity	2
1.4	Eccentricity, Radius, Diameter, Vertex and edge cuts and Vertex partition	1
1.5	Independent set, Clique, Digraph, Orientation and Strongly connected digraphs	1
1.6	Weekly connected digraphs and Unilaterally connected digraphs	1
1.7	Directed acyclic graph, Adjacency matrix and Incidence matrix of graphs	1
2	**Connected graphs and shortest paths**	
2.1	Walks, trails, paths, cycles and Connected graphs	1
2.2	Distance, Cut-vertices and cut-edges	1
2.3	Blocks and Connectivity	1
2.4	Weighted graphs and shortest paths	2
2.5	Dijkstra's shortest path algorithm	2
2.6	Floyd-Marshall shortest path algorithm	2
3	**Trees**	
3.1	Definitions and characterizations, Number of trees and Cayley's formula	1

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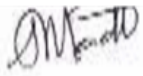

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3.2	Kircho-matrix tree theorem and Minimum spanning trees	1
3.3	Kruskal's algorithm and Prim's algorithm	2
3.4	Special classes of graphs, Bipartite Graphs, Line Graphs, Chordal Graphs and Eulerian Graphs	1
3.5	Fleury's algorithm and Chinese Postman problem	1
3.6	Hamilton Graphs	2
3.7	Necessary conditions and sufficient conditions	1
4	**Independent sets, coverings and matchings**	
4.1	Introduction, Independent sets and coverings	1
4.2	basic equations	2
4.3	Matchings in bipartite graphs	1
4.4	Hall's Theorem, Konig's Theorem	2
4.5	Perfect matchings in graphs	1
4.6	Greedy and approximation algorithms.	2
5	**Vertex Colorings**	
5.1	Basic definitions, Cliques and chromatic number	1
5.2	Mycielski's theorem, Greedy coloring algorithm	1
5.3	Coloring of chordal graphs, Brooks theorem and Edge Colorings	1
5.4	Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs	2
5.5.	Edge-coloring of bipartite graphs, Class-2 graphs, Hajos union and Class-2 graphs	2
5.6.	A scheduling problem and equitable edge-coloring	2
	Total	45

Course Designers

1. Dr.K.Kiruthika - kiruthika@ksrct.ac.in

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

60 CS E31	DEEP

Category	L	T	P	Credit
PE	2	0	2	3

Objective

- 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 analyse Different Deep Learning Models for different Applications
- To understand and implement Deep Learning Architectures

Prerequisite

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	Analyse 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2							3		3
CO2	3	3	3	3	2							3		3
CO3	3	3	3	3	2							3		3
CO4	3	3	3	2	2							3		3
CO5	3	3	3	2	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 (Re)	10	10	20

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BoS Chairman

Understand (Un)	10	10	20
Apply (Ap)	20	20	30
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	0
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology – Autonomous R2022

60 CS E31 Deep Learning

Elective - III

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	2	0	2	45	3	50	50	100

BASICS OF NEURAL NETWORKS* **[7]**

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- Feature extraction and feature learning.

INTRODUCTION TO DEEP LEARNING* **[8]**

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 - Installation of TensorFlow and Keras. Overfitting and Underfitting. Hyper parameters.

CONVOLUTIONAL NEURAL NETWORKS** **[9]**

Role of Convolutional Networks in Machine Learning.- CNN Architectures – Concept of Convolution – Pooling Layers – Transfer Learning – Image Classification using Transfer Learning - Image classification and recurrent nets.

MORE DEEP LEARNING ARCHITECTURES **[9]**

LSTM, GRU, Encoder/Decoder Architectures – Auto encoders – Compression of features using Auto encoders.- Standard- Sparse – Denoising – Contractive- Variational Auto encoders – Adversarial Generative Networks – Auto encoder and DBM - **deep generative models, Deep Belief Networks**.**

APPLICATIONS OF DEEP LEARNING** **[12]**

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 – Opinion Mining using Recurrent Neural Networks – Parsing and Sentiment Analysis using Recursive Neural Networks – Sentence Classification using Convolutional Neural Networks – Dialogue Generation with LSTMs.

PRACTICAL EXERCISES:

1. Implement Simple Programs like vector addition in TensorFlow.
2. Implement a simple problem like regression model in Keras.
3. Implement a Feed-Forward Network in TensorFlow/Keras.
4. Implement Feature Selection from Video and Image Data 5. Implement an Image Classifier using CNN in TensorFlow/Keras.
6. Implement a Simple LSTM using TensorFlow/Keras.

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		Total Hours	**45**
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.	
3	Phil Kim, “Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence”, Apress , 2017.	
4	Deep Learning A Practitioner’s Approach Josh Patterson and Adam Gibson O’Reilly Media, Inc. 2017	
Reference(s):		
1.	Ragav Venkatesan, Baoxin Li, “Convolutional Neural Networks in Visual Computing”, CRC Press, 2018.	
2.	Navin Kumar Manaswi, “Deep Learning with Applications Using Python”, Apress, 2018.	
3	Joshua F. Wiley, “R Deep Learning Essentials”, Packt Publications, 2016.	

*** SDG:4- Quality Education**

****SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**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
1.7	Feature extraction and feature learning.	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
2.7	Installation of TensorFlow and Keras.	1
2.8	Overfitting and Underfitting. Hyperparameters.	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	2
3.7	Image classification and recurrent nets	1
3.8	Image and video recognition	1
4	**MORE DEEP LEARNING ARCHITECTURES**	
4.1	LSTM	1
4.2	GRU	1
4.3	Encoder/Decoder Architectures, Auto encoders	1
4.4	Compression of features using Auto encoders	1
4.5	Standard- Sparse – Denoising	1
4.6	Contractive- Variational Auto encoders	1
4.7	Adversarial Generative Networks	1
4.8	Deep generative models,	1
4.9	Deep Belief Networks.	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	2
5.5	Attention Models for Computer Vision	1
5.6	Case Study: Named Entity Recognition	1
5.7	Opinion Mining using Recurrent Neural Networks	2
5.8	Parsing and Sentiment Analysis using Recursive Neural Networks	1

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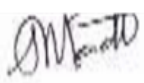

BoS Chairman

5.9	Sentence Classification using Convolutional Neural Networks	1
5.10	Dialogue Generation with LSTMs.	2
	Total	45

Course Designers

1. Dr. P.KALADEVI - kaladevi@ksrct.ac.in

60 CS E32	**Seman**	Category	L	T	P	Credit
		PC	2	0	2	3

Objective

- Introducing basic concepts, tasks, methods, and techniques in semantic web
- To understand the concept of RDF and its schemas
- To learn the ontology and semantic web architecture To construct logic and inference and rule markup in XML Understanding of the semantic web process and issues.

Prerequisite

NIL

Course Outcomes

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

CO1	Gain knowledge in Semantic Web and its Technologies	Remember, Understand, Analyze
CO2	Construct the RDF data model and defining the vocabularies used in RDF data model	Remember, Apply, Analyze
CO3	Identify the requirements of Ontology and know the sublanguages	Remember, Understand, Apply Analyze
CO4	Write the Monotonic and Non monotonic Rules	Remember, Understand, Apply
CO5	Realize the applications of semantic web technologies	Remember, Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	3	2		2			2	2	2	3		3

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2	2	3	3	2	3	2			2	3	3	3	2	3
3	2	3	3	2		2	2		2	2	2	3		3
4	2	3	3	2		2	2		2	2	2	3		3
5	2	2	2	2	3	2	2		2	3	3	3	2	3

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	30
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E32 – Semantic Web								
B.E. Computer Science and Engineering								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	2	0	2	45	3	50	50	100

Introduction History–Semantic Web Layers –Semantic Web technologies –Semantics in Semantic Web–XML **:** Structuring – Namespaces – Addressing – Querying – Processing	**[9]**
RDF RDF and Semantic Web–Basic Ideas -RDF Specification–RDF Syntax:XML and Non-XMLRDF elements–RDF relationship: Reification, Container, and collaboration – RDF Schema – Editing, Parsing, and Browsing RDF/XML-RQL-RDQL	**[9]**
Ontology Why Ontology– Ontology movement – OWL – OWL Specification –OWL Elements –OWL constructs: Simple and Complex – Ontology Engineering : Introduction –Constructing ontologies – Reusing ontologies – On –To - Knowledge Semantic Web architecture	**[9]**
Logic and Inference Logic–Description Logics-Rules–Monotonic Rules :Syntax, Semantics and examples – Nononotonic Rules – Motivation, Syntax and Examples – Rule Markup in XML: Monotonic Rules, and Non-Monotonic Rules	**[9]**

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Applications of Semantic Web Technologies* RDF Uses : Commercial and Non-Commercial use– Sample Ontology – e-Learning –Web Services – Web mining – Horizontal information – Data Integration – Future of Semantic Web **Hands on*:** 1. Working with XML 2. Design of Ontology using RDF 3. Design RDF document with different Serialization format (e.g. tutle,N-triple) 4. Design of Ontology using OWL 5. Design of Ontology using RDFS	**[9]**
Total Hours	**45**

Text book(s):	
1.	Grigorous Antoniou and Van Hermelen - "A Semantic Web Primer"-The MIT Press –2004
2.	Spinning the Semantic Web: Bringing the world wide web to its full potential – The MIT Press – 2004
Reference(s):	
1.	Shelley Powers – "Practical RDF" – O'reilly publishers – First Indian Reprint :2003
2.	Markus Kroetzsch, Pascal Hitzler, and Sebastian Rudolph," Foundations of Semantic Web Technologies", CRC press,2009
3.	Grigoris Antoniou,Frank van Harmelen," A Semantic Web Primer"MIT, 2nd Edition, Press,2020
4.	https://www.w3.org/standards/semanticweb/

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction**	
1.1	History	1
1.2	Semantic Web Layers	1
1.3	Semantic Web technologies	1
1.4	Semantics in Semantic Web	1
1.5	XML **:** Structuring	1
1.6	Namespaces	1
1.7	Addressing	1
1.8	Querying	1
1.9	Processing	1
2	**RDF**	
2.1	RDF and Semantic Web	1
2.2	Basic Ideas -RDF Specification	1

2.3	RDF Syntax:XML and Non-XML RDF elements	1
2.4	RDF relationship: Reification, Container, and collaboration	1
2.5	RDF Schema	1
2.6	Editing, Parsing, and Browsing	1
2.7	RDF/XML	1
2.8	RQL	1
2.9	RDQL	1
3	**Ontology**	
3.1	Why Ontology	1
3.2	Ontology movement	1
3.3	OWL – OWL Specification	1
3.4	OWL Elements	1
3.5	OWL constructs: Simple and Complex	1
3.6	Ontology Engineering : Introduction	1
3.7	Constructing ontologies	1
3.8	Reusing ontologies – On –To - Knowledge Semantic Web architecture	2
4	**Logic and Inference**	
4.1	Logic–Description Logics-Rules	2
4.2	Monotonic Rules :Syntax, Semantics and examples	2
4.3	Non-onotonic Rules	1
4.4	Motivation, Syntax and Examples	2
4.5	Rule Markup in XML: Monotonic Rules and Non-Monotonic Rules	2
5	**Applications of Semantic Web Technologies**	
5.1	RDF Uses : Commercial and Non-Commercial use	2
5.2	Sample Ontology	1
5.3	e-Learning	1
5.4	Web Services	1
5.5.	Web mining	1
5.6.	Horizontal information	1

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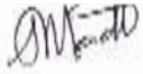

BoS Chairman

5.7.	Data Integration	1
5.8.	Future of Semantic Web	1
	Total	45

Course Designers

1. S.B.Thamarai selvi -thamaraiselvi@ksrct.ac.in

60 CS E33	**Industrial Applications Development and Deployment Practices**	Category	L	T	P	Credit
		PE	3	0	0	3

Objective

- To provide a comprehensive understanding of Real-Time IoT applications.
- To understand effective project management and issue tracking using JIRA.
- To learn version control fundamentals and seamless CI/CD integration.
- Develop expertise in InstallAnywhere for cross-platform installation and deployment. To understand hands-on experience in Docker architecture.

Prerequisite

NIL

Course Outcomes

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

CO1	Design, deploy, and optimize real-time IoT applications in healthcare by leveraging IoT technologies.	Remember, Understand, Apply
CO2	Understand efficiently manage projects, track issues, customize workflows, and leverage JIRA's capabilities across diverse projects.	Remember, Understand
CO3	Integrating CI/CD practices via hands-on project work with Helix Core for streamlined software development workflows.	Remember, Understand, Apply
CO4	Create and deploy efficient, user-friendly installers across multiple platforms through hands-on projects in InstallAnywhere 2018.	Understand, Apply

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BoS Chairman

CO5	Deploy and manage containerized applications proficiently using Docker, covering Docker Hub, image manipulation, commands.	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3			3	2			3	2	2	3	
2	3	3	3			3	2			3	2	2	3	
3	3	3	3			3	2			3	2	2	3	
4	3	2	3			3	2			3	2	2	3	
5	3	2	3			3	2			3	2	2	3	

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	20	20	30
Understand (Un)	20	20	40
Apply (Ap)	20	20	30
Analyze (An)	0	0	0
Evaluate (Ev)	0	0	0
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS E33 - Industrial Applications Development and Deployment Practices								
B.E. Computer Science and Engineering								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0		3	40	60	100

Architectural Overview: Real Time IoT Applications* Internet of Things: Data Analytics, IoT data acquisition, Data Exploration and Pre-processing, IoT technologies, Layered Architecture of Medical IoT Systems, Challenges in IoT, Overview of Infusion Pumps, Demonstration of Real-Time Medication Safety software, Data visualization, clustering and classification using orange data mining tool for Medical Records. AI and Agile systems in health care, Future of Health care. Tools: Cloud AWS, CloudFront, Cloud S3 Bucket, QuickSight and Orange.	**[9]**

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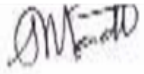

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Effective Project Management and Issue Tracking* Overview of JIRA's role in project management and issue tracking, Creating, and managing issues, customizing workflows, and utilizing agile boards, Custom dashboards, automation rules, permissions, and security management, Integrating JIRA with other tools, creating meaningful reports, and analyzing project data, effective utilization of JIRA in diverse projects.	**[9]**
Source Code Management & CI/CD Integration* Introduction to version control systems, Understanding the need for version control in software development, Overview of Perforce and its role in version control, Installing Perforce server and client, understanding user roles and permissions, Basic Perforce commands: p4 add, p4 edit, p4 submit, p4 sync, Branching and Merging, Collaboration and Code Review, Automation and CI/CD Integration. Project Hands-on using Perforce Helix Core Tool.	**[9]**
Cross-Platform Installation and Deployment* Install Anywhere as a cross-platform installation tool, building a basic installer package, customizing installation options and user prompts, custom actions and scripting, license management and software updates, best practices for creating efficient and user-friendly installers, Deploying installers across different platforms. Project Hands-on using InstallAnyWhere 2018	**[9]**
DevOps Containerization using Docker* Docker - An Architectural overview - The Docker Hub - Installation and configuration - Docker images - Docker commands - Saving and Loading Docker Images - Docker Compose – Run applications using Docker. Exercises: Installation of docker and Image Setup, creating a Custom Image from a Docker file, creating own Images, Exposing Container Ports to the Host and test it.	**[9]**
Total Hours	**45**

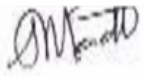
Text book(s):	
1.	Dr Kamlesh Lakhwani, Dr Hemant Kumar Gianey, Joseph Kofi Wireko, “Internet of Things
	(IoT)”, First Edition, BPB Publications, 2020.
2.	Sricharan Vadapalli, “Devops: Continuous Delivery, Integration, and Deployment with Devops: Dive into the core DevOps strategies”, Ingram short title, 2018.
Reference(s):	
1.	Sricharan Vadapalli, “Hands-on DevOps: Explore the concept of continuous delivery and integrate it with data science concepts”, Packt Publishing Limited, 2017.
2.	Eberhard Wolff, “A Practical Guide to Continuous Delivery”, Addison-Wesley Professional, 2017.
3.	Paul Duvall, Steve Matyas, Andrew Glover, “Continuous Integration: Improving Software Quality and Reducing Risk”, 1st Edition, Pearson Addison-Wesley, 2007.
4.	Jean-Marcel Belmont, “Hands-On Continuous Integration and Delivery”, 1st Edition, Packt Publishing, 2018.

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

1	**Architectural Overview: Real Time IoT Applications**	
1.1	Internet of Things: Data Analytics, IoT data acquisition	2
1.2	Data Exploration and Pre-processing	1
1.3	IoT technologies, Layered Architecture of Medical IoT Systems	1
1.4	Challenges in IoT, Overview of Infusion Pumps	1
1.5	Demonstration of Real-Time Medication Safety software	1
1.6	Data visualization	1
1.7	clustering and classification using orange data mining tool for Medical Records	1
1.8	AI and Agile systems in health care, Future of Health care	1
2	**Effective Project Management and Issue Tracking**	
2.1	Overview of JIRA's role in project management and issue tracking, Creating, and managing issues	2
2.2	customizing workflows, and utilizing agile boards	1
2.3	Custom dashboards, automation rules	1
2.4	permissions, and security management	1
2.5	Integrating JIRA with other tools	1
2.6	creating meaningful reports, and analyzing project data	2
2.7	effective utilization of JIRA in diverse projects.	1
3	**Source Code Management & CI/CD Integration**	
3.1	Introduction to version control systems	1
3.2	Understanding the need for version control in software development	1
3.3	Overview of Perforce and its role in version control	1
3.4	Installing Perforce server and client	1
3.5	understanding user roles and permissions	1
3.6	Basic Perforce commands: p4 add, p4 edit, p4 submit, p4 sync	1
3.7	Branching and Merging, Collaboration and Code Review	1
3.8	Automation and CI/CD Integration	1
3.9	Project Hands-on using Perforce Helix Core Tool.	1
4	**Cross-Platform Installation and Deployment**	
4.1	InstallAnywhere as a cross-platform installation tool	1

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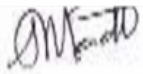

BoS Chairman

4.2	building a basic installer package	1
4.3	customizing installation options and user prompts	2
4.4	custom actions and scripting	1
4.5	license management and software updates	1
4.6	best practices for creating efficient and user-friendly installers	1
4.7	Deploying installers across different platforms	1
4.8	Project Hands-on using InstallAnyWhere 2018	1
5	**DevOps Containerization using Docker**	
5.1	Docker - An Architectural overview	1
5.2	Docker Hub - Installation and configuration	1
5.3	Docker images - Docker commands	1
5.4	Saving and Loading Docker Images	1
5.5.	Docker Compose	1
5.6.	Run applications using Docker	2
	Total	45

Course Designers

1. Ms. S. Mithuna – mithuna@ksrct.ac.in

60 CS E34	**XML and W**	Category	L	T	P	Credit
		PE	3	0	0	3

Objective

- To provide an in-depth knowledge of XML and Web Services.
- To understand the fundamental concepts of Web services.
- To understand the fundamental concepts of XML Technology.
- To design Web Service Architecture.
- To Study Building Blocks of Web services and content management using XML

Prerequisite

NIL

Course Outcomes

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

CO1	Know the fundamental elements in XML and XML Technologies and schemes	Understand
CO2	Design and analysis the Architecture of Web Services	Apply
CO3	Construct building blocks of Web services	Apply
CO4	Design XML web service in E-Business and implement xml in EBusiness	Apply
CO5	Analyze Content Management in XML	Analyze

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1		2	2									3	2	
2	3	2	2	2	3			3	3	3		3	2	
3	3	2	2	2	3			3	3	3		3	2	
4	3	2	2	2	3			3	3	3		3	2	
5		2	2	2	3			3	3	3		3	2	

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	20	20	25
Understand (Un)	20	20	25
Apply (Ap)	10	10	25
Analyze (An)	10	10	25
Evaluate (Ev)	0	0	0
Create (Cr)	0	0	0

K.S. Rangasamy College of Technology–Autonomous R2022

60 CS E34 – XML and Web Services

B.E. Computer Science and Engineering

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

Xml Technology Family*

XML – benefits – Advantages of XML over HTML – EDL –Databases – XML based standards – DTD –XML Schemas – X- Files – XML processing – DOM –SAX- presentation technologies – XSL – XFORMS – XHTML –voice XML – Transformation – XSLT – XLINK – XPATH –XQ **[9]**

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Architecting Web Services* Business motivations for web services – B2B – B2C- Technical motivations – limitations of CORBA and DCOM –Service – oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer –process view – life in the runtime	**[9]**
Web Services Building Block* Transport protocols for web services – messaging with web services – protocols – SOAP – describing web services – WSDL – Anatomy of WSDL – manipulating WSDL – web service policy – Discovering web services – UDDI –Anatomy of UDDI- Web service inspection – Ad-Hoc Discovery – Securing web services.	**[9]**
Implementing Xml In E-Business** B2B – B2C Applications – Different types of B2B interaction – Components of e-business XML systems – ebXML –Rosetta Net Applied XML in vertical industry – Web services for mobile devices.	**[9]**
Xml And Content Management* Semantic Web – Role of Meta data in web content – Resource Description Framework – RDF schema –Architecture of semantic web – content management workflow – XLANG –WSFL.	**[9]**
Total Hours	**45**

Text book(s):	
1.	Ron schmelzer et al, “XML and Web Services”, Pearson Education, 2002.
2.	SandeepChatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall, 2004.
Reference(s):	
1.	Frank P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002.
2.	Keith Ballinger, “.NET Web Services Architecture and Implementation”, Pearson Education, 2003.
3.	Henry Bequet and MeerajKunnumpurath, “Beginning Java Web Services”, Apress, 2004.
4.	Russ Basiura and Mike Batongbacal, “Professional ASP.NET Web Services”, Apress,

***SDG:4 – Quality Education**

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Xml Technology Family**	
1.1	XML – benefits – Advantages of XML over HTML	1
1.2	EDL, Databases	1
1.3	XML based standards, DTD	1
1.4	XML Schemas, X- Files	1

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1.5	XML processing – DOM	1
1.6	SAX- presentation technologies	1
1.7	XSL – XFORMS	1
1.8	XHTML –voice XML	1
1.9	Transformation – XSLT – XLINK – XPATH –XQ	1
2	**Architecting Web Services**	
2.1	Business motivations for web services – B2B – B2C	1
2.2	Technical motivations – limitations of CORBA and DCOM	1
2.3	Service – oriented Architecture (SOA)	1
2.4	Architecting web services – Implementation view	1
2.5	web services technology stack	1
2.6	logical view – composition of web services	1
2.7	Deployment view	1
2.8	From application server to peer to peer –process view – life in the runtime	2
3	**Web Services Building Block**	
3.1	Transport protocols for web services	1
3.2	messaging with web services	1
3.3	protocols – SOAP	1
3.4	Describing web services – WSDL	1
3.5	Anatomy of WSDL – manipulating WSDL	1
3.6	Web service policy – Discovering web services	2
3.7	UDDI –Anatomy of UDDI	1
3.8	Web service inspection	1
3.9	Ad- Hoc Discovery – Securing web services	
4	**Implementing Xml in E-Business**	
4.1	B2B – B2C Applications	2
4.2	Different types of B2B interaction	2
4.3	Components of e-business XML systems	2
4.4	ebXML	1

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4.5	Rosetta Net Applied XML in vertical industry	1
4.6	Web services for mobile devices.	1
5	**Xml and Content Management**	
5.1	Semantic Web	1
5.2	Role of Meta data in web content	1
5.3	Resource Description Framework	2
5.4	RDF schema	1
5.5.	Content management workflow	2
5.6.	XLANG	1
5.7	WSFL	1
	Total	45

Course Designers

1. Ms. S. Suganya -suganya@ksrct.ac.in

60 CS E35	**Information Storag**	Category	L	T	P	Credit
		PE	3	0	0	3

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BoS Chairman

Objective

- To study the concepts of storage architecture
- To learn about various storage networking technologies
- To understand NAS and object based and unified storage
- To study backup and archives and business impact analysis
- To provide comprehensive learning of storage technology, allow to make more informed decisions in an increasingly complex IT environment

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the origin of storage systems and observe the virtualization	Remember, Understand
CO2	Classify the connectivity between the storage devices and servers	Remember
CO3	Apprehend the network attached storage in sharing environment	Remember, Understand, Apply
CO4	Revise the data backup the data archive in the event of data loss	Remember, Understand, Apply
CO5	Analyze the concept of local replication technologies	Remember, Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	3	3	3						2	2	
2	3	3	2	3	3	3						2	2	
3	3	2	2	3	3	3						2	2	
4	3	2	2	3	3	3						3	2	
5	3	3	2	3	3	3						3	2	

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	20	20	25
Understand (Un)	20	20	25
Apply (Ap)	10	10	25
Analyze (An)	10	10	25
Evaluate (Ev)	0	0	0

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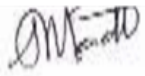

BoS Chairman

Create (Cr)	0	0	0

K.S. Rangasamy College of Technology–Autonomous R2022								
60 CS E35 – Information Storage and Management								
B.E. Computer Science and Engineering								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Introduction to Information Storage* Information Storage – evolution of storage architecture – data center infrastructure – virtualization and cloud computing. Data Center Environment: host–connectivity–disk diveperformance–DAS benefits and limitations–flashdrives.Intelligent Storage Systems: components –storage provisioning –types of Intelligent storage system	**[9]**
Storage Networking Technologies* Fibre Channel Storage Area Networks: components – FC connectivity–switched fabric ports –FC architecture–fabric services – switched fabric login types – zoning – FC SAN topologies – virtualization in SAN. IP SAN and FcoE: iSCSI – FCIP – FcoE	**[9]**
Network Attached Storage* NAS: Benefits – file sharing and network file sharing – components – I/O operations – implementations – file sharingprotocols–factorsaffectingNASperformance–file level virtualization.Object-Based and Unified Storage: Object-Based storage devices – contentaddressed storage – CAS use case – Unified storage.	**[9]**
Backup and Archive* Introduction to Business Continuity: Information Availability – BC: terminologies – planning life cycle – failure analysis – business impact analysis – technology solutions. Backup: Purpose – considerations – granularity –methods –architecture– operations – topologies– backup in NAS environments –targets –data duplication for backup – Data Archive.	**[9]**
Replication* Local replication: terminology – uses – replica consistency – technologies – restore and restart considerations –virtualization environment. Remote replication:modes– technologies–migration in virtualization environment	**[9]**
Total Hours	**45**

Text book(s):

1.	Somasundaram Gnanasundaram, AlokShivastava, “Information Storage and Management (storing, Managing and protecting digital information in classic, virtualization and cloud environments)”, EMC2Corporation, Second Edition Wiley India, 2010.

Reference(s):

1.	RobertSpalding, “Storage Networks: The Complete Reference”, TataMc GrawHill, Osborne, 2003.
2.	Marc Farley, “Building Storage Networks”, TataMc GrawHill, Osborne,2001.
3.	EMC2,“Information Storage and Management: Storing, Managing, and Protecting Digital Information”, EMC Education Services,2009

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4.	Ulf Troppens, Ulf Troppen, RainerErkens, “Storage Networks Explained: Basics and Application of Fibre Channel SAN”, 2nd edition, Wiley Publisher, 2008

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction To Information Storage**	
1.1	Information Storage, evolution of storage architecture	1
1.2	Data center infrastructure	1
1.3	Virtualization and cloud computing	1
1.4	Data Center Environment: host, connectivity	1
1.5	Disk drive performance, DAS benefits and limitations	1
1.6	Flashdrives, Intelligent Storage Systems: components	2
1.7	Storage provisioning	1
1.8	Types of Intelligent storage system	1
2	**Storage Networking Technologies**	
2.1	FibreChannel Storage Area Networks: components	2
2.2	FCconnectivity, switched fabric ports	2
2.3	FCarchitecture, fabric services	1
2.4	Switched fabric login types	1
2.5	Zoning, FC SAN topologies, virtualization in SAN.	2
2.6	FCIP, FcoE	1
3	**Network Attached Storage**	
3.1	NAS: Benefits , file sharing and network file sharing	1
3.2	Components ,I/O operations	1
3.3	Implementations, file sharing protocols	1
3.4	Factors affecting NAS performance	1
3.5	File level virtualization, Object	1
3.6	Based and Unified Storage: Object-Based storage devices	2
3.7	Content-addressed storage, CAS use case	1

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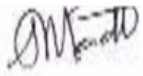

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3.8	Unified storage	1
4	**Backup and Archive**	
4.1	Introduction to Business Continuity: Information Availability	1
4.2	Notations and Axioms of Probability	1
4.3	BC: terminologies	1
4.4	Planning life cycle	1
4.5	Failure analysis, business impact analysis, technology solutions.	1
4.6	Backup: Purpose, considerations, granularity	1
4.7	Methods ,architecture, operations and topologies	1
4.8	Backup in NAS environments, targets	1
4.9	Data duplication for backup, Data Archive.	1
5	**Replication**	
5.1	Local replication: terminology and uses	2
5.2	Replica consistency	2
5.3	Technologies ,restore and restart considerations	1
5.4	Virtualization environment.	1
5.5.	Remote replication: modes, technologies	2
5.6.	Migration in virtualization environment	1
	Total	45

Course Designers

1. R.Vijay Sai -vijaysair@ksrct.ac.in

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K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS E36 - Professional Readiness for Innovation, Employability And Entrepreneurship								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	6	45	3	40	60	100
Objective(s)	• To empower students with overall Professional and Technical skills required to solve a real world problem. • To mentor the students to approach a solution through various stages of Ideathon, Research , Design Thinking , workflows , architecture and building a prototype in keeping with the end user and client needs. • To provide experiential learning to enhance the Entrepreneurship and employability skills of the students.							
Course Outcomes	**At the end of the course, the students will be able to** CO1: Upskill in emerging technologies and apply to real industry-level use cases CO2: Understand agile development process CO3: Develop career readiness competencies, Team Skills/leadership qualities CO4: Develop Time management, Project management skills and Communication Skills CO5: Use Critical Thinking for Innovative Problem Solving CO6: Develop entrepreneurship skills to independently work on products							

The course will involve 40-50 hours of technical training, and 40-50 hours of project development. The activities involved in the project along with duration are given in table 1.

Table 1: Activities*

Activity Name	Activity Description	Time(Weeks)
Choosing a Project	Selecting projects from the list of projects categorized various technologies & business domains	2
Team Formation	Students shall form a team of 4 members before enrolling to a project. Team members shall distribute the project activities among themselves.	1
Hands on training	Students will be provided with hands-on training on selected technology in which they are going to develop the project.	2
Project Development	Project shall be developed in agile mode. The status of the project shall be updated to the mentors via appropriate platform.	6
Code submission, project Doc and Demo	Project deliverable must include the working code, project document and demonstration video. All the project deliverables are to be uploaded to cloud based repository such as GitHub.	3
Mentor review and Approval	Mentor will be reviewing the project deliverable as per the milestone schedule and the feedback will be provided to the team.	1

	Total	16 weeks

ally, it involves 15 weeks of learning and doing, and one week for evaluation. The evaluatior carried (assess technical and soft skills as given in table 2. to

Table 2: Evaluation Schema

	Skills		Weightage
I	Technical Skills		
	1	Technical Training & Assignments	20%
	2	Project Planning	5%
	3	Requirements Analysis	5%
	4	Project Design	5%
	5	Innovation	5%
	6	Technology Stack (Utillization of various APIs, tools, techniques)	5%
	7	Coding	15%
	8	Acceptance Testing	5%
	9	Performance	5%
II	Soft Skills		
	1	Team work	5%
	2	Time management	10%
	3	Attendance & Punctuality	5%
	4	Project Documentation	5%
	5	Project Demonstration	5%
Total Scores			100%

	Evaluation and Scoring	Evaluators will be assigned to the team to evaluate the project deliverable, and the scoring will be provided based on the evaluation metrics	1	

***SDG:9 - Industry Innovation and Infrastructure**

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3	2	3	2	2	2	3	3	3	3	3	2
2	3	3	3	2	3	2	2	2	3	3	3	3	3	2
3	3	3	3	2	3	2	2	2	3	3	3	3	3	2
4	3	3	3	2	3	2	2	2	3	3	3	3	3	2
5	3	3	3	2	3	2	2	2	3	3	3	3	3	2

60 CS L01	Object Oriente

Category	L	T	P	Credit
OE	2	0	2	3

Objective

- To enable the students to learn how C++ supports object Oriented properties
- To create and use classes, objects, constructors and destructors for specific applications To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to design and implement generic classes with C++ templates. To learn how to use exception handling in C++ programs.

Prerequisite NIL

Course Outcomes

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

CO1	Recognize the principles of object-oriented problem solving and programming	Understand
CO2	Implement the concept of classes and objects	Apply
CO3	Analyze the concept of reusability and compile time polymorphism	Analyze
CO4	Recognize the concept of dynamic memory allocation and runtime polymorphism.	Apply
CO5	Identify the uses of generic programming and exception handling	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3		2				2		2		3	
2	3	3	3		2				2		2		3	
3	2	2	3		2				2		2		3	
4	2	2	3		2								3	
5	3	2	3		2				2		2		3	

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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	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	40
Analyze (An)	20	20	30
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K. S. Rangasamy College of Technology–Autonomous R2022								
60 CS L01 – Object Oriented Programming								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Introduction to C++ and Functions* Evolution of C++ - Concepts of OOP - Advantages of OOP, Basics of C++: Structure of a C++ Program - Streams in C++ and Stream Classes - Unformatted Console I/O Operations, C++ Declarations, Functions: Return by Reference -Default Arguments - Const arguments - Inline Functions - Function Overloading.	**[9]**
Classes and Objects, Constructors and Destructors* Classes in C++ - Declaring Objects- Access Specifiers and their Scope - Defining Member Functions - Static Members - Array of Objects - Object as Function Arguments - Friend Function and Friend Classes, Constructors and Destructors: Characteristics - Parameterized Constructor - Overloading Constructor - Copy Constructor -Dynamic Initialization Constructor – Destructors	**[9]**
Inheritance, Compile Time Polymorphism and Type Conversion* Inheritance: Reusability - Types of Inheritance - Abstract Classes - Object as Class Member, Operator Overloading: Rules for Operator Overloading – The Keyword Operator –Unary and Binary Operators Overloading-Overloading using Friend Function - Type Conversion.	**[10]**
Pointers, Memory Models, Binding and Polymorphism* Pointers: Pointer to Class - Pointer to Object – void, wild and this Pointers – Pointer to Constant and Constant Pointers, Memory Models: Dynamic Memory Allocation - Heap Consumption - Dynamic Objects, Polymorphism: Binding in C++ - Pointer to Base and Derived class objects - Working with Virtual Functions - Pure Virtual Functions - Object Slicing - Virtual Destructor.	**[9]**

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Generic Programming with Templates, Exception Handling* Class Templates - Function Templates - Exception Handling: Principles of Exception Handling - try, throw and catch keywords - Re-throwing Exception - Specifying Exception. Hands on: 1. Construct a C++ program to manage the input and output operations using stream classes 2. Construct a C++ program to manage large amount of statements using functions 3. Design a C++ program to implement the concept of class and objects 4. Develop a C++ program to initialize the class members using constructors and destroy the objects by using destructor 5. Design a C++ program for reusability using inheritance 6. Develop a C++ program to handle function overriding by using virtual function. 7. Develop a C++ program to allow functions and classes to operate with generic types using templates	**[8]**
Total Hours	**45**

Text book(s):	
1.	Ashok N. Kamthane, “Programming in C++”, Pearson, Second Edition, 2016.
2.	Herbert Schildt, “ The Complete Reference C++”, Fourth Edition, McGraw-Hill Education, 2013.
Reference(s):	
1.	Bjarne Stroustrup, “The C++ programming language”, Addison Wesley, 2013.
2.	Venugopal K.R., Rajkumar Buyya, ”Mastering C++”, Second Edition,McGraw-Hill Education, 2013.
3.	Rajesh K. Shukla, ”Object-Oriented Programming in C++”, Wiley-India Edition, 2008
4.	E Balagurusamy, ”Object Oriented Programming with C++”, Sixth Edition, McGraw-Hill Education, 2013.
5.	Carl Dennis,”Machine Learning And Artificial Intelligence: A Comprehensive Guide to Understanding and Implementing ML and AI (2023 Beginner Crash Course)”,Carl Dennis,2023

***SDG:4 – Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	Introduction to C++ and Functions	
1.1	Evolution of C++ - Concepts of OOP - Advantages of OOP	1
1.2	Basics of C++: Structure of a C++ Program	1
1.3	Streams in C++ and Stream Classes	1
1.4	Unformatted Console I/O Operations	1
1.5	C++ Declarations	1
1.6	Functions: Return by Reference -Default Arguments	2

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1.7	Const arguments - Inline Functions	1
1.8	Function Overloading	1
2	Classes and Objects, Constructors and Destructors	
2.1	Classes in C++	1
2.2	Declaring Objects, Access Specifiers and their Scope	1
2.3	Defining Member Functions - Static Members	1
2.4	Array of Objects - Object as Function Arguments	1
2.5	Friend Function and Friend Classes	1
2.6	Constructors and Destructors: Characteristics - Parameterized Constructor	1
2.7	Overloading Constructor	1
2.8	Copy Constructor	1
2.9	Dynamic Initialization Constructor – Destructors	1
3	**Inheritance, Compile Time Polymorphism and Type Conversion**	
3.1	Inheritance: Reusability - Types of Inheritance	1
3.2	Abstract Classes	1
3.3	Object as Class Member	1
3.4	Operator Overloading: Rules for Operator Overloading	1
3.5	The Keyword Operator	1
3.6	Unary and Binary Operators Overloading	2
3.7	Overloading using Friend Function	2
3.8	Type Conversion	1
4	**Pointers, Memory Models, Binding and Polymorphism**	
4.1	Pointers: Pointer to Class	1
4.2	Pointer to Object	1
4.3	void, wild and this Pointers	1
4.4	Pointer to Constant and Constant Pointers	1
4.5	Memory Models: Dynamic Memory Allocation	1
4.6	Heap Consumption - Dynamic Objects	1
4.7	Polymorphism: Binding in C++ - Pointer to Base and Derived class objects	1
4.8	Working with Virtual Functions - Pure Virtual Functions	1

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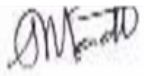

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4.9	Object Slicing - Virtual Destructor	1
5	**Generic Programming with Templates, Exception Handling**	
5.1	Class Templates	2
5.2	Function Templates	2
5.3	Exception Handling: Principles of Exception Handling	1
5.4	try, throw and catch keywords	2
5.5.	Re-throwing Exception	1
5.6.	Specifying Exception	1
	Total	45

Course Designers

1. Dr. P. Kaladevi -kaladevi@ksrct.ac.in

60 CS L02	**Angu**	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To understand the design of single-page applications and how Angular JS facilitates their development
- To properly separate the model, view, and controller layers of your application and implement them using Angular JS
- To master Angular JS expressions, filters, and scopes
- To build Angular forms
- To elegantly implement Ajax in your Angular JS applications

Prerequisite

Moderate knowledge of HTML, CSS, and JavaScript

Course Outcomes

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

CO1	Recall the concepts of HTML and JavaScript and express the features of AngularJS	Understand
CO2	Understand the purpose of binding and template and the various effects of elements and events	Understand
CO3	Apply the knowledge of scopes and controllers and various features of directives	Apply
CO4	Identify the several services and its works and Design the applications using AJAX	Apply

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CO5	Comprehend the concepts of animation services and the various actions of provision and injection services	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3	2	2	3			2	3	2		3	2	
2		3	2	2	3			2	3	2		3	2	
3		3	2	2	3			2	3	2		3	2	
4		2	2	2	3			2	3	2		3	2	
5	2	2	2	2	3			2	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 (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L02 – Angular JS								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Introduction Introduction to AngularJS: HTML and Bootstrap CSS Primer - JavaScript Primer - Single Page Application –MVC Architecture – first Application of AngularJS.	**[9]**
Working with AngularJS Binding – Template Directives – Elements – Events.	**[9]**

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Working with Forms Forms – Controllers – Scopes – Filters - Custom & Complex Directives.	**[9]**
Working with Services Modules – Services – Global objects – Errors and Expressions – AJAX and Promises.	**[9]**
Advanced Services* REST – Views – Animation – Touch – Provision – Injection Real-world applications: NLP and Computer Vision. **Hands on*:** 1. Create an Angular Application. Build a component inside the application in order to implement a simple log in form. 2. Create an Angular Application. Build a component to implement two-way binding which is combination of both property binding and event binding. 3. Create an Angular Application. Build a component to define the switch structural directive. 4. Write a program to show the Responses while the Form is in the Submitted State and provide an Edit Button. 5. Create an Angular Application. Build a component to inject service into it. The component will also display the data provided by the service. The service will provide an array of Employee Details.	**[9]**
Total Hours	**45**

Text book(s):	
1.	Adam Freeman, “Pro AngularJS”, Apress Publications.
2.	Ken Williamson,” Learning AngularJS: A Guide to AngularJS Development”, O' Reilly,2015

Reference(s):	
1.	Brad Green, ShyamSeshadri, “AngularJS”, O’REILLY publications.
2.	AgusKurniawan, **“**AngularJS Programming**”, Kindle Edition.**
3.	ValeriKarpov, Diego Netto, “Professional AngularJS”, Kindle Edition.
4.	Doguhan Uluca,” Angular 6 for Enterprise-Ready Web Applications: Deliver production-ready and cloud-scale Angular web apps”,kindle Edition,2018

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction**	
1.1	Introduction to AngularJS	1
1.2	HTML and Bootstrap	1
1.3	CSS Primer	1
1.4	JavaScript Primer	1
1.5	Single Page Application	1
1.6	MVC Architecture	2
1.7	First Application of AngularJS	1

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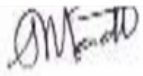

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2	**Working with AngularJS**	
2.1	Introduction - Working with AngularJS	1
2.2	Binding	2
2.3	Template Directives	2
2.4	Elements	2
2.5	Events	2
3	**Working with Forms**	
3.1	Forms	2
3.2	Controllers	2
3.3	Scopes	1
3.4	Filters	2
3.5	Custom & Complex Directives.	2
4	**Working with Services**	
4.1	Modules	1
4.2	Services	2
4.3	Global objects	2
4.4	Errors and Expressions	2
4.5	AJAX and Promises	2
5	**Advanced Services**	
5.1	REST	1
5.2	Views	1
5.3	Animation	2
5.4	Touch	1
5.5.	Provision	1
5.6.	Injection	1
5.7.	Real-world applications: NLP and Computer Vision	2
	Total	45

Course Designers

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BoS Chairman

1. Ms. M. Varshanadevi -varshanadevi@ksrct.ac.in

60 CS L03	**C# and .N**	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To gain the fundamental skills in C# programming Language
- To gain knowledge in object-oriented concepts in C#
- To understand the concepts of the .NET Core and its platform
- To implement data manipulation using Razor pages
- To enhance the knowledge in Model-View-Controller architecture

Prerequisite

Basic knowledge of HTML, Visual Studio, and Object Oriented Programming

Course Outcomes

At the end of the course, the students will be able to

CO1	Know the basic concepts of C#	Understand
CO2	Understand the Object-Oriented concepts in C#	Understand
CO3	Ability to develop web pages using ASP.NET Core platform	Apply
CO4	Implement the data manipulation concept using Razor Pages	Apply
CO5	Integrate the concept of MVC in ASP.NET Core platform	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	2					1		3	2	
2	3	3			2					2		1	3	
3	3	3		3	2					3		3	3	
4	3	2	2		2					3		3	3	
5	3	3		3	2					3		3	3	
3- Strong;2-Medium;1-Some														

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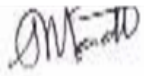

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Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	30
Analyze (An)	20	20	30
Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L03 C# and .NET Core								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Introduction to C#: Introducing C# – Understanding .NET – Overview of C# – Literals – Variables – Data Types – Operators –Expressions – Branching – Looping – Methods – Arrays – Strings – Structures – Enumerations.	**[8]**
Object-Oriented Programming in C#: Classes–Objects –Inheritance– Methods –Polymorphism –Interfaces –Operator Overloading – Delegates –Events–Errors–Exceptions–Collections–Managing File system	**[8]**
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 codebehind files.	**[10]**
Data Manipulation using Razor Pages*: Introduction to ADO.NET-Database connectivity concept using ADO.NET – Connection Class with Authentication – Command Class – DataReader Class –DataAdapter Class – DataSet – OnGet –OnPost – OnPostDelete – OnPostEdit – OnPostView – REST API –Model and Controller for REST API.	**[10]**

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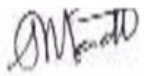

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Model-View-Controller (MVC) in ASP.NET Core*: Introduction to MVC – Setting up an ASP.NET Core MVC Website – MVC Routing – Controllers and Actions –Model – Views – Parameters Passing – View Helpers – Model Validation. **Hands on*:** 1. Develop simple application using C#. 2. Implement inheritance and Operator overloading using C#. 3. Design an ASP.NET Webpage to work with Dropdown list and ListBox controls. 4. Write a C# programs to demonstrate the concepts of Label, Text Box and Button controls. 5. Create a ADO.NET application in C# to verify if the connection is established with OLEDB and MS-ACCESS. 6. Create a ADO.NET applications in C# to demonstrate the Data Reader, Data Set, Data Adapter and Data View Objects	**[9]**
7. Develop a Registration Form with all Validation Controls. 8. Create a Web Service for all Arithmetic operations.	
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.	https://docs.microsoft.com/en-us/aspnet/core/
2.	Christian Nagel, "Professional C# 7 and .NET Core 2.0", 1st Edition, Wiley Publication, 2018
3.	Andrew Troelsen Phil Japikse," Pro C# 8 with .NET Core 3: Foundational Principles and Practices in Programming", Apress, 2020
4.	Jon Skeet," C# in Depth",Fourth Edition, 2019

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Introduction to C#:**	
1.1	Introducing C# – Understanding .NET	1
1.2	Overview of C# – Literals	1
1.3	Variables – Data Types – Operators –Expressions	1
1.4	Branching – Looping	1
1.5	Methods – Arrays	2
1.6	Strings	1
1.7	Structures – Enumerations	1
2	**Object-Oriented Programming in C#:**	
2.1	Object-Oriented Programming in C# -Classes – Objects	1

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2.2	Inheritance	1
2.3	Methods – Polymorphism – Interfaces	1
2.4	Operator Overloading	1
2.5	Delegates –Events	1
2.6	Errors – Exceptions –	1
2.7	Collections	1
2.8	Managing File system.	1
3	**ASP.NET Core Web Application using Razor Pages**	
3.1	Introduction to ASP.NET Core Web Application	2
3.2	Environment Setup	1
3.3	Project Layout	1
3.4	Static and Default Files	1
3.5	Enabling and Defining Razor Pages	2
3.6	Shared Layouts	1
3.7	Shared Layouts Using code-Managing File system.	2
4	**Data Manipulation using Razor Pages**	
4.1	Introduction to ADO.NET	1
4.2	Database connectivity concept using ADO.NET	1
4.3	Connection Class with Authentication	1
4.4	Command Class	1
4.5	DataReader Class	1
4.6	DataAdapter Class	1
4.7	DataSe	1
4.8	OnGet –OnPost – OnPostDelete	1
4.9	OnPostEdit – OnPostView	1
4.10	REST API –Model and Controller for REST API.	1
5	**Model-View-Controller (MVC) in ASP.NET Core**	
5.1	Introduction to MVC	1
5.2	Setting up an ASP.NET Core MVC Website	1
5.3	MVC Routing	1
5.4	Controllers and Actions	1

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5.5	Model – Views	1
5.6	Parameters Passing	1
5.7	View Helpers	1
5.8	Model Validation.	1
	Total	45

Course Designers

1. Mr. K. Dineshkumar -dineshkumark@ksrct.ac.in

60 CS L04	**Data M**	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To introduce basic concepts, tasks, methods, and techniques in data mining.
- To emphasis is on various data mining problems and their solutions.
- To understand the data mining process and issues, learn various data mining techniques
- To apply the techniques in solving data mining problems using data mining tools and systems
  To apply the clustering analysis and statistical approach

Prerequisite

Basic understanding of Linear Algebra, Statistics and programming

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Course Outcomes

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

CO1	Explain the basic concept and issues of Data Mining	Understand
CO2	Explore the multidimensional model and cube operations	Apply
CO3	Interpret the steps of data preprocessing and multidimensional association rules	Apply
CO4	Implement different classification techniques and association rule mining and its applications	Apply
CO5	Apply different clustering techniques and outlier analysis in real time applications	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1	3	3										2	2	3
2	3	3	3		2	2			2			2	2	3
3	3	3	3		2				2			2	2	3
4	3	3	3		2	2			3			2	2	3
5	3	3	3		2	2			3			2	2	3

3- Strong;2-Medium;1-Some

Assessment Pattern

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

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60 CS L04 – Data Mining								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Introduction to Data Mining* Motivation and importance - What is Data Mining - Relational Databases - Data Warehouses - Transactional Databases -Advanced Database Systems - Data Mining Functionalities - Interestingness of a pattern Classification of Data Mining Systems - Major issues in Data Mining.	**[7]**
Data Warehouse and OLAP Technology for Data Mining* What is a Data Warehouse - Multi-Dimensional Data Model - Data Warehouse Architecture – Data Warehouse Implementation - Development of Data Cube Technology - Data Warehousing to Data Mining.	**[9]**
Data Preprocessing* Why Pre-process the Data? - Data Cleaning - Data Integration and Transformation Data Reduction - Discretization and Concept Hierarchy Generation - Data Mining Primitives: Mining Association rule in large Databases - Association Rule Mining - Mining Singledimensional Boolean Association rules from Transactional Databases - Mining Multidimensional Association rules from relational databases & Data Warehouses.	**[10]**
Classification and Prediction** Concepts and Issues regarding Classification and Prediction - Classification by Decision Tree Induction – Bayesian Classification - Classification by SVM - Classification by Random Forest - Classification by K nearest neighbor - Classification Based on Concepts from Association Rule Mining.	**[10]**
Cluster Analysis** What is Cluster Analysis? - Types of Data in Cluster Analysis - A Categorization of Major clustering methods - partitioning methods - Hierarchial methods - Density-Based Methods: DBSCAN - Grid-based Method: STING - Model-based Clustering Method: Statistical approach - Outlier analysis. **Hands On**:** 1. Implementation of exploratory data analysis 2. Implementation of preprocessing phase	**[9]**
3. Implementation of feature selection techniques 4. Implementation of Association rule mining 5. Implementation of classification algorithm 6. Implementation of clustering mechanism	
Total Hours	**45**

Text book(s):

1.	Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, 3rd Edition, Morgan Kaufman Publications, 2011.
2.	Pang-Ning Tan et.,” Introduction to Data Mining”, first edition,2006.

Reference(s):

1.	Adriaan, “Introduction to Data Mining”, Addison Wesley Publication
2.	A.K.Pujari, “Data Mining Techniques”, University Press.

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3.	Mohammed J. Zaki and Wagner Meira, Jr," Data Mining and Machine Learning: Fundamental Concepts and Algorithms", Cambridge University Press, March 2020.
4.	Gordon S. Linoff, Michael J. A. Berry," Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management", Wiley publisher, third edition,2008

***SDG:4 – Quality Education**

****SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S. No.	Topic	No. of Hours
1	**Introduction to Data Mining**	
1.1	Motivation and importance - What is Data Mining	1
1.2	Relational Databases	1
1.3	Data Warehouses	1
1.4	Transactional Databases	1
1.5	Advanced Database Systems	1
1.6	Data Mining Functionalities	1
1.7	Interestingness of a pattern Classification of Data Mining Systems	2
1.8	Major issues in Data Mining	1
2	**Data Warehouse and OLAP Technology for Data Mining**	
2.1	What is a Data Warehouse	1
2.2	Multi-Dimensional Data Model	2
2.3	Data Warehouse Architecture	1
2.4	Data Warehouse Implementation	2
2.5	Development of Data Cube Technology	2
2.6	Data Warehousing to Data Mining	1
3	**Data Preprocessing**	
3.1	Why Pre-process the Data? - Data Cleaning	1
3.2	Data Integration and Transformation	1
3.3	Data Reduction	1
3.4	Discretization and Concept Hierarchy Generation	1
3.5	Data Mining Primitives: Mining Association rule in large Databases	1
3.6	Association Rule Mining	1

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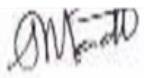

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3.7	Mining Single-dimensional Boolean Association rules from Transactional Databases	1
3.8	Mining Multi-dimensional Association rules from relational databases & Data Warehouses	2
4	**Classification and Prediction**	
4.1	Concepts and Issues regarding Classification and Prediction	1
4.2	Classification by Decision Tree Induction	1
4.3	Bayesian Classification	2
4.4	Classification by SVM	1
4.5	Classification by Random Forest	1
4.6	Classification by K nearest neighbor	1
4.7	Classification Based on Concepts from Association Rule Mining	2
5	**Cluster Analysis**	
5.1	What is Cluster Analysis?	1
5.2	Types of Data in Cluster Analysis	1
5.3	A Categorization of Major clustering methods	1
5.4	Partitioning methods	1
5.5.	Hierarchial methods	1
5.6.	Density-Based Methods: DBSCAN	1
5.7.	Grid-based Method: STING	1
5.8.	Model-based Clustering Method: Statistical approach	1
5.9.	Outlier analysis	1
	Total	45

Course Designers

1. Ms. T. Subalaxmi -subalakxmi@ksrct.ac.in

60 CS L05	**Artificial Ir**	Category	L	T	P	Credit
		OE	2	0	2	3

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Objective

- Understand the fundamentals of problem solving
- Interpret the knowledge and reasoning in propositional logic and first order logic
- Gain knowledge on Planning and acting in the real world
- Learn to represent uncertain knowledge in solving AI problems and ML and deep learning algorithms and models Understand the different forms of learning and NLP, computer vision

Prerequisite

Knowledge on statistics, linear algebra, matrix, calculus, probability, programming languages and data modelling

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.	Analyze
CO2	Interpret the knowledge of propositional logic and FOL.	Analyze
CO3	Understand the issues of planning problems.	Analyze
CO4	Describe the Uncertainty and probabilistic reasoning and ML and deep learning algorithms and models.	Apply
CO5	Summarize the types of learning methods and AI applications, NLP, Computer vision.	Remember, Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	2							2		
2	3	3	2	2	2							2		3
3	3	2	2	2	2	2						2		3
4	3	2	2	2	2	2						3		3
5	3	3	2	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)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	30
Analyze (An)	20	20	30

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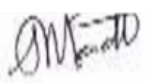

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Evaluate (Ev)	0	0	10
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L05 – Artificial Intelligence								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Problem Solving Introduction - What is Artificial Intelligence? – Structure of Intelligent Agents –Problem formulation – Uninformed search strategies – Informed search strategies – Constraint satisfaction problems.	**[9]**
Knowledge and Reasoning Logical agents – Propositional logic – First-order logic – Inference in first order logic – Unification - Forward Chaining – Backward Chaining – Resolution.	**[9]**
Planning Planning Problem - Planning with state-space search – Partial-order planning – Planning graphs - Planning and acting in the real world - Conditional planning - Multi agent planningRobotics-Action	**[9]**
Uncertain Knowledge and Reasoning Uncertainty – Notations and Axioms of Probability – Probabilistic Reasoning – Bayesian networks (Semantics, Exact Inference, Approximate Inference) – Inference in Temporal models – Hidden Markov models- Knowledge representation and reasoning through fuzzy logic and Bayesian networks-**Introduction to ML-Machine learning fundamentalsDeep learning***	**[9]**
Learning and Applications Learning from observation –Inductive learning –Decision trees – Ensemble Learning – Explanation based learning – Statistical Learning methods. Applications of Artificial intelligence- Contemporary Issues: Recent Trends & Future of AI Real-world applications: **NLP and Computer Vision*** Hands On: **1.** Develop PEAS descriptions for given AI tasks **2.** Implement Hill climbing algorithm **3.** Write a program to generate the output for A* algorithm **4.** Write a program to show the Tic Tac Toe game for 0 and X **5.** Implementation of Bayesian Belief networks **6.** Approximate inferences in Bayesian network **7.** Implementation of decision problems for various real-world applications **8.** To learn various Bayesian parameters **9.** Implementation of Hidden Markov Models	**[9]**
10. Implement propositional logic inferences for AI tasks	
Total Hours	**45**

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Text book(s):	
1.	S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Fourth Edition, Pearson Education, 2022.
2.	Melanie Mitchell,” Artificial Intelligence: A Guide for Thinking Humans”, Farrar, Straus and Giroux Publisher,2019
Reference(s):	
1.	Dan W. Patterson, “Introduction to AI and ES”, Third Edition, Pearson Education, 2007.
2.	Nils J. Nilsson, “The Quest for Artificial Intelligence”, Cambridge University Press, 2009.
3.	Nptel course, Artificial Intelligence, https://nptel.ac.in/courses/106106126/
4.	Stuart Russell,” Human Compatible – Artificial Intelligence and the Problem of Control”,Viking publisher,2019
5.	Carl Dennis,”Machine Learning And Artificial Intelligence: A Comprehensive Guide to Understanding and Implementing ML and AI (2023 Beginner Crash Course)”,Carl Dennis,2023

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Problem Solving**	
1.1	Introduction – What is Artificial Intelligence?	2
1.2	Structure of Intelligent Agents	1
1.3	Problem formulation	2
1.4	Uninformed search strategies	1
1.5	Informed search strategies	1
1.6	Constraint satisfaction problems	2
2	**Knowledge and Reasoning**	
2.1	Logical agents	2
2.2	Propositional logic	1
2.3	First-order logic	1
2.4	Inference in first order logic	1
2.5	Unification	1
2.6	Forward Chaining	1
2.7	Backward Chaining	1
2.8	Resolution	1

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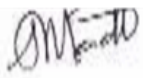

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3	**Planning**	
3.1	Planning Problem	1
3.2	Planning with state-space search	1
3.3	Partial-order planning	1
3.4	Planning graphs	1
3.5	Planning and acting in the real world	1
3.6	Conditional planning	2
3.7	Multi agent planning	1
3.8	Robotics-Action	1
4	**Uncertain Knowledge and Reasoning**	
4.1	Uncertainty	1
4.2	Notations and Axioms of Probability	1
4.3	Probabilistic Reasoning	1
4.4	Bayesian networks (Semantics, Exact Inference, Approximate Inference)	1
4.5	Inference in Temporal models	1
4.6	Hidden Markov models	1
4.7	knowledge representation and reasoning through fuzzy logic and Bayesian networks	1
4.8	Introduction to AI and ML-Machine learning fundamentals	1
4.9	Deep learning	
5	**Learning and Applications**	
5.1	Learning from observation	1
5.2	Inductive learning	1
5.3	Decision trees	1
5.4	Ensemble Learning	1
5.5.	Explanation based learning	1
5.6.	Statistical Learning methods	1
5.7.	Applications of Artificial intelligence	1
5.8.	Contemporary Issues: Recent Trends & Future of AI	1
5.9.	NLP and Computer vision	1

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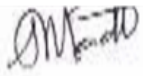

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	Total	45

Course Designers

1. Mr. R.Vijay Sai -vijaysair@ksrct.ac.in

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60 CS L06	Python Programmin

Category	L	T	P	Credit
OE	2	0	2	3

Objective

- To know the basic python concepts
- To understand the data wrangling and string manipulation
- To understand data aggregation, group operation and time series
- To learn web scrapping and CSS selectors
- To visualize the data using packages in python

Prerequisite

Knowledge in basic mathematics, including algebra, calculus, and probability

Course Outcomes

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

CO1	Understanding the basic concepts of Python and data structures	Understand
CO2	Understand the concept of data wrangling and various ways of combining and merging datasets	Understand
CO3	Implement data aggregation and group operations and time series basics	Apply
CO4	Gain the knowledge for Preparing and pre-processing of data, data aggregation and grouping concepts	Apply
CO5	Leveraging web scraping and visualizing the results of analytics effectively	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1	2	3										2		3
2	2	3	3		3							3		3
3	3	3	2		3				2	2	2	3		3
4	3	3	2		3			2	2	2	2	3		3
5	3	3	3		3			2	2	2	2	3		3

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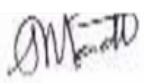

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3- Strong;2-Medium;1-Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	30	30	50
Apply (Ap)	20	20	40
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L06 – Python Programming for Data Analytics								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Python Concepts* Interpreter – Program Execution – Statements – Expressions – Flow Controls – Functions - Numeric Types –Sequences - Strings, Tuples, Lists and - Class Definition – Constructors – Inheritance – Overloading – Text & Binary Files - Reading and Writing.	**[9]**
Data Wrangling* Combining and Merging DataSets – Reshaping and Pivoting – Data Transformation – String Manipulation, Regular Expressions.	**[9]**
Data Aggregation, Group Operations, Timeseries* GoupBy Mechanics – Data Aggregation – Groupwise Operations and Transformations – Pivot Tables and Cross Tabulations – Date and Time Date Type tools – Time Series Basics – Data Ranges, Frequencies and Shifting.	**[9]**
Web Scraping* Data Acquisition by Scraping web applications –Submitting a form - Fetching web pages – Downloading web pages through form submission – CSS Selectors.	**[9]**
Visualization in Python* Matplotlib package – Plotting Graphs – Controlling Graph – Adding Text – More Graph Types – Getting and setting values – Patches.	**[9]**
Total Hours	**45**

Text book(s):

1. Mark Lutz, "Programming Python", O'Reilly Media, 4th edition, 2010.
2. Mark Lutz, "Learning Python", O'Reilly Media, 5th Edition, 2013

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Reference(s):	
1.	Tim Hall and J-P Stacey, “Python 3 for Absolute Beginners”, Apress, 1st edition, 2009.
2.	Magnus Lie Hetland, “Beginning Python: From Novice to Professional”, Apress, Second Edition, 2005.
3.	Shai Vaingast, “Beginning Python Visualization Crafting Visual Transformation Scripts”, Apress, 2nd edition, 2014
4.	Wes Mc Kinney, “Python for Data Analysis”, O'Reilly Media, 2012
5.	Carl Dennis,”Machine Learning And Artificial Intelligence: A Comprehensive Guide to Understanding and Implementing ML and AI (2023 Beginner Crash Course)”,Carl Dennis,2023

***SDG:4 – Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Python Concepts**	
1.1	Interpreter – Program Execution - Statements, Expressions	1
1.2	Flow Controls	1
1.3	Functions	1
1.4	Numeric Types, Sequences	1
1.5	Strings	1
1.6	Tuples, Lists	1
1.7	Class Definition – Constructors	1
1.8	Inheritance – Overloading	1
1.9	Text & Binary Files - Reading and Writing.	1
2	**Data Wrangling**	
2.1	Combining and Merging DataSets	2
2.2	Reshaping and Pivoting	2
2.3	Data Transformation	1
2.4	String Manipulation	2
2.5	Regular Expressions	2
3	**Data Aggregation, Group Operations, Timeseries**	
3.1	GoupBy Mechanics	1
3.2	Data Aggregation	1
3.3	Groupwise Operations and Transformations	2
3.4	Pivot Tables and Cross Tabulations	1
3.5	Date and Time Date Type tools	1
3.6	Time Series Basics	1
3.7	Data Ranges	1
3.8	Frequencies and Shifting	1
4	**Web Scraping**	

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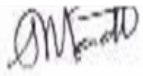

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4.1	Data Acquisition by Scraping web applications	1
4.2	Submitting a form	2
4.3	Fetching web pages	2
4.4	Downloading web pages through form submission	2
4.5	CSS Selectors	2
5	**Visualization in Python**	
5.1	Matplotlib package	2
5.2	Plotting Graphs	2
5.3	Controlling Graph	1
5.4	Adding Text	1
5.5.	More Graph Types	1
5.6.	Getting and setting values	1
5.7.	Patches	1
	Total	45

Course Designers

1. Ms. M. Saradha – saradha@ksrct.ac.in

60 CS L07	**Java Prog**	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To cram the fundamental element of the Java language. To communicate classes over objects using methods To implement Packages, Interfaces and Exception handling.
- To understand the concept of Collections.
- To apply the knowledge of threads and to access remote data.

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the need of Platform independency by acquiring knowledge in architecture, Language basics and implementing Character and String Class	Understand
CO2	Express the concept of classes, objects and communicate classes over objects using methods	Apply
CO3	Implement Packages, Interfaces and handle various Checked and Unchecked Exceptions	Apply
CO4	Prompt the collection classes to implement various data structures	Apply
CO5	Express the concept of thread execution with thread priority and to perform remote data access	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1	2	3											3	
2	2	3	3		2	2			2			2	3	
3	2	3	3		2				2			3	3	
4	3	3	3		2	2			3				3	
5	3	3	3		2	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 (Re)	10	10	20
Understand (Un)	20	20	30
Apply (Ap)	30	30	50
Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022				
60 CS L07 – Java Programming				
Open Elective				
Semester	Hours/Week	Total hrs	Credit	Maximum Marks

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

JAVA FUNDAMENTALS* Fundamentals of OOPs – Java Features – Java Architecture-Language Basics: set PATH, set CLASSPATH, Executing your first Java Program-Constants – Variables – Data types - Operators – Arrays –control statements – Character Class-Strings : String class, String Buffer class, String Builder Class and String handling methods.	**[9]**
CLASS and OBJECTS* Class – Object– Methods-Method overloading-Constructor-Constructor Overloading-Wrapper Class - Inheritance-Method Overriding-super-final-Garbage Collection.	**[8]**
PACKAGES, INTERFACES AND EXCEPTION HANDLING* Packages-Access specifiers -Built-in Packages, User defined Packages-Interfaces-Abstract Class-Exception Handling-try-catch-throw-throws-finally-finalize-Managing Predefined Exceptions- Creating and handling User defined Exceptions.	**[11]**
COLLECTIONS Collections: Iterator, Enumerator, List, Set, Queue Vector and Map.	**[8]**
MULTI THREADING AND JAVA NETWORKING** Multi threading - Java Thread model – Main thread – creating thread – creating multiple thread – Thread priority – methods – synchronization – IPC, RMI – Basics – RMI Layer – Stub, Skeleton – RMI Implementation. **Hands On:** 1. Implementation of Simple Java Programs* 2. Implementation of Array based Logical Programs* 3. Implementation of Character, String class* 4. Demonstration of communication of classes over objects using getter, setter, constructor, methods * 5. Implementation of various inheritance* 6. Implementation of various data structures using Collections* 7. Implementation of different applications using packages, interfaces and to check abnormal conditions using exception handling* 8. Implementation of multi-tasking concepts using threads* 9. Implementation of accessing remote data using RMI**. 10. Mini – Project	**[9]**
Total Hours	**45**

Text book(s):

1.	Herbert Schildt, "the Java 2: Complete Reference", Fifth edition, TMH,2002.
2.	M. Heckler, “JavaFX 8: Introduction by Example”, Second Edition,Apress.

Reference(s):

1.	https://www.tutorialspoint.com,
2.	https://www.javatpoint.com,
3.	https://beginnersbook.com

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4.	https://www.journaldev.com,

*SDG:4- Quality Education

**SDGs – 17 : Global Partnership

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**JAVA FUNDAMENTALS**	
1.1	Fundamentals of OOPs	2
1.2	Java Features – Java Architecture	1
1.3	Language Basics: set PATH, set CLASSPATH, Executing your first Java Program	2
1.4	Constants – Variables	1
1.5	Data types	1
1.6	Operators – Arrays	2
1.7	control statements	

1.8	Character Class	
	Strings : String class, String Buffer class, String Builder Class and String handling methods.	
2	**CLASS and OBJECTS**	
2.1	Class – Object	1
2.2	Methods-Method overloading	1
2.3	Constructor	1
2.4	Constructor Overloading	1
2.5	Wrapper Class	1
2.6	Inheritance	1
2.7	Method Overriding	1
2.8	Super - final-Garbage Collection	1
3	**PACKAGES, INTERFACES AND EXCEPTION HANDLING**	
3.1	Packages	1

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3.2	Access specifiers	1
3.3	Built-in Packages	1
3.4	User defined Packages	1
3.5	Interfaces	1
3.6	Abstract Class	1
3.7	Exception Handling-try-catch-throw-throws-finally-finalize	2
3.8	Managing Predefined Exceptions	1
3.9	Creating and handling User defined Exceptions	2
4	**COLLECTIONS**	
4.1	Collections: Iterator	1
4.2	Enumerator	2
4.3	List	2
4.4	Set	2
4.5	Queue Vector and Map	1
5	**MULTI THREADING AND JAVA NETWORKING**	
5.1	Multi threading	1
5.2	Java Thread model	1
5.3	Main thread	1
5.4	Creating thread	1
5.5.	Creating multiple thread	1
5.6.	Thread priority - methods	1
5.7.	synchronization – IPC	1
5.8.	RMI – Basics – RMI Layer	1
5.9.	Stub, Skeleton – RMI Implementation	1
	Total	45

Course Designers

1. Ms. J.Mythili - mythili@ksrct.ac.in

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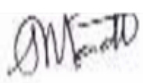

BoS Chairman

60 CS L08	Linux and Shel	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To know the basics of Linux OS, Linux environment and file system
- To understand and make effective use of the UNIX commands
- To learn and understand the use of process fundamentals in Linux
- To enhance the skills needed for the shell scripting and shell programming
- To develop the writing skills for system programming

Prerequisite

Knowledge on basic programming constructs such as variables, loops, and conditional statements **Course Outcomes**

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

CO1	Apprehend the basics of Linux environment and file system	Apply
CO2	Demonstrate and execute the files and directories commands to store in directories	Apply
CO3	Interpret the uses of commands for the processes in Linux	Apply
CO4	Analyze and implement the programs using shell programming	Analyze
CO5	Design and execute the filter commands using regular expressions to match a string of text	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1	3		3						2			2	3	
2	3		3						2			2	3	
3	3		3						2			2	3	
4	3		3						2			2	3	3
5	3		3						2			2	3	3
3- Strong;2-Medium;1-Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)	End Sem Examination (Marks)

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

	1	2	
Remember (Re)	10	10	10
Understand (Un)	30	20	20
Apply (Ap)	20	20	40
Analyze (An)	-	10	30
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L08 – Linux and Shell Programming								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Introduction* Linux Introduction and File System - Basic Features, Advantages, Installing Requirement, Basic Architecture of Unix/Linux System, Kernel, Shell, Linux File System - Boot Block, Super Block, Inode Table, Data Blocks, How Linux Access Files, Storage Files, Linux Standard Directories.	**[9]**
Files and Directories Commands* Files and Directories Commands - cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more and less, Creating and Viewing Files Command - cat, File Comparisons Commands - cmp and comm, View files, Disk Related Commands, Checking Disk Free Spaces, System Startup and Shut - Down Process, init and Run Levels.	**[9]**
Essential Linux Commands* Understanding Shells, Processes in Linux - Process Fundamentals, Connecting Processes Commands - pipes and tee, Input/Output Redirecting, Manual Help, Background Processing, Managing Multiple Processes, Changing Process Priority with nice Command, Scheduling of Processes Commands - at, cron, batch, kill, ps, who and sleep, Printing Commands - find, sort, touch and file, File Related Commands - ws, sat, cut and dd, Mathematical Commands - bc, expr, factor and units, Creating and Editing Files Commands - vi and vim.	**[9]**
Shell Programming* Shell Programming - Basic of Shell Programming, Various Types of Shell Available in Linux, Comparisons Between Various Shells, Shell Programming in Bash - read Command, Conditional and Looping Statements, Case Statements, Parameter Passing and Arguments, Shell Variables, System Shell Variables, Shell Keywords, Creating Shell Programs.	**[9]**

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Filtering Commands* Filtering Commands - pr, head, tail, cut, paste, sort, uniq and tr, Filter using Regular Expressions - grep, egrep, and sed; AWK Programming – Report Printing with AWK. **Hands On:** 1. Execution of files and directory commands to list all files or directories in the current directory. 2. Execution of scheduling of processes commands to schedule one-time jobs for a specific time and date 3. Implementation of Shell script to perform operations on files and strings. 4. Implementation of Shell programming concepts such as conditional and looping statements, and functions. 5. Implement and execute the C program in Linux. 6. Implementation of inter process communication between two unrelated processes. 7. Execution of filtering commands for filtering text for effective file operations. 8. Execution of filters and regular expressions commands grep, awk and sed that use all of its features.	**[9]**
Total Hours	**45**

Text book(s):	
1.	Behrouz A. Forouzan and Richard F. Gilberg, ” Unix and Shell Programming”, Cengage Learning, 2009.
2.	Richard Blum, ” Linux Command Line and Shell Scripting Bible”, Second Edition, Wiley India Pvt. Ltd., 2011.
Reference(s):	
1.	Richard Petersen, “Linux: The Complete Reference”, Sixth Edition, McGraw-Hill Companies, 2008
2.	Neil Matthew and Richard Stones, ”Beginning Linux Programming”, Wiley Publishing, 2008.
3.	Eric Foster-Johnson, John C. Welch and Micah Anderson, “Beginning Shell Scripting”, Wiley Publishing, 2008.
4.	Christopher Vickery, “UNIX Shell Programmer's Interactive Workbook”, Pearson Education 2001.

*** SDG:4- Quality Education**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction**	
1.1	Linux Introduction and File System	1

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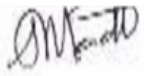

BoS Chairman

1.2	Basic Features, Advantages	1
1.3	Installing Requirement, Basic Architecture of Unix/Linux System	1
1.4	Kernel, Shell, Linux File System	1
1.5	Boot Block, Super Block	1
1.6	Inode Table	1
1.7	Data Blocks	1
1.8	How Linux Access Files	1
1.9	Storage Files, Linux Standard Directories	1
2	**Files and Directories Commands**	
2.1	Files and Directories Commands - cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more and less	2
2.2	Creating and Viewing Files Command - cat,	1
2.3	File Comparisons Commands - cmp and comm	1
2.4	View files, Disk Related Commands	2
2.5	Checking Disk Free Spaces	1
2.6	System Startup and Shut - Down Process	1
2.7	init and Run Levels	1
3	**Essential Linux Commands**	
3.1	Understanding Shells	1
3.2	Processes in Linux - Process Fundamentals, Connecting Processes Commands	1
3.3	pipes and tee, Input/Output Redirecting, Manual Help	1
3.4	Background Processing, Managing Multiple Processes	1
3.5	Changing Process Priority with nice Command	1
3.6	Scheduling of Processes Commands - at, cron, batch, kill, ps, who and sleep	1
3.7	Printing Commands - find, sort, touch and file	1
3.8	File Related Commands - ws, sat, cut and dd, Mathematical Commands - bc, expr, factor and units	1
3.9	Creating and Editing Files Commands - vi and vim.	1
4	**Shell Programming**	
4.1	Shell Programming - Basic of Shell Programming	1

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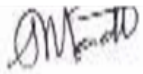

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4.2	Various Types of Shell Available in Linux	1
4.3	Comparisons Between Various Shells	1
4.4	Shell Programming in Bash - read Command	1
4.5	Conditional and Looping Statements	1
4.6	Case Statements	1
4.7	Parameter Passing and Arguments	1
4.8	Shell Variables, System Shell Variables	1
4.9	Shell Keywords, Creating Shell Programs.	1
5	**Filtering Commands**	
5.1	Filtering Commands - pr, head, tail, cut, paste, sort, uniq and tr,	3
5.2	Filter using Regular Expressions - grep, egrep, and sed	2
5.3	AWK Programming	2
5.4	Report Printing with AWK	2
	Total	45

Course Designers

1. Dr. R. Gopinath -gopinathr@ksrct.ac.in

60 CS L09	**Sales**	Category	L	T	P	Credit
		OE	2	0	2	3

Objective

- To Understand Salesforce Architecture and Features
- To know the customization process in Salesforce
- To Understand the security model
- To Understand the Sales Cloud and Cloud modules
- To Understand the business process automation options
- To Understand the reports and dashboard

Prerequisite

Knowledge on Software Engineering and computer programming skills

Course Outcomes

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

CO1	Apply data modeling techniques to design and configure custom objects, fields, and relationships in Salesforce.	Apply
CO2	Apply advanced data management and customization techniques in Salesforce to enhance data organization and user experience	Apply
CO3	Evaluate and recommend appropriate Salesforce user setup and security settings to control access and permissions	Analyze
CO4	Develop advanced automation solutions using Process Builder and Visual Workflow to meet complex business requirements	Apply
CO5	Evaluate and recommend appropriate reporting and analytics strategies based on business requirements.	Evaluate

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3		3						2			2	3	
2	3		3						2			2	3	
3	3		3						2			2	3	
4	3		3						2			2	3	3
5	3		3						2			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 (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	40
Analyze (An)	20	20	30
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L09 – Salesforce								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	2	0	2	45	3	50	50	100

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

Salesforce Fundamentals Introduction to CRM- CRM Use Cases - Why Salesforce? - Overview of Salesforce platform and its Architecture - Advantage of Salesforce, Salesforce editions and licenses - Salesforce user interface and navigation - Salesforce Mobile App and Salesforce Lightning Experience - Signing up Developer Edition - Standard Objects - Creating Custom Objects - Fields and data types - Apps Creation.	**[8]**

Salesforce Data Management and Customization Essentials* Relationships and junction objects, Roll up Summary- Creating Formula Fields, Schema Builder. Data Validation - Validation rules. Working with Record Types and Page Layouts - Compact Layout- Lightning Record Pages – Home Page Customization -Path Settings. - List Views - Data import and data management tools.	**[10]**
Security and Data Access* Organization Security Controls - Passwords, IP restrictions, Network Settings. User Setup and Security - User Creation- Security Model: Meta Data - Profile settings and permissions - Permission set- Salesforce Sharing model -Organization Wide Defaults (OWD) - Role Hierarchy- Sharing Rules- Manual Sharing - Sharing rules and public groups.	**[10]**
Business Process Automation **Introduction to WorkFlow and Process Builder -** Work flow rules – Work flow action - Flows: Types of Flow Screen Flow- Record Trigrrered Flow- Scheduled Trigger Flow- Auto Launched Flow. **uses cases of Process Automation. Email Alerts and Field Updates - Approval Processes**.**	**[10]**

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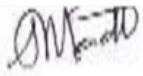

BoS Chairman

Reports, Dashboards, and Analytics - Creating or customizing a report - Summarizing data, report formats and flash Boards: scheduling, Report Charts and Dashboard Components. Creating and modifying custom report types - Summary Report- Tabular Report- matrix Report- Standard DashBoards & Dynamic DashBoards**. Hands on: 1. Create Objects, Fields and App 2. Explore Data Types 3. Create Field Relationships 4. Create Record Types(create), Page Layout (adding section, field property settings), Page Layout Assignment (assign page layout based on Record types) 5. Create Lightning Record Page, List View, Path Settings 6. Validation Rule 7. **Automation I*** a. Screen Flow b. Auto Launched Flow 8. **Automation II*** a. Record Trigger Flow b. Scheduled Flow c. Approval Process 9. **Security*** a. Profiles and Permission Set b. Org Wide Default c. Roles d. Sharing Rules e. Manual Sharing 10. **Reports and Dashboards **** a. Custom Report Types b. Dynamic Dashboards c. Report and Dashboards Sharing	**[7]**
Total Hours	**45**

Text book(s):

1.	Sharif Shaalan, Timothy Royer, “Salesforce for Beginners, A step-by-step guide to optimize sales and marketing and automate business processes with the Salesforce platform”, 2nd Edition, Packt Publishing Limited, 2022.
2.	Sharif Shaalan, “Salesforce for Beginners: A step-by-step guide to creating, managing, and automating sales and marketing processes Paperback – Illustrated”, Packt Publishing Limited, 2020

***SDG:4- Quality Education**

****SDG:8- sustainable economic growth, full and productive employment**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

1	**Salesforce Fundamentals**	
1.1	Introduction to CRM- CRM Use Cases - Why Salesforce?	1
1.2	Overview of Salesforce platform and its Architecture	1
1.3	Advantage of Salesforce, Salesforce editions and licenses	1
1.4	Salesforce user interface and navigation	1
1.5	Salesforce Mobile App and Salesforce Lightning Experience	1
1.6	Signing up Developer Edition - Standard Objects	1
1.7	Creating Custom Objects - Fields and data types - Apps Creation	1
2	**Salesforce Data Management and Customization Essentials**	
2.1	Relationships and junction objects	1
2.2	Roll up Summary	1
2.3	First-order logic	1
2.4	Creating Formula Fields	1
2.5	Schema Builder	1
2.6	Data Validation - Validation rules	1
2.7	Working with Record Types and Page Layouts	1
2.8	Compact Layout- Lightning Record Pages	1
2.9	Home Page Customization -Path Settings	1
2.10	List Views - Data import and data management tools	1
3	**Security and Data Access**	
3.1	Organization Security Controls	1
3.2	Passwords, IP restrictions, Network Settings	1
3.3	User Setup and Security	1
3.4	User Creation	1
3.5	Security Model: Meta Data	1
3.6	Profile settings and permissions	1
3.7	Permission set	1
3.8	Salesforce Sharing model	1
3.9	Organization Wide Defaults (OWD)	1
3.10	Role Hierarchy- Sharing Rules- Manual Sharing - Sharing rules and public groups	1
4	**Business Process Automation**	

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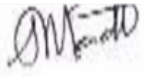

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4.1	Introduction to WorkFlow and Process Builder	1
4.2	Work flow rules	1
4.3	Work flow action	1
4.4	Flows: Types of Flow	1
4.5	Screen Flow	1
4.6	Record Trigrrered Flow	1
4.7	Scheduled Trigger Flow	1
4.8	Auto Launched Flow	1
4.9	uses cases of Process Automation	1
4.10	Email Alerts and Field Updates - Approval Processes.	1
5	**Reports, Dashboards, and Analytics**	
5.1	Creating or customizing a report	1
5.2	Summarizing data, report formats and filtering data	1
5.3	scheduling, Report Charts and Dashboard Components	1
5.4	Creating and modifying dashboards	1
5.5.	custom report types	1
5.6.	Summary Report- Tabular Report- matrix Report	1
5.7.	Dash Boards: Standard DashBoards & Dynamic DashBoards	1
	Total	45

Course Designers

1. Dr. P. Kaladevi -kaladevi@ksrct.ac.in

60 CS L10	**Scripting l**	Category	L	T	P	Credit
		OE	3	0	0	3

Objective

- To learn various scripting languages
- To understand the basic of JQuery
- To learn Ruby and working with web

- To learn the basics of TCL
- To learn the advanced concepts of TCL

Prerequisite

NIL

Course Outcomes

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

CO1	Understand the concept Scripting and JavaScript	Understand
CO2	Explore the concept of JQuery	Apply
CO3	Understanding use of Ruby	Understand
CO4	Analyze the structure of TCL	Analyze
CO5	Explore the commands and issues in TCL	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1					3					2	2	3	2	
2	2	2	2	2	3					2	2	3	2	2
3	2	2	2	2	3					2	2	3	2	2
4	2	2	2	2	3					2	2	3	2	2
5					3					2	2	3	2	

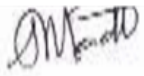
3- Strong;2-Medium;1-Some

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Understand (Un)	15	15	20
Apply (Ap)	15	15	40
Analyze (An)	20	20	30
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022
60 CS L10 – Scripting Languages
Open Elective

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

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

Introduction to Scripting and JavaScript* Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting languages, Web Scripting, and the universe of Scripting Languages, what is JavaScript – Object models – Design philosophy –Versions of JavaScript – The JavaScript core language – System objects – Advanced facilities – JavaScript and Java – JavaScript operators and precedence.	**[9]**
jQuery ** Introduction to jQuery -Using jQuery Core -jQuery Events – jQuery Effects - AJAX and jQuery -HTML5 Forms and jQuery UI.	**[10]**
Ruby ** Introduction Ruby, Rails, the structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services, RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling.	**[8]**
Introduction to TCL * TCL structure, syntax, variables and data in TCL, control flow, data structures, input/output, procedures, strings, patterns, files	**[8]**
Advanced TCL Eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts internet programming, Security issues, C interface, Java interface.	**[10]**
Total Hours	**45**

Text book(s):

1.	David Barron: “The World of Scripting Languages”, 1st Edition, Wiley publications.
2.	David Flanagan, Yukihiro Matsumoto: “The Ruby Programming Language”, O’Reilly Media,.

Reference(s):

1.	John Ousterhout, Ken Jones: “Tcl and the Tk Toolkit”, 2nd Edition, Pearson education.
2.	Dabve Thomas, “Programming Ruby: The Pragmatic Programmers' Guide” Second edition
3.	https://api.jquery.com/
4.	Alex Libby, “Mastering jQuery”, Packet Publications first edition,2015

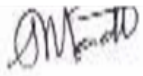
***SDGs – 4 : Quality education**

****SDGs – 3 : Healthy lives and promote well-being for all at all age**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction to Scripting and JavaScript**	

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

1.1	Scripts and Programs	1
1.2	Origin of Scripting, Scripting Today, Characteristics of Scripting languages	1
1.3	Web Scripting, and the universe of Scripting Languages	1
1.4	what is JavaScript – Object models	1
1.5	Design philosophy –Versions of JavaScript	1
1.6	The JavaScript core language – System objects	2
1.7	Advanced facilities - JavaScript and Java	1
1.8	JavaScript operators and precedence.	1
2	**JQuery**	
2.1	Introduction to jQuery	1
2.2	Using jQuery Core	1
2.3	jQuery Events	2
2.4	jQuery Effects	2
2.5	AJAX and jQuery	2
2.6	HTML5	1
2.7	Forms and jQuery UI.	1
3	**Ruby**	
3.1	Introduction Ruby, Rails, the structure and Execution of Ruby Programs	1
3.2	Package Management with RUBYGEMS	1
3.3	Ruby and web: Writing CGI scripts, cookies	2
3.4	Choice of Webservers	1
3.5	SOAP and web services	1
3.6	RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling.	2
4	**Introduction to TCL**	
4.1	TCL structure, syntax	1
4.2	Variables and data in TCL	1
4.3	Control flow	1
4.4	Data structures	1

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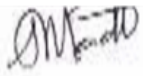

BoS Chairman

4.5	Input/output	1
4.6	Procedures	1
4.7	Strings, patterns	1
4.8	Files	1
5	**Advanced TCL**	
5.1	Eval	1
5.2	source	1
5.3	exec and up level commands	1
5.4	Name spaces	1
5.5.	trapping errors	1
5.6.	event driven programs	1
5.7.	making applications internet aware	1
5.8.	Nuts and Bolts internet programming	1
5.9.	Security issues	1
5.10	C interface, Java interface	1
	Total	45

Course Designers

1. Mr. S. Vadivel -vadivels@ksrct.ac.in

60 CS L11	**Advanced Java**	Category	L	T	P	Credit
		OE	3	0	0	3

Objective

- To become familiar with the advanced features of Java Language
- To discover how to write Java applications this can communicate with Relational Databases
- To understand the possible actions can be performed using JSP

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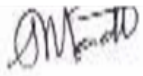

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- To develop Web Applications using Servlets / JSP
- To understand the Java 8 features **Prerequisite**

Core Java

Course Outcomes

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

CO1	Interpret the java fundamentals and essentials of inheritance	Understand
CO2	Execute the various commands in RDBMS for data management	Apply
CO3	Apply the elements available in JSP for web page design	Apply
CO4	Explore the various JSP actions in web application development	Apply
CO5	Demonstrate Java 8 features	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
1	3	3	3	3	2				2		3	2	3	
2	3	3	3	3	2				2		3	2	3	
3	3	3	3	3	3	2			2		3	2	3	
4	3	3	3	3	3	2			2		3	2	3	3
5	3	3	3	3	3	2			3		3	2	3	3

Assessment Pattern

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

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60 CS L11 – Advanced Java Programming								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Java Fundamentals* Java Architecture, Language basics, OOPS, Garbage collection, String, String buffer, Collection Framework, Packages, Exception Handling, Abstract, Interfaces.	**[9]**
RDBMS and JDBC** RDBMS/SQL/PL/SQL: Introduction to RDBMS, DML, DDL, Select statement, Restricting and Sorting data, Single row functions, Group functions, Joins, JDBC: Introduction, Establishing Connection, Execute query process results, Meta Data and Prepared Statement, Callable Statement and Transactions.	**[9]**
JSP Elements* Scripting Elements: Scriptlets, Expression, Declarations, Data Types, Variables, Operators, JSP Directive Elements: Page, Include and Taglib	**[9]**
JSP Actions and Expression Language JSP Actions: Standard Actions, forward, include, param, useBean, setProperty, getProperty, element, attribute, body, EL Expression, JSP Standard Tag Library, Core Library.	**[9]**
Java 8 Features* Lambda expressions, Method references, Functional interfaces, Stream API, Default methods, Base64 Encode Decode, Static methods in interface, Optional class, Collectors class, ForEach() method, Nashorn JavaScript Engine, Parallel Array Sorting, Type and Repeating Annotations, IO Enhancements, Concurrency Enhancements	**[9]**
Total Hours	**45**

Text book(s):

1. Luciano Manelli, Giulio Zambon, “Beginning Jakarta EE Web Development_ Using JSP, JSF, MySQL, and Apache Tomcat for Building Java Web Applications”, Apress, 2020.
2. Herbert Schildt, "Java The Complete Reference", Twelfth Edition, McGraw Hill Education, 2021.
3. Peter Späth, “Beginning Jakarta EE - Enterprise Edition for Java From Novice to Professional”, Apress, 2019.

Reference(s):

1. https://www.javatpoint.com/jsp-tutorial
2. https://www.geeksforgeeks.org/introduction-to-jsp/

***SDGs – 4 : Quality education**

****SDGs – 17 : Global Partnership**

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

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Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Java Fundamentals**	
1.1	Java Architecture, Language basics	1
1.2	OOPS, Garbage collection	1
1.3	String, String buffer	1
1.4	Collection Framework	1
1.5	Packages	1
1.6	Exception Handling	2
1.7	Abstract	1
1.8	Interfaces	1
2	**RDBMS and JDBC**	
2.1	RDBMS/SQL/PL/SQL: Introduction to RDBMS, DML, DDL	1
2.2	Select statement, Restricting and Sorting data	1
2.3	Single row functions, Group functions	1
2.4	Joins	1
2.5	JDBC: Introduction	1
2.6	Establishing Connection	1
2.7	Execute query process results	1
2.8	Meta Data and Prepared Statement	1
2.9	Callable Statement and Transactions	1
3	**JSP Elements**	
3.1	Scripting Elements: Scriptlets	1
3.2	Expression	1
3.3	Declarations	1
3.4	Data Types	1
3.5	Variables	1
3.6	Operators	2
3.7	JSP Directive Elements: Page, Include and Taglib	2

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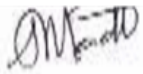

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4	**JSP Actions and Expression Language**	
4.1	JSP Actions: Standard Actions	1
4.2	forward	1
4.3	include	1
4.4	param	1
4.5	useBean	1
4.6	setProperty, getProperty	1
4.7	element, attribute, body	1
4.8	EL Expression	1
4.9	JSP Standard Tag Library, Core Library	1
5	**Java 8 Features**	
5.1	Lambda expressions	1
5.2	Method references	1
5.3	Functional interfaces, Stream API	1
5.4	Default methods, Base64 Encode Decode	1
5.5.	Static methods in interface, Optional class	1
5.6.	Collectors class, ForEach() method	1
5.7.	Nashorn JavaScript Engine, Parallel Array Sorting	1
5.8.	Type and Repeating Annotations	1
5.9.	IO Enhancements, Concurrency Enhancements	1
	Total	45

Course Designers

1. Mr. S. Vadivel -vadivels@ksrct.ac.in

60 CS L12	**Generative AI**	Category	L	T	P	Credit
		OE	3	0	0	3

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Objective

- To get an introduction to Generative AI
- To learn the language models and LLM architectures of generative AI
- To understand the Generative Pre-Trained Transformer
- To develop the practical applications of GPT
- To work with LangChain framework

Prerequisite

Knowledge on statistics, linear algebra, matrix, calculus, probability, programming languages and data modelling

Course Outcomes

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

CO1	Understand the generative AI basics	Understand
CO2	Apply the language models and LLM architectures in generative AI	Apply
CO3	Develop the ChatGPT from Generative Pre-trained Transformer	Apply
CO4	Develop the practical application of GPT	Apply
CO5	Recognize the concept of LangChain framework	Apply

Mapping with Programme Outcomes

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3	2	3				3	2			3	
2	3	2	3	2	3	2	2		3	2			3	
3	3	2	3		3	2			3	2		3	3	
4	3	2	3		3			3	3	2		3	3	3
5	3	2	3	2	3	2	1	3	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 (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40

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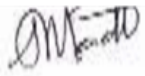

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Analyze (An)	-	-	-
Evaluate (Ev)	-	-	-
Create (Cr)	-	-	-

K.S.Rangasamy College of Technology–Autonomous R2022								
60 CS L12–Generative AI								
Open Elective								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Introduction to Generative AI* Introduction to Artificial Intelligence – Machine Learning -Difference between AI and Machine Learning – Deep Learning – Deep Learning Model Types - Generative AI - Definition and scope of Generative AI - Overview of generative models and their applications - Importance of Generative AI in various domains - Ethical considerations and challenges	**[8]**
Generative AI: Language Models and LLM Architectures* Introduction to language models and their role in AI - Traditional approaches to language modeling - Deep learning-based language models and their advantages - Overview of popular LLM architectures: RNNs, LSTMs, and Transformers	**[9]**
Understanding GPT (Generative Pre-trained Transformer)** Introduction to GPT and its significance - Pre-training and fine-tuning processes in GPT - Architecture and working of GPT models - Overview of GPT variants and their use cases	**[10]**
ChatGPT: A Practical Application of GPT** Introduction to ChatGPT and its purpose - Training data and techniques for ChatGPT - Handling user queries and generating responses - Tips for improving ChatGPT's performance.	**[9]**
LangChain: Simplifying Development with Language Models** Introduction to LangChain and its objectives - Overview of the LangChain framework and its components - Streamlining application development using LangChain - Examples of applications built with LangChain	**[9]**
Total Hours	**45**

Text Book(s):

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, “Deep Learning”, Illustrated edition, The MIT Press, 2016.
2. Alger Fraley, “The Artificial Intelligence and Generative AI Bible”, AlgoRay Publishing, 2023.

Reference(s):

1. David Foster, “Generative Deep Learning”, O'Reilly Media, Inc, 2019
2. Michael Negnevitsky, “Artificial Intelligence: A Guide to Intelligent Systems Paperback”, 2011
3. Jakub Langr, Vladimir Bok,“GANs in Action: Deep learning with Generative Adversarial Networks”, First Edition, Manning, 2019.

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4.	Joseph Babcock, Raghav Bali,“Generative AI with Python and TensorFlow 2: Create images, text, and music with VAEs, GANs, LSTMs, Transformer models”, Packt Publishing Limited, 2021

***SDG:4 – Quality Education**

***SDG:9 - Industry Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Introduction to Generative AI**	
1.1	Introduction to Artificial Intelligence	1
1.2	Machine Learning ,Difference between AI and Machine Learning	1
1.3	Deep Learning ,Deep Learning Model Types	1
1.4	Generative AI , Definition and scope of Generative AI ,Overview of generative models and their applications	2
1.5	Importance of Generative AI in various domains - Ethical considerations and challenges	2
1.6	Ethical considerations and challenges	1
2	**Generative AI: Language Models and LLM Architectures**	
2.1	Introduction to language models and their role in AI	3
2.2	Traditional approaches to language modeling	2
2.3	Deep learning-based language models and their advantages	2
2.4	Overview of popular LLM architectures: RNNs, LSTMs, and Transformers	2
3	**Understanding GPT (Generative Pre-trained Transformer)**	
3.1	Introduction to GPT and its significance	2
3.2	Pre-training and fine-tuning processes in GPT	2
3.3	Architecture and working of GPT models	3
3.4	Overview of GPT variants and their use cases	2
4	**ChatGPT: A Practical Application of GPT**	
4.1	Introduction to ChatGPT and its purpose	2
4.2	Training data and techniques for ChatGPT	3
4.3	Handling user queries and generating responses	2
4.4	Tips for improving ChatGPT's performance	2
5	**LangChain: Simplifying Development with Language Models**	
5.1	Introduction to LangChain and its objectives	2
5.2	Overview of the LangChain framework and its components	3
5.3	Streamlining application development using LangChain	3
5.4	Examples of applications built with LangChain	1
	Total	45

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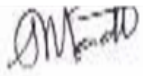

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Course Designers

1. Dr. S. Madhavi -madhavis@ksrct.ac.in

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K.S.Rangasamy College of Technology (Autonomous)

Curriculum & Syllabi for

B. E Computer Science Engineering Honours Degree - Full Stack Development

(For the batch admitted in 2022-2023)

R 2022

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.

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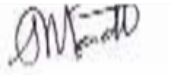

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K. S. RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637 215
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
HONOURS DEGREE PROGRAMME - FULL STACK DEVELOPMENT LIST OF COURSES

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	60 CS H01	Industrial Cloud Practices	PE	3	3	0	0	3
2.	60 CS H02	DevOps	PE	3	3	0	0	3
3.	60 CS H03	Advanced Java	PE	3	3	0	0	3
4.	60 CS H04	Data Analytics	PE	3	3	0	0	3
5.	60 CS H05	Advanced .NET	PE	3	3	0	0	3
6.	60 CS H06	Cyber Security	PE	3	3	0	0	3
			Total	18	18	0	0	18

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60 CS H01 - Industrial Cloud Practices

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

Objective(s)

- Equip participants with a comprehensive understanding of cloud computing principles, AWS services, and security fundamentals to confidently initiate their cloud journey.
- Enable participants to grasp fundamental concepts of cloud-based compute resources, specifically focusing on Amazon Elastic Compute Cloud (Amazon EC2) and related services, including containerization and orchestration, fostering a solid foundation for practical application.
- Provide a concise understanding of OSI model layers, foundational AWS networking and security services, and proactive vulnerability prevention within the AWS cloud environment.
- Immerse learners in the realm of AWS storage solutions, covering the diverse offerings of block storage, object storage, and database services, while facilitating practical skills in hosting websites through Amazon S3.
- Equip participants with a comprehensive understanding of AWS monitoring and cost management tools, specifically focusing on CloudTrail, CloudWatch, and effective cloud cost optimization strategies.

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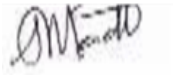

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Course outcomes	**At the end of the course, the students will be able to** CO1: possess a clear grasp of cloud computing concepts, the advantages of cloud adoption, the significance of AWS, and the foundational knowledge to utilize key AWS services effectively, while also demonstrating an understanding of cloud security essentials and initial steps to set up an AWS account and explore its service offerings. CO2: Understand the benefits of Amazon EC2 and its various instance types, distinguishing among billing options, comprehending dynamic scaling through features like Amazon EC2 Auto Scaling and Elastic Load Balancing, grasping containerization history and technologies, explaining AWS container offerings like Fargate and Amazon EKS, and practically creating an EC2 instance using a t2.micro instance type.

	CO3: Gain the knowledge of OSI model's structure, AWS networking services including subnetting, Virtual Private Cloud (VPC), security essentials like Security Groups and Network Access Control Lists (NACLs), AWS's comprehensive security measures and global infrastructure, strategies to prevent and detect vulnerabilities, and practical skills to create a VPC with multiple subnets across different availability zones. CO4: Understand the Amazon Elastic Block Store (EBS) and its volume types, performance distinctions, and EC2 instance store applications. They will also be adept in comprehending Amazon S3's object storage services, storage classes, tiering options, data protection, AWS database options including RDBMS and NoSQL (DynamoDB), and will have the practical ability to create an S3 bucket and host a static website CO5: Understand CloudTrail operations, application scenarios, cost structures, and benefits. They will also gain an understanding of Amazon CloudWatch, CloudWatch Logs, and Log Insights, along with the ability to query logs from CloudWatch Logs. Additionally, participants will become proficient in cloud financial management, cost optimization considerations, and practical skills such as sending CloudTrail logs to CloudWatch, running Log Insights queries, and validating their results

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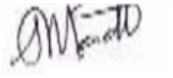

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Overview of Cloud Computing: Exploring the Concept of Cloud Computing, Understanding the Benefits of Cloud Adoption - Selecting AWS: Reasons and Advantages - Initiating Your Journey: Getting Started with Cloud and AWS - **Introduction to AWS:** Getting Started in the AWS Cloud, Understanding the AWS Global Infrastructure - **Core Services Part I:** Explore AWS Cloud Computing Fundamentals, Delve into AWS Cloud Storage Essentials, Gain Insight into AWS
Cloud Database Services - **Core Services Part II:** Understand Networking in Core AWS Services, Explore Security Aspects in Core AWS Services, Grasp Pricing Essentials of Core AWS Services - **Security Basics:** Identity and Access Management**.**
Case Study: A Kick Start - Cloud Journey: Open AWS Cloud Account - Review the Services Offerings from Compute,
Storage, Database, Networking, Security
[9]

Compute in the Cloud: Benefits of Amazon Elastic Compute Cloud (Amazon EC2) at a basic level, Identify the different Amazon EC2 instance types, Differentiate between the various billing options for Amazon EC2, Benefits of Amazon EC2 Auto Scaling - **Dynamic Scaling and Hosting in the Cloud:** Summarize the benefits of Elastic Load Balancing, Give an example of the uses for Elastic Load Balancing, Summarize additional AWS compute options - **Learn Container Concepts:** History of Containerization, Container Technologies, Microservices and Management - **Learn AWS Container Offerings:** Explain the functioning of Fargate, What is Container Orchestration Environment, Learn the fundamentals of AWS EKS.
Case Study: Create EC2 Instance - t2. Micro
[9]

Introduction to OSI Layer: OSI Model Overview, Physical and Data Link Layers, Network and Transport Layers Session, Presentation, and Application Layers - **AWS Networking Services Fundamentals:** Learn the concept of Subnetting, Amazon Virtual Private Cloud, Security Group, NACL - **AWS Security Services Fundamentals:** Cloud Security Measures, The Worldwide Infrastructure of AWS, Ensuring Data Center Security, Adhering to Compliance and Governance, Countering DDoS Attacks - **Prevention and Detection Vulenarabities in AWS Cloud:** Introduction to AWS Entry Points, Identity and Access Management in AWS, Exploring Detective Controls, Securing Infrastructure in Cloud, Ensuring Data Protection in AWS, Incident Response Strategies in Cloud Environment
Case Study: Create a VPC and 2 Subnets in Different Availability Zone
[9]

AWS Block Storage: Amazon EBS Block Storage Service, Amazon EBS Volume Types, Performance Differentiation of Amazon EBS Volume Types, Uses for Amazon EC2 Instance Stores, Retention Options for EBS Volumes - **AWS Object Storage Basic:** Amazon S3 Object Storage Services, Amazon S3 Storage Classes
Distinguishing Amazon S3 Glacier Storage Classes, Storage Class Data Tiering Options, Data Protection for Amazon S3 - **AWS Database offerings – RDBMS:** Discerning Among AWS Database Options, Exploring Amazon Relational Database Service (RDS) Value, Unveiling Amazon Aurora Architecture, Achieving High Performance with Amazon Aurora - **AWS Database offerings - NoSQL – DynamoDB:** What is NoSQL and why we need it, Amazon DynamoDB Fundamentals, Terminology and Technology Concepts
Case Study: Host Website in S3 Bucket: Create a S3 Bucket and Host a Static Website
[9]

Learn the CloudTrail: CloudTrail Operation Understanding, Surveying CloudTrail Application Scenarios, CloudTrail Cost Structure Explanation, Recognizing CloudTrail Advantages - **Understand the Cloudwatch, Cloudwatch Logs and Log Insights:** Introduction to Amazon CloudWatch, Log files from Amazon Elastic Compute Cloud (Amazon EC2)

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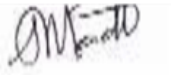

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instances, AWS CloudTrail, Query the logs from Cloudwatch Logs - **Cloud Cost Management:** Understand Cloud Financial Management, Six capabilities to have to be successful in your Cloud Financial Management journey - **Cost Optimization:** Cloud Usage with Cost Consideration, Enhance Cloud Utilization, Purchase Choices Based on Commitment.

Case Study: Explore CloudTrail and CloudWatch: Send the Logs from CloudTrail to Cloudwatch, Run LogInsights query and Validate it [9]

Total Hours: 45 hours

Text book	
1	https://www.amazon.in/-/hi/Neal-Davis/dp/1073015513
2	https://www.amazon.in/Certified-Cloud-Practitioner-CLF-C01-Pearson/dp/9353945364
Reference(s):	
1	https://explore.skillbuilder.aws/learn/course/internal/view/elearning/15120/cloud-for-ceos https://explore.skillbuilder.aws/learn/course/internal/view/elearning/15009/getting-started-with-aws-cloud-essentials https://explore.skillbuilder.aws/learn/course/internal/view/elearning/454/aws-identity-and-access-management-basics https://explore.skillbuilder.aws/learn/learning_plan/view/82/cloud-essentials-learning-plan-earn-a-learning-badge https://explore.skillbuilder.aws/learn/course/internal/view/elearning/2486/introduction-to-container-concepts https://explore.skillbuilder.aws/learn/course/internal/view/elearning/13380/getting-started-with-aws-fargate https://explore.skillbuilder.aws/learn/course/internal/view/elearning/12439/aws-networking-basics https://explore.skillbuilder.aws/learn/course/internal/view/elearning/4791/differences-between-security-groups-and-nacls" https://explore.skillbuilder.aws/learn/course/internal/view/elearning/13105/security-fundamentals-301 https://explore.skillbuilder.aws/learn/course/internal/view/elearning/16650/aws-block-storage-services-getting-started https://explore.skillbuilder.aws/learn/course/internal/view/elearning/16651/aws-object-storage-services-getting-started https://explore.skillbuilder.aws/learn/course/internal/view/elearning/1383/aws-database-services-navigate-technical https://explore.skillbuilder.aws/learn/course/internal/view/elearning/324/amazon-dynamodb-service-primer https://explore.skillbuilder.aws/learn/course/internal/view/elearning/193/getting-started-with-aws-cloudtrail https://explore.skillbuilder.aws/learn/course/internal/view/elearning/203/introduction-to-amazon-cloudwatch https://explore.skillbuilder.aws/learn/course/internal/view/elearning/191/introduction-to-amazon-cloudwatch-logs https://explore.skillbuilder.aws/learn/course/internal/view/elearning/265/introduction-to-amazon-cloudwatch-logs-insights" https://explore.skillbuilder.aws/learn/course/internal/view/elearning/1955/aws-foundations-cost-management https://explore.skillbuilder.aws/learn/course/internal/view/elearning/10803/aws-cloud-for-finance-professionals

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2						2				
2	3	2	3	2						2		2		
3	3	2	3	2	2				3	2			3	
4	3	3	3	2						2			3	
5	3	3	2	2	2				3	2		2	3	

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS H02 - DevOps								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman

V	3	0	0	45	3	40	60	100

Objective(s)	• Understand the concept of DevOps • Understand the Continuous Integration in Automated Testing and Reporting • Explore Configuration Management, Continuous Delivery and Deployment • Know the concept of Containerization and Orchestration • Analyse the Security and Compliance
Course Outcomes	**At the end of the course, the student will be able to** CO1: Recognize the concept of DevOps CO2: Apply Continuous Integration in Automated Testing and Reporting CO3: Analyze Configuration Management, Continuous Delivery and Deployment CO4: Understand the Containerization and Orchestration CO5: Evaluate the Security and Compliance

Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

Introduction to DevOps:
What is DevOps? - Benefits of DevOps - DevOps Principles - DevOps Culture and Collaboration **Version Control and Collaboration Tools:**
- Introduction to Version Control (Git) - Git Basics: Clone, Commit, Push, Pull - Branching and Merging - Collaborative Development with Git - Introduction to Git Hub/ Git Lab/ Bi bucket. [9]

Continuous Integration (CI)
CI/CD Pipeline Overview - Building and Testing Code Automatically - Introduction to Jenkins or other CI tools - Configuring Jenkins Jobs - Integration with Version Control - Automated Testing and Reporting. [8]

Configuration Management
Infrastructure as Code (IaC) concepts - Introduction to Configuration Management Tools (e.g., Ansible) - Creating Playbooks/Roles for Automated Deployment - Managing Configuration Drift
Continuous Delivery and Deployment
Understanding Continuous Delivery vs. Continuous Deployment - Blue-Green Deployments - Canary Deployments - Release Orchestration
[10]

Containerization and Orchestration
Introduction to Containers (Docker) - Creating Docker Images - Container Registries (Docker Hub, AWS ECR) - Introduction to Kubernetes - Deploying Containers with Kubernetes
Monitoring and Logging
Importance of Monitoring and Observability - Monitoring Tools (Prometheus, Grafana) - Application Logging and Log Management
[10]

Security and Compliance
Security Principles in DevOps - Incorporating Security in CI/CD - Compliance and Auditing in Dev Ops **Cloud Services and Dev Ops**
Cloud Computing Overview - Infrastructure Automation in the Cloud - Serverless Architectures
DevOps Best Practices and Case Studies
Industry Best Practices - Case Studies of Successful DevOps Implementations
[8]

Hands On:
- Applying DevOps Concepts to a Sample Project
- Setting Up a CI/CD Pipeline

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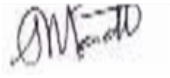

BoS Chairman

- Deploying and Monitoring the Application	
Total Hours: 45 hours	
Text books :	
1.	Gene Kim, Patrick Debois, John Willis, “The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations”, IT Revolution Press; Illustrated edition, October 6, 2016.
2.	Mikael Krief, “Learning DevOps: A comprehensive guide to accelerating DevOps culture adoption with Terraform, Azure DevOps, Kubernetes, and Jenkins”, Packt Publishing; 2nd ed. Edition, March 31, 2022.
Reference Books:	
1.	Emily Freeman, “DevOps For Dummies”, For Dummies; 1st edition, August 20, 2019.
2.	Gaurav Agarwal, “Modern DevOps Practices: Implement and secure DevOps in the public cloud with cuttingedge tools, tips, tricks, and techniques”, Packt Publishing, September 13, 2021
3.	Martyn Coupland, “DevOps Adoption Strategies: Principles, Processes, Tools, and Trends: Embracing DevOps through effective culture, people, and processes”, Packt Publishing, July 9, 2021
4.	Christopher Cowell, Nicholas Lotz, Chris Timberlake, “Automating DevOps with GitLab CI/CD Pipelines: Build efficient CI/CD pipelines to verify, secure, and deploy your code using real-life examples”, Packt Publishing, February 24, 2023.

CO’s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2		2				2	2		2		3
2	3	3	3		3	3		2	2	2		2	2	3
3	3	3	3	3	3	2		2	2	2		2	2	3
4	3	3	2	2	3	3		2	2	2		2	2	3
5	3	3	3		3				2	2		3	2	3

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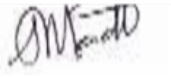
BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS H03 - Advanced Java								
Semester	Hours / Week			Total hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100
Objective(s)	• To enable the students to learn Java Collections Framework • To understand the Collections Utility and Concurrent Collections in Java • To create and use Spring Framework and Enterprise JavaBeans (EJB) • To understand Java 8 Features • To understand Web Services and Design Patterns							
Course Outcomes	**At the end of the course, the students will be able to** CO1: Recognize the principles of Java Collections Framework CO2: Implement Collections Utility and Concurrent Collections in Java. CO3: Create and use Spring Framework and Enterprise JavaBeans (EJB) CO4: Analyzing the Java 8 Features CO5: Implement the concept of Web Services and Design Patterns							
Note: Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus**.**								

Passed in BoS Meeting held on 02/12/2023 Approved in Academic Council Meeting held on 23/12/2023



BoS Chairman

Java Collections Framework

Introduction to Collections, Overview of the Java Collections Framework (JCF), Importance of collections in Java programming, Core Interfaces- List, Set, and Map interfaces, hierarchy of collection interfaces, Lists and their Implementations - ArrayList and LinkedList, Sets and their Implementations - HashSet, LinkedHashSet, and TreeSet, Maps and their Implementations- HashMap, LinkedHashMap, and TreeMap, Key-value pairs, ordering, and special features. [9]

Collections Utility and Concurrent Collections

Common utility methods- Sorting, searching, and synchronization, Custom Objects in Collections- Implementing Comparable and Comparator interfaces, customizing sorting for user-defined classes, Concurrent Collections - ConcurrentHashMap and CopyOnWriteArrayList, Collections Best Practices - Guidelines for choosing the right collection, Performance considerations and best coding practices. [9]

Spring Framework and Enterprise JavaBeans (EJB)

Overview of the Spring framework - Dependency injection and Inversion of Control (IoC), Spring MVC - Building web applications, Controllers, views, and forms, Spring Data and Hibernate Integration, Integrating Spring with Hibernate, Spring Data. Introduction to EJB - Session beans, entity beans, and message-driven beans, EJB 3.x Features - Annotations and simplifications. [9]

Java 8 Features

Lambda expressions, Method references, Functional interfaces, Stream API, Default methods, Base64 Encode Decode, Static methods in interface, Optional class, Collectors class, ForEach() method, Nashorn JavaScript Engine, Parallel Array Sorting, Type and Repeating Annotations, IO Enhancements, Concurrency Enhancements, JDBC Enhancements. [9]

Web Services and Design Patterns

Web Services - SOAP and RESTful web services, JAX-RS and JAX-WS for Java web services. Design Patterns in Java - Overview of Design Patterns – Categories, Creational Design Patterns - Singleton, Factory, Builder, Prototype. Structural Design Patterns – Adapter, Bridge, Composite, Decorator. Behavioral Design Patterns – Observer, Strategy, Command. Additional Design Patterns and Best Practices - Chain of Responsibility Pattern, Visitor and Template Method patterns. [9]

Total Hours: 45 hours

Text book(s):

1.	Uttam Kumar Roy, “Advanced Java Programming”, UK Edition, OUP India, 2015
2.	R. Nageswara Rao, DT Editorial Services, “Core Java: An Integrated Approach”, Dreamtech Press, 1st Edition, 2016.

Reference(s) :

1.	Anuradha A. Puntambekar, “Advanced Java”, Technical Publications, 2020

CO’s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3		3				3	3	2	3	2	
2	3	3	3		3	2		2	3	3	2	3	3	2
3	2	3	3		3			2	3	3	2	3	3	2
4	3	3	3	2	3	2			3	3	2	3	3	2

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BoS Chairman

5	2	3	3	2	3	2			3	3	2	3	3	

K.S. Rangasamy College of Technology – Autonomous R2022								
60 CS H04 - Data Analytics								
Semester	**Hours / Week**			**Total hrs**	**Credit**	**Maximum Marks**		
	L	**T**	**P**		**C**	**CA**	**ES**	**Total**
VI	**3**	**0**	**0**	**45**	**3**	**40**	**60**	**100**
Objective(s)	• To know the basic data analytics concepts • To understand the Data Collection and Preprocessing • To understand Exploratory Data Analytics (EDA) • To learn Statistical Data Analytics • To know about Distributed File Systems							
Course Outcomes	**At the end of the course, the students will be able to** CO1: Understanding the basic concepts of data analytics CO2: Understand the concept of data collection and preprocessing CO3: Know about Exploratory Data Analytics (EDA) CO4: Gain the knowledge of statistical data analytics CO5: Understand about distributed file systems							
Note: Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus**.**								

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BoS Chairman

Introduction

Overview of Data Analytics - Business Intelligence- Pattern Recognition- Data Processing Chain- BI for Better Decisions- Decision Types- BI Tools - BI Applications - Introduction to Big Data - Data analysis life cycle - Overview of popular programming tools (Python, R, SQL) for data analysis - Introduction to data visualization tools (Tableau, Power BI) and their significance - Understand the statistical concepts: descriptive and inferential statistics - summary statistics: mean, median, mode, range, standard deviation, quartiles and correlation. [9]

Data Collection and Preprocessing

Introduction to Data Sources - Data Cleaning - Data Transformation - Normalization/Scaling- Log Transformation - Handling Categorical Data- One-Hot Encoding- Label Encoding- Dealing with Imbalanced Data - Handling Date and Time Data- Feature Engineering- Removing Redundant Features - Data Integration- Handling Duplicate Data- Data Splitting - Data Standardization. [9]

Exploratory Data Analytics (EDA)

Introduction, Data Visualization Techniques -Univariate, Bivariate, and Multivariate Plots - Selection of Appropriate Charts (Histograms, Box Plots, Scatter Plots) - Data Distribution Analysis: Normality Testing, Skewness and Kurtosis, Correlation and Covariance - Handling Outliers in EDA - Data Patterns and Trends: Time Series Analysis, Seasonality and Trends - Exploring Relationships: Heatmaps for Correlation, Pair Plots - Hypothesis Testing: Formulating Hypotheses and Selecting the Right Test (TTests, ANOVA) - Interactive EDA Tools: Use Tools like Tableau Power BI and create interactive Dashboards. [9]

Statistical Data Analytics

Linear Regression - Logistic Regression - Multinomial Logistic Regression - Poisson Regression - Generalized Linear Models (GLM) - Time Series Models.
[9]

Distributed File Systems

Hadoop Distributed File System (HDFS) and Google File System (GFS). - NoSQL Databases: Explore distributed databases like Apache Cassandra, MongoDB, or Amazon DynamoDB. Distributed Processing - MapReduce programming model for distributed processing. Apache Spark framework for in-memory data processing. [9]

Total Hours : 45

Text book(s):

1	Anil Maheshwari, “Data Analytics – Made Accessible”, Kindle Edition, 1st edition, 2014.
2	Michael Berthhold, David J.Hand, “Intelligent Data Analysis”, Springer, 2nd Edition, 2015

Reference(s) :

1.	Shai Vaingast, “Beginning Python Visualization Crafting Visual Transformation Scripts”, Apress, 2nd edition, 2014
2.	Wes Mc Kinney, “Python for Data Analysis”, O'Reilly Media, 2012
3.	White, “Hadoop: The Definitive Guide”, Third Edition - O’Reilly , 2012.
4.	http://blog.matthewrathbone.com/2013/11/17/python-map-reduce-on-hadoop---a-beginners-tutorial.html
5.	http://www.michael-noll.com/tutorials/writing-an-hadoop-mapreduce-program-in-python/
6.	http://allthingshadoop.com/category/python/

CO’s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	3										2		3

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BoS Chairman

2	2	3	3		3						3		3
3	3	3	2		3				2	2	2	3		3
4	3	3	2		3			2	2	2	2	3		3
5	3	3	3		3			2	2	2	2	3		3

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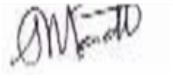

BoS Chairman

K.S.Rangasamy College of Technology (Autonomous)

Curriculum & Syllabi for

B. E Computer Science Engineering

Minor Degree - Full Stack Development

(For the batch admitted in 2022-2023)

R 2022

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.

02/12/2023

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BoS Chairman

(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
MINOR DEGREE PROGRAMME - FULL STACK DEVELOPMENT LIST OF COURSES

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 CS M01	Java Programming	PE	3	3	0	0	3
2.	50 CS M02	Front End Development	PE	3	3	0	0	3
3.	50 CS M03	Database Technology	PE	3	3	0	0	3
4.	50 CS M04	Node JS	PE	3	3	0	0	3
5.	50 CS M05	React JS	PE	3	3	0	0	3
6.	50 CS M06	Enterprise Integration	PE	3	3	0	0	3
			Total	19	18	0	0	18

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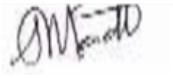

BoS Chairman

K.S.Rangasamy College of Technology – Autonomous R2022								
60 CS M01 - Java Programming								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100
Objective(s)	• To learn the fundamental element of the Java language • To understand the concept of Array and Strings • To apply the knowledge of Collections and Generics • To learn about Exception and Threads • To enhance the knowledge in Java Database Connectivity							
Course outcomes	CO 1: Illustrate the concept of classes, objects and communicate classes over objects using methods CO2: Apply the concepts of Arrays and String CO3: Express the Collections and Generics CO4: Practice the concept of Exception Handling and Threads CO5: Develop an application to enrich the knowledge in database Connectivity							

Java Fundamentals

Java Fundamentals: Java Architecture, Language basics, conditional statements, Flow Control Statements, OOPS / Inheritance: Classes and Objects, Encapsulation and Abstraction, Inheritance, Overriding and overloading, Garbage collection. [9]

Arrays and String

Arrays: One Dimensional Array and Multi-dimensional Array, String: Immutable String, Substring, String Comparison, String methods, String Buffer and String Builder. [9]

Collections and Generics

Collection Framework: Introduction to collection, Set, List, Map and Generics, Vector, Stack, Priority Queue, Iterator and Collection Interface. [9]

Exception Handling and Threads

Exception Handling: Introduction, Exception Types, Keywords: Try, catch, finally, throw and throws. Threads: Creating threads by Thread class and Runnable Interface, Thread lifecycle, Thread priorities. [9]

RDBMS and JDBC

RDBMS **:** Introduction to SQL,DDL,DML,DCL,TCL Commands, JDBC: Introduction, Establishing Connection and Transactions [9]

Total Hours: 45 hours

Text Books :

1	Herbert Schildt, " The Java 2: Complete Reference", Fifth edition, TMH, 2002.
2	Jim Keogh, " J2EE: The Complete Reference", First edition, TMH, 2002.

Reference(s):

www.javatpoint.com

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3		3				3	3	2	3	2	

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2	3	3	3		3	2		2	3	3	2	3	3	2
3	2	3	3		3			2	3	3	2	3	3	2
4	3	3	3	2	3	2			3	3	2	3	3	2
5	2	3	3	2	3	2			3	3	2	3	3	

K.S. Rangasamy College of Technology – Autonomous R2022								
60 CS M02 - Front End Development								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100
Objective(s)	• To understand the communication between web browsers and servers • To enhance the knowledge of how hierarchy of objects are used in HTML • To design a web page by utilizing CSS components • To Incorporate JavaScript variables, operators and functions in web pages • To design of single-page applications and how Angular JS facilitates their development							
Course Outcomes	**At the end of the course, the students will be able to** CO1: Understand and create interactive web pages CO2: Analyze different types of HTML tags, their functionality and attributes and learn the basics of web services CO3: Implement CSS to control the appearance of web pages and denote the background elements and media types CO4: Interpret JavaScript variables, operators and functions in web pages and manipulate HTML forms to validate user inputs CO5: Express the features of AngularJS with the various effects of elements and events							
Note: Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus**.**								

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BoS Chairman

Introduction to Web Essentials

History of Web and Internet Basic – HTTP Request and Response Message – Introduction to Front end technology- Client – Server Computing: Web Client – Web Servers. [9]

HTML

Traditional HTML and XHTML: History – Basic HTML Syntax and Semantics – Some Fundamental HTML Elements – Lists – Creating Table - Linking document - Frames - Graphics to HTML- Forms – HTML5 Document Structure Changes. [9]

CSS

Basics of CSS, CSS properties for manipulating texts, background, colors, Gradients, Shadow Effects, borders, margins, paddings, transformations, transitions and animations, etc., CSS box modal and CSS Flex, Positioning systems of CSS, CSS media queries. [9]

JavaScript

Basics of JavaScript and Client-side scripting language, JavaScript syntaxes for variables, functions, branches and repetitions. JavaScript alert, prompt and confirm. Objects in JavaScript, Access/Manipulate web browser elements using DOM Structure, forms and validations, JavaScript events. [9]

Angular JS

Introduction to AngularJS: HTML and Bootstrap CSS Primer - JavaScript Primer - Single Page Application –MVC Architecture – first Application of AngularJS- Binding –Template Directives – Elements – Events. [19]

Practice:

1. Create a static webpage using table tags of HTML.
2. Develop and demonstrate the usage of inline, internal and external style sheet using CSS
3. Design a HTML code to create a frameset having header, navigation and Content sections with CSS.
4. Design a Java Script program which makes use of Java Script's inbuilt objects
5. Design HTML form for keeping student record and validate it using Java script.
6. Develop a fully functional website using Angular JS

Total Hours: 45 hours

Text book(s):

1. H.M.Deitel, P.J.Deitel, A.B.Goldberg, “INTERNET and WORLD WIDE WEB – How to program”, Pearson education, Third Edition, 2014.
2. Ken Williamson,” Learning AngularJS: A Guide to AngularJS Development”, O' Reilly,2015

Reference(s) :

1. D.Norton and H. Schildt, “Java 2: The complete Reference”, TMH, 2000.
2. Jeffrey C.Jackson, "Web Technologies-A Computer Science Perspective", Pearson Education, 2017.
3. Paul Deitel, Harvey Deitel and Abbey Deitel,” Internet and World Wide Web How to Program”, 5th Edition, Pearson Education, 2018.
4. Robert. W. Sebesta, "Programming the World Wide Web", 8th Edition, Pearson Education, 2015.

CO’s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2		2				2	2		2		3

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2	3	3	3		3	3		2	2	2		2	2	3
3	3	3	3	3	3	2		2	2	2		2	2	3
4	3	3	2	2	3	3		2	2	2		2	2	3
5	3	3	3		3				2	2		3	2	3

K. S. Rangasamy College of Technology – Autonomous R2022								
60 CS M03 - Database Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100
Objective(s)	• To familiarize the students with various data models and query language. • Gain knowledge on data storage and indexing concepts. • To expose the fundamentals of transaction processing and recovery concepts. • To make the students aware of the various current trends in database system. • To know the current trends of various databases							
Course Outcomes	**At the end of the course student will able to** CO1: Express the knowledge of data base systems and analyze the various data models CO2: Employ the concept of Data Definition Language and Data Manipulation Language and apply the various Normal Forms in database design CO3: Express the knowledge of secondary storage device and the concepts of hashing, B Tree,B+ Tree in indexing to retrieve the data CO4: Apply the various concurrency control techniques in database transactions and recovery techniques CO5: Classify the recent databases such and Express the knowledge of data warehousing and data mining							

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BoS Chairman

Note: Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus**.**

Introduction and Conceptual Modeling

Introduction Database systems – DBMS Applications – Purpose of DBMS – Views of Data - Database System Architecture –Data Storage and Querying – DB Users and Administrators - Data Models – ER model – Relational Model – Relational Algebra and Calculus. [9]

Relational Model

Introduction to SQL – Intermediate SQL – Advanced SQL– Triggers – Functions and Procedures –Embedded SQL- Normalization for Relational Databases (up to 5NF). [9]

Data Storage and Indexing Concepts

Record storage and Primary file organization –RAID – Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree. [9]

Transaction Management Transaction – Transaction Concepts- Transaction Model- Desirable properties of Transaction- Schedule and Recoverability- Serializability – Concurrency Control – Types of Locks- Two Phase locking- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update. [9]

Current Trends Object Oriented Databases –Distributed databases- Homogenous and HeterogeneousDistributed data Storage –Distributed Transaction – Commit Protocols - Data Mining– Data Mining Applications –Data Warehousing. [9]

Total Hours : 45

Text book(s):

1	Abraham Silberschatz, Henry F. Korth and S. Sudarshan - “Database System Concepts”, sixth Edition, McGraw-Hill, 2011.
2	RamezElmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Fifth Edition, Pearson Education, 2009.

Reference(s):

1.	Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.
2.	Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2003.
3.	Peter Rob and Corlos Coronel- “Database System, Design, Implementation and Management”, Thompson Learning Course Technology- Fifth edition, 2003.
4.	Rajiv Chopra, “ Database Management System a Practical Approach “, S.Chand & co

CO’s	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2		2	2	2		3			2		2
2	3	3	2		2	2	2		3			2	3	3
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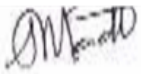

BoS Chairman

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K.S. Rangasamy College of Technology – Autonomous R2022								
60 CS M04– Node JS								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100
Objective(s)	• To learn the runtime web development for easily building fast and scalable network applications. • To enhance the knowledge in event-driven and real-time applications that run across distributed devices. • To learn the streams and file systems in Node Js • To acquire the knowledge on web development and database connectivity • To Acquire the knowledge of various file operations using file systems							
Course Outcomes	**At the end of the course, the students will be able to** CO1: Examine the fundamental structure of Node.js platform CO2: Affirm the concepts of NPM CO3: Interpret the concepts of streams and file systems CO4: Gain the knowledge of web content using node.js CO5: Annotate the various file operations using file systems							
Note: Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus**.**								

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Introduction to Node.js

The environment of Node.js - Benefits and Features - Install Node.js on Windows - Console and Web programs - Node.js REPL Commands [8]

NPM

Node.js Package Manager - Installing modules using NPM - Node.js Command Line Options - Node.js Errors- Node.js DNS - Node.js Net [9]

Streams and File Systems

Node.js Creating Buffers - Node.js Streams - Node.js Piping Streams - Node.js Chaining Streams - Node.js File Systems

[11]

Web Development

Node.js Web Module - Node.js html form handling - Node.js Database Connectivity [9]

File System

Fs.readFile - Writing a File - Writing a file asynchronously - Opening a file - Deleting a file - Other IO Operations. [8]

Hands on:

1. Read the text file and print the content using file system module
2. Design the employee web page using html. Using node js program call the HTML file which display the output in browser.
3. Sample buffer program for different operations
   - Creating buffer
   - Concatenating the buffer
   - Copying buffer
   - Buffer length
   - Compare
   - Slice
   - Converting buffer to JSON file
4. Read the data from one text file and write the content to another text file using readerStream, writerStream.
5. Sample Node.js program using pipe and chaining using streams
6. Node.js program for various file operation using File System
   - Reading the file
   - Writing the file
   - Truncating the file
   - Deleting the file
7. Design the sample student registration form using html and call these html file using node.js, which will display output in browser.
8. Mini Project with Node.js database connectivity.

Total Hours: 45 hours

Text book(s):

1. Practical Node. Js Building Real-World Scalable Web Apps, AzatMardan, APRESS Publication, 2018.
2. https://www.w3schools.com/nodejs,

Reference(s) :

1. Node.js in Action, Alex Young, Bradley Meck, Mike Cantelon, Manning Publications, 2017
2. Learning React, Alex banks & Eve Porcello, O'Reilly Publications, 2017.
3. https://www.w3schools.com/REACT/default.asp
4. https://www.tutorialspoint.com/nodejs/nodejs_introduction.htm,

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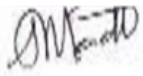

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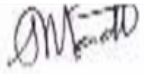

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