NANDHA ENGINEERING COLLEGE

(An Autonomous Institution affiliated to Anna University Chennai and approved by AICTE, New Delhi)
Erode-638 052, Tamilnadu, India, Phone: 04294 – 225585

Curriculum and Syllabi
for
B.Tech – Information Technology [R17]

[CHOICE BASED CREDIT SYSTEM]

(This Curriculum and Syllabi are applicable to Students admitted from the academic year 2017-2018 onwards)

SEPTEMBER 2021

INFORMATION TECHNOLOGY DEPARTMENT PEOs , PSOs and POs

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

The following Programme Educational Objectives are designed for B.Tech. Information Technology programme in Information Technology based on the Department Vision & Mission to provide higher engineering education and motivate research in the field of Information Technology.

PEO1: To afford students with knowledge environment in mathematical, scientific and basic engineering basics necessary to evaluate, analyze and solve hardware/software engineering problems.

PEO2: To provide our graduates with core proficiency awareness of the life-long learning needed for a successful specialized career.

PEO3: To scrutinize real life problems, design and develop solutions through the knowledge of basic computing and management principles that are publicly acceptable.

PEO4: To apply multifaceted skills for employment and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programmes.

PEO5: To create an interest for self learning, updating recent developments in the major area of study by way of inplant training and industrial visit and motivating to present in national / international forums for dissemination of knowledge.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO 1: Apply the acquired knowledge of basic skills, principles of computing, mathematical foundations, algorithmic principles, modeling and design of computer- based systems in solving engineering Problems.

PSO 2: Relate and analyze the interdisciplinary problems for developing innovative sustained solutions with environmental concerns.

PSO 3: Able to update knowledge continuously in various technologies and programming languages to meet the industry standards.

PSO 4: Capable to handle efficiently as part of a team with professional behavior and ethics.

PROGRAM OUTCOMES (POs)

a-l	GRADUATE ATTRIBUTES	PO No.	PROGRAMME OUTCOMES
a	Engineering Knowledge	**PO1**	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b	Problem Analysis	**PO2**	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c	Design and Development of Solutions	**PO3**	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.
d	Investigation of Complex Problems	**PO4**	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.
e	Modern Tool Usage	**PO5**	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.
f	The Engineer and Society	**PO6**	Apply reasoning acquired by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
g	Environment and Sustainability	**PO7**	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
h	Ethics	**PO8**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
i	Individual and Team Work.	**PO9**	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
j	Communication	**PO10**	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.
k	Project Management and Finance	**PO11**	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.
l	Lifelong Learning	**PO12**	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.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

Abroad relation between the Programme educational objectives and the Program Outcomes is given in the following table

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	a	b	c	d	E	f	G	H	I	j	k	l
1	3	3	2	3	2	1	1	2	1	1	3	1
2	3	3	3	3	3	1	1	1	1	1	1	2
3	3	3	3	3	3	2	2	3	1	2	2	2
4	3	3	3	2	3	2	1	2	1	1	1	2
5	3	3	2	3	2	1	1	3	1	1	2	1

MAPPING OF PROGRAM SPECIFIC OUTCOMES WITH PROGRAMME OUTCOMES

Abroad relation between the Program Specific Outcomes and the Programme Outcomes is given in the following table

PROGRAM SPECIFIC OUTCOMES	PROGRAMME OUTCOMES											
	A	b	c	d	E	f	G	H	I	j	k	l
1	3	3	2	3	2	1	1	1	1	1	1	2
2	3	3	3	3	3	2	2	3	1	3	3	3
3	3	3	3	3	3	3	3	2	1	1	1	3
4	3	3	2	3	3	2	2	3	1	2	2	2

*Contribution 1:Reasonable 2:Significant 3:Strong

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REGULATIONS–2017 **CHOICE BASED CREDITSYSTEM**

B.TECH. INFORMATION TECHNOLOGY

CURRICULA: I –VIII SEMESTERS **SYLLABI I – VIII SEMESTERS**

SEMESTER: I									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17EYA01	Professional English- I	HS	-	4	2	0	2	3
2.	17MYB01	Calculus and Solid Geometry	BS	-	5	3	2	0	4
3.	17PYB02	Physics for Computer Engineers	BS	-	5	3	0	2	4
4.	17CYB03	Environmental Science	BS	-	3	3	0	0	3
5.	17CSC02	Python Programming	ES	-	3	3	0	0	3
PRACTICAL									
6.	17MEP01	Engineering Graphics Laboratory	ES	-	4	0	0	4	2
7.	17CSP02	Python Programming Laboratory	ES	-	4	0	0	4	2
8.	17GEP01	Personal Values	HS	-	2	0	0	2	0
				TOTAL	**30**	**14**	**2**	**14**	**21**

SEMESTER: II									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17EYA02	Professional English- II	HS	17EYA01	4	2	0	2	3
2.	17MYB02	Complex Analysis and Laplace Transforms	BS	17MYB01	5	3	2	0	4
3.	17PYB04	Applied Physics	BS	17PYB02	3	3	0	0	3
4.	17CYB04	Chemistry for computer Engineers	BS	-	5	3	0	2	4
5.	17CSC03	Structured Programming	ES	-	3	3	0	0	3
6.	17ECC04	Basics of Electronics Engineering	ES	-	4	3	0	0	3
PRACTICAL									
7.	17CSP03	Structured Programming Laboratory	ES	-	4	0	0	4	2
8.	17ECP02	Electronics Laboratory	ES	-	4	0	0	4	2
9.	17GEP02	Interpersonal Values	HS	17GEP01	2	0	0	2	0
				TOTAL	**34**	**17**	**2**	**14**	**24**

SEMESTER: III									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17MYB04	Probability and Statistics	BS	-	4	2	2	0	3
2.	17CSC04	Data Structures using Python	PC	17CSC02	5	3	0	2	4
3.	17ITC01	OOPS using Java	PC	-	3	3	0	0	3
4.	17ITC02	Computer Architecture and Organization	PC	-	3	3	0	0	3
5.	17ECC22	Digital Electronics and Microprocessor	ES	-	3	3	0	0	3
PRACTICAL									
6.	17ITP01	OOPS using Java Laboratory	PC	-	4	0	0	4	2
7.	17ECP05	Digital Electronics and Microprocessor Laboratory	ES	-	2	0	0	2	1
8.	17GED01	Soft Skills – Listening and Speaking	EEC	-	2	0	0	2	0
				TOTAL	**26**	**14**	**2**	**10**	**19**

SEMESTER: IV									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17MYB08	Discrete Mathematics	BS	-	4	2	2	0	3
2.	17ITC04	Design and Analysis of Algorithms	PC	17CSC04	5	3	2	0	4
3.	17ITC05	Computer Networks and Internets	PC	-	3	3	0	0	3
4.	17CSC07	Database Management System	PC	-	3	3	0	0	3
5.	17ITC06	Operating System Principles	PC	-	3	3	0	0	3
6.	17ITC07	Software Engineering	PC	-	3	3	0	0	3
PRACTICAL									
7.	17ITP02	Computer Networks and Internets Laboratory	PC	-	2	0	0	2	1
8.	17CSP05	Database Management System Laboratory	PC	-	4	0	0	4	2
9.	17ITP03	Operating System Principles Laboratory	PC	-	2	0	0	2	1
10.	17GED02	Soft Skills – Reading and Writing	EEC	-	2	0	0	2	0
11.	17GED03	Personality and Character Development	EEC	-	1	0	0	1	0
				TOTAL	**32**	**17**	**4**	**11**	**23**

SEMESTER: V									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17ECC12	Digital Signal Processing	ES	-	4	2	2	0	3
2.	17ITC09	Internet and Web Programming	PC	17ITC01	4	2	0	2	3
3.	17ITC10	Object Oriented Analysis and Design	PC	17ITC07	3	3	0	0	3
4.	17ITC11	Computer Graphics and Multimedia	PC	-	3	3	0	0	3
5.	E1	Elective I (PSE)	PSE	-	3	3	0	0	3
6.	E2	Elective II (PSE)	PSE	-	3	3	0	0	3
PRACTICAL									
7.	17ITP04	Case Tools Laboratory	PC	-	4	0	0	4	2
8.	17ITP05	Computer Graphics and Multimedia Laboratory	PC	-	2	0	0	2	1
9.	17GED08	Essence of Indian Traditional Knowledge	EEC	-	2	2	0	0	0
				TOTAL	**28**	**18**	**2**	**8**	**21**

SEMESTER:VI									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17CSC09	Artificial Intelligence	PC	-	3	3	0	0	3
2.	17ITC13	Compiler Design	PC	-	3	3	0	0	3
3.	17ITC14	Cryptography and Network Security	PC	17ITC05	3	3	0	0	3
4.	E3	Elective III (PSE)	PSE	-	3	3	0	0	3
5.	E4	Elective IV (PSE)	PSE	-	3	3	0	0	3
6.	E5	Elective V (PSE/OE)	PSE/OE	-	3	3	0	0	3
PRACTICAL									
7.	17CSP09	Internet of Things Laboratory	ES	-	4	0	0	4	2
8.	17GED06	Comprehension	PC	-	2	0	0	2	0
9.	17GED07	Constitution of India	EEC	-	2	2	0	0	0
				TOTAL	**26**	**20**	**0**	**6**	**20**

SEMESTER: VII									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	17GEA01	Engineering Economics and Financial Accounting	HS	-	3	3	0	0	3
2.	17ITC15	Machine Learning Techniques	PC	17MYB01	3	3	0	0	3
3.	17CSC18	Full Stack Development	PC	-	3	3	0	0	3
4.	E6	Elective – VI (PSE/OE)	PSE/OE	-	3	3	0	0	3
5.	E7	Elective VII (OE)	OE	-	3	3	0	0	3
PRACTICAL									
6.	17ITP06	Machine Learning Techniques Laboratory	PC	-	4	0	0	4	2
7.	17ITD01	Project Work I	EEC	-	4	0	0	8	4
				TOTAL	**23**	**15**	**0**	**12**	**21**

SEMESTER: VIII									
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
THEORY									
1.	E8	Elective VIII (PSE)	PSE	-	3	3	0	0	3
2.	E9	Elective IX (OE)	OE	-	3	3	0	0	3
PRACTICAL									
3.	17ITD02	Project Work II	EEC	-	20	0	0	16	8
TOTAL					**26**	**6**	**0**	**16**	**14**

B.TECH. INFORMATION TECHNOLOGY

HUMANITIES SCIENCE (HS)									
AICTE NORMS : 5 –10%					**ACTUAL : 5.55 %**				
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PRERQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17EYA01	Professional English- I	HS	-	4	2	0	2	3
2.	17EYA02	Professional English- II	HS	17EYA01	4	2	0	2	3
3.	17GEP01	Personal Values	HS	-	2	0	0	2	0
4.	17GEP02	Interpersonal Values	HS	17GEP01	2	0	0	2	0
5.	17GEA01	Engineering Economics and Financial Accounting	HS	-	3	3	0	0	3

BASIC SCIENCE (BS)									
AICTE NORMS : 15 –20%					**ACTUAL : 17.28 %**				
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PREREQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17MYB01	Calculus and Solid Geometry	BS	-	5	3	2	0	4
2.	17PYB02	Physics for Computer Engineers	BS	-	5	3	0	2	4
3.	17CYB03	Environmental Science	BS	-	3	3	0	0	3
5.	17MYB02	Complex Analysis and Laplace Transforms	BS	17MYB01	5	3	2	0	4
6.	17PYB04	Applied Physics	BS	17PYB02	4	3	0	0	3
7.	17CYB04	Chemistry for Computer Engineers	BS	-	5	3	0	2	4
8.	17MYB04	Probability and Statistics	BS	-	4	2	2	0	3
9.	17MYB08	Discrete Mathematics	BS	-	4	2	2	0	3

PROGRAMME CORE (PC)									
AICTE NORMS : 30 –40%					**ACTUAL : 35.58%**				
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PREREQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17CSC04	Data Structures using Python	PC	17CSC02	4	2	0	2	3
2.	17ITC01	OOPs using Java	PC	-	3	3	0	0	3
3.	17ITP01	OOPs using Java Laboratory	PC	-	4	0	0	4	2
4.	17ITC02	Computer Architecture and Organization	PC	-	3	3	0	0	3
5.	17ITC04	Design and Analysis of Algorithms	PC	17CSC04	4	3	2	0	4
6.	17ITC05	Computer Networks and Internets	PC	-	3	3	0	0	3

7.	17ITP02	Computer Networks and Internets Laboratory	PC	-	2	0	0	2	1
8.	17CSC07	Database Management System	PC	-	3	3	0	0	3
9.	17CSP05	Database Management System Laboratory	PC	-	4	0	0	4	2
10.	17ITC06	Operating System Principles	PC	-	3	3	0	0	3
11.	17ITC07	Software Engineering	PC	-	3	3	0	0	3
12.	17ITP03	Operating Systems Laboratory	PC	-	2	0	0	2	1
13.	17ITC09	Internet and Web Programming	PC	17ITC01	4	2	0	2	3
14.	17ITC10	Object Oriented Analysis and Design	PC	17ITC07	3	3	0	0	3
15.	17ITP04	Case Tools Laboratory	PC	-	4	0	0	4	2
16.	17ITC11	Computer Graphics and Multimedia	PC	-	3	3	0	0	3
17.	17ITP05	Computer Graphics and Multimedia Laboratory	PC	-	4	0	0	2	1
18.	17CSC09	Artificial Intelligence	PC	-	3	3	0	0	3
19.	17ITC13	Compiler Design	PC	-	3	3	0	0	3
20.	17ITC14	Cryptography and Network Security	PC	17ITC05	3	3	0	0	3
21.	17ITC15	Machine Learning Techniques	PC	17MYB01	3	3	0	0	3
22.	17ITP06	Machine Learning Techniques Laboratory	PC	-	4	0	0	4	2
23.	17GED06	Comprehension	PC	-	2	0	0	2	0
24.	17CSC18	Full Stack Development	PC	-	3	3	0	0	3

ENGINEERING SCIENCE (ES)									
AICTE NORMS : 15 –20%								**ACTUAL : 17.90 %**	
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**PREREQUISITE**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17CSC02	Python Programming	ES	-	3	3	0	0	3
2.	17MEP01	Engineering Graphics Laboratory	ES	-	4	0	0	4	2
3.	17CSP02	Python Programming Laboratory	ES	-	4	0	0	4	2
4.	17CSC03	Structured Programming	ES	-	3	3	0	0	3
5.	17ECC04	Basics of Electronics Engineering	ES	-	4	3	0	0	3
6.	17CSP03	Structured Programming Laboratory	ES	-	4	0	0	4	2
7.	17ECP02	Electronics Laboratory	ES	-	4	0	0	4	2

8.	17ECC22	Digital Electronics and Microprocessor	ES	-	3	3	0	0	3
9.	17ECP05	Digital Electronics and Microprocessor Laboratory	ES	-	2	0	0	2	1
10.	17ECC12	Digital Signal Processing	ES	-	4	2	2	0	3
11.	17CSP09	Internet of Things Laboratory	ES	-	4	0	0	4	2

ENGINEERING EMPLOYABILITY COURSE (EEC)								
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17ITD01	Project Work I	EEC	4	0	0	8	4
2.	17ITD02	Project Work II	EEC	20	0	0	16	8

ENGINEERING EMPLOYABILITY COURSE (EEC- Not to be included in CGPA)								
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
1.	17GED01	Soft Skills – Listening and Speaking	EEC	2	0	0	2	0
2.	17GED02	Soft Skills – Reading and Writing	EEC	2	0	0	2	0
3.	17GED03	Personality and Character Development	EEC	1	0	0	1	0
4.	17GED07	Constitution of India	EEC	2	2	0	0	0
5.	17GED08	Essence of Indian Traditional Knowledge	EEC	2	2	0	0	0

LIST OF PROGRAMME SPECIFIC ELECTIVES (PSE)									
AICTE NORMS : 10 –15%					ACTUAL : 12.96 %				
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
1.	17ITX04	Data mining and warehousing	PSE	17CSC07	3	3	0	0	3
2.	17ITX05	PHP Programming	PSE	17ITC09	3	3	0	0	3
3.	17ITX06	Programming with JAVA 2 Enterprise Edition	PSE	17ITC01	3	3	0	0	3
4.	17ITX07	Advanced Web Programming	PSE	17ITC09	3	3	0	0	3
5.	17ITX08	C# and .Net	PSE	17ITC01	3	3	0	0	3
6.	17ITX09	Ruby Programming	PSE	-	3	3	0	0	3
7.	17ITX11	Principles of Cloud Computing	PSE	-	3	3	0	0	3
8.	17ITX14	Software Testing	PSE	-	3	3	0	0	3
9.	17ITX19	Information Security Management	PSE	-	3	3	0	0	3
10.	17CSX19	Software Agents	PSE	-	3	3	0	0	3
11.	17CSX11	Human Computer Interaction	PSE	17ITC05	3	3	0	0	3
12.	17ITX17	Building Enterprise Applications	PSE	17ITX06	3	3	0	0	3
13.	17ITX20	Finite Automata	PSE	17ITC13	3	3	0	0	3
14.	17CSX20	Software Quality Assurance	PSE	-	3	3	0	0	3
15.	17ITX21	Knowledge Management Techniques	PSE	-	3	3	0	0	3
16.	17ITX22	Enterprise Resource Planning	PSE	-	3	3	0	0	3
17.	17CSX22	Natural Language Processing	PSE	-	3	3	0	0	3
18.	17ITX25	Video Processing And Analytics	PSE	-	3	3	0	0	3
19.	17MYB12	Basic Statistics and Numerical Analysis	PSE	-	3	3	0	0	3
20.	17ITX26	Problem Solving and Algorithmic Skills	PSE	-	3	3	0	0	3
21.	17CSX31	Problem Solving And Programming	PSE	-	3	3	0	0	3
22.	17CSX29	Internet of Things	PSE	17ITC05	3	3	0	0	3
23	17CSX30	Agile Methodologies	PSE	-	3	3	0	0	3
24.	17CSX05	Network Analysis and Management	PSE	17ITC05	3	3	0	0	3
25	17ITX28	Agile Software Development	PSE	-	3	3	0	0	3
26.	17ITX29	IT operations	PSE	-	3	3	0	0	3
27.	17ITX30	IT operations Advanced	PSE	17ITX29 17CSC09	3	3	0	0	3

28.	17ITX31	Professional Readiness for Innovation, Employability and Entrepreneurship	PSE	-	3	3	0	0	3
29.	17ITX32	Test Driven Programming	PSE	-	3	3	0	0	3
30.	17ITX33	Java-Full Stack Implementation	PSE	-	3	3	0	0	3
31.	17ITX37	Problem Solving using Java	PSE	-	3	3	0	0	3
32.	17ITX38	Product Lifecycle Management	PSE	-	3	3	0	0	3

LIST OF OPEN ELECTIVES (OE)

(b)Open Electives			AICTE Credit Distribution Norm:18							
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1	17AGZ01	Baking and Confectionery Technology	OE	-	3	3	0	0	3	VII
2	17AGZ02	Food safety and quality control system	OE	-	3	3	0	0	3	VII
3	17AGZ03	Farm Mechanization	OE	-	3	3	0	0	3	VIII
4	17AGZ04	Processing of Fruits and Vegetables	OE	-	3	3	0	0	3	VIII
5	17CHZ01	Waste Water Treatment	OE	-	3	3	0	0	3	VII
6	17CHZ02	Piping Engineering	OE	-	3	3	0	0	3	VII
7	17CHZ03	Process Automation	OE	-	3	3	0	0	3	VII
8	17CHZ04	Process Instrumentation	OE	-	3	3	0	0	3	VII
9	17CEZ01	Energy conservation in Buildings	OE	-	3	3	0	0	3	VII
10	17CEZ02	Air Pollution Management	OE	-	3	3	0	0	3	VIII
11	17CEZ03	Building Services	OE	-	3	3	0	0	3	VIII
12	17CEZ04	Road Safety Management	OE	-	3	3	0	0	3	VII
13	17CEZ05	Waste Management	OE	-	3	3	0	0	3	VIII
14	17CSZ01	Design Thinking	OE	-	3	3	0	0	3	VII
15	17CSZ02	Digital Marketing	OE	-	3	3	0	0	3	VII
16	17CSZ03	Software Engineering	OE	-	3	3	0	0	3	VIII
17	17CSZ04	Unified Functional Testing	OE	-	3	3	0	0	3	VIII
18	17CSZ05	C Programming	OE	-	3	3	0	0	3	VI
19	17CSZ06	Data Structures	OE	-	3	3	0	0	3	VI

20	17CSZ07	Web Services Using Java	OE	-	3	3	0	0	3	VII
21	17ECZ01	Modern wireless communication system	OE	-	3	3	0	0	3	VII
22	17ECZ02	Consumer Electronics	OE	-	3	3	0	0	3	VII
23	17ECZ03	Automotive Electronics	OE	-	3	3	0	0	3	VIII
24	17ECZ04	Electronic Testing	OE	-	3	3	0	0	3	VIII
25	17EEZ01	Renewable Energy Technology	OE	-	3	3	0	0	3	VII
26	17EEZ02	Smart Grid	OE	-	3	3	0	0	3	VII
27	17EEZ03	Energy Auditing, Conservation and Management	OE	-	3	3	0	0	3	VIII
28	17EEZ04	Electrical Machines	OE	-	3	3	0	0	3	VIII
29	17EIZ01	Autotronix	OE	-	3	3	0	0	3	VII
30	17EIZ02	Industrial Automation	OE	-	3	3	0	0	3	VII
31	17EIZ03	Fiber Optic Sensors	OE	-	3	3	0	0	3	VIII
32	17EIZ04	Ultrasonic Instrumentation	OE	-	3	3	0	0	3	VIII
33	17ITZ01	Software Testing Tool	OE	-	3	3	0	0	3	VII
34	17ITZ02	User Experience	OE	-	3	3	0	0	3	VII
35	17ITZ03	Developing Mobile Apps	OE	-	3	3	0	0	3	VIII
36	17ITZ04	Software Project Management	OE	-	3	3	0	0	3	VIII
37	17ITZ05	Java Programming	OE	-	3	3	0	0	3	
38	17MEZ01	Engineering Ergonomics	OE	-	3	3	0	0	3	VII / VIII
39	17MEZ02	Energy Audit and Resource Management	OE	-	3	3	0	0	3	VII / VIII
40	17MEZ03	Electric Vehicle Technology	OE	-	3	3	0	0	3	VII / VIII
41	17MEZ04	Value Engineering	OE	-	3	3	0	0	3	VII / VIII
42	17MEZ05	Smart Mobility	OE	-	3	3	0	0	3	VII / VIII
43	17MEZ06	Smart Sensor Systems	OE	-	3	3	0	0	3	VII / VIII
44	17MYZ01	Mathematical Structures	OE	-	3	3	0	0	3	VII
45	17MYZ02	Optimization Techniques	OE	-	3	3	0	0	3	VII
46	17MYZ03	Statics for Engineers	OE	-	3	3	0	0	3	VII
47	17MYZ04	Statistics for Engineers	OE	-	3	3	0	0	3	VII

48	17PYZ01	Nanomaterials	OE	-	3	3	0	0	3	VII
49	17PYZ02	Nuclear physics and Reactors	OE	-	3	3	0	0	3	VII
50	17PYZ03	Space science and technology	OE	-	3	3	0	0	3	VII
51	17CYZ01	Chemistry for Every Day Life	OE	-	3	3	0	0	3	VII
52	17CYZ02	E - Waste Management	OE	-	3	3	0	0	3	VII
53	17CYZ03	Industrial Chemistry	OE	-	3	3	0	0	3	VII
54	17EYZ01	Communicative Hindi	OE	-	3	3	0	0	3	VII
55	17EYZ02	Fundamentals of German	OE	-	3	3	0	0	3	VII
56	17EYZ03	Basics of Japanese	OE	-	3	3	0	0	3	VII
57	17EYZ04	Employability Enhancement and Analytical Skills	OE	-	3	3	0	0	3	VII
58	17EYX01	Effective Communication	OE	-	3	3	0	0	3	VII
59	17GYZ01	Biology for Engineers	OE	-	3	3	0	0	3	VII
60	17BMZ01	Health care technology	OE	-	3	3	0	0	3	VII
61	17BMZ02	Telemedicine	OE	-	3	3	0	0	3	VII
62	17BMZ03	Epidemiology and Pandemic Management	OE	-	3	3	0	0	3	VII
63	17BMZ04	Medical Ethics	OE	-	3	3	0	0	3	VII
64	17EYZ05	Workplace Communication	OE	-	3	3	0	0	3	VII
65	17AIZ01	Fundamentals of artificial intelligence and machine learning	OE	-	3	3	0	0	3	VII
66	17AIZ02	Data science fundamentals	OE	-	3	3	0	0	3	VII
67	17AIZ03	Introduction to Business analytics	OE	-	3	3	0	0	3	VIII
68	17AIZ04	Augmented reality/virtual reality technologies	OE	-	3	3	0	0	3	VII`
69	17ITZ06	Data Structures using C	OE	-	3	3	0	0	3	VII
70	17ITZ07	Product Lifecycle Management for Engineers	OE	-	3	3	0	0	3	VII

Honor Degree Courses								
Vertical I - Cloud and Data Center Technologies								
S.NO	**SUB. CODE**	**SUBJECT**	**CONTACT PERIODS**	**PRERQUISITE**	**L**	**T**	**P**	**C**
1.	17ITX01	Data Science and Big Data Analytics	3	17MYB04 17CSC07	3	0	0	3
2.	17ITX02	Advanced Database Management System	3	17CSC07	3	0	0	3
3.	17ITX03	Object Oriented Database Management System	3	17ITC01 17CSC07	3	0	0	3
4.	17ITX15	Information Storage Management	3	17CSC07	3	0	0	3
5.	17ITX18	Business Intelligence	3	-	3	0	0	3
6.	17ITX23	Text Mining Techniques	3	-	3	0	0	3
7.	17ITX27	Data Science Techniques	3	-	3	0	0	3
8.	17ITX34	Cloud Services Management	3	-	3	0	0	3

Vertical II - Networking and Security								
S.No	**Sub. Code**	**Subject**	**Contact Periods**	**PRERQUISITE**	**L**	**T**	**P**	**C**
1.	17ITX10	Mobile Communication	3	17ITC05	3	0	0	3
2.	17ITX12	Ethical Hacking	3	17ITC13	3	0	0	3
3.	17ITX13	Social media network analysis	3	17ITC13	3	0	0	3
4.	17ITX16	Composing Mobile Apps	3	-	3	0	0	3
5.	17ITX24	Distributed Systems Concepts and Design	3	-	3	0	0	3
6.	17ECX16	Internet Of Things And Its Applications	3	-	3	0	0	3
7.	17ITX35	Cyber Security	3	17ITC14	3	0	0	3
8.	17ITX36	Security and Privacy in Cloud	3	-	3	0	0	3

Minor Degree Courses								
Web Development								
S.No	**Sub. Code**	**Subject**	**Contact Periods**	**PRE-REQUISITE**	**L**	**T**	**P**	**C**
1	17ITM01	Fundamentals of Problem Solving	3	-	3	0	0	3
2	17ITM02	Java programming Basics	3	-	3	0	0	3
3	17ITM03	Database System Concepts	3	-	3	0	0	3
4	17ITM04	UI and UX Design	3	-	3	0	0	3
5	17ITM05	Web essentials	3	-	3	0	0	3
6	17ITM06	Full stack web development	3	-	3	0	0	3
7	17ITM07	App development	3	-	3	0	0	3
8	17ITM08	Web Application Security	3	-	3	0	0	3

CREDIT DISTRIBUTION

SEM	HS	BS	PC	ES	EEC	PSE	OE	TOTAL
I	3	11	-	7	-	-	-	**21**
II	3	11	-	10	-	-	-	**24**
III	-	3	12	4	-	-	-	**19**
IV	-	3	20	-	-	-	-	**23**
V	-	-	12	3	-	6	-	**21**
VI	-	-	9	2	-	9	-	**20**
VII	3	-	8	-	4	3	3	**21**
VIII	-	-	-	-	8	3	3	**14**
TOTAL	**9**	**28**	**61**	**26**	**12**	**21**	**6**	**163**
%	**5.52**	**17.18**	**37.42**	**15.95**	**7.36**	**12.88**	**3.68**	
AICTE %	**5-10**	**15-20**	**30-40**	**15-20**	**-**	**10-15**	**5-10**	

TOTALCREDITS (21+24+19+23+21+20+21+14) = 163CREDITS

17EYA01– PROFESSIONAL ENGLISH – I *(Common to All Branches)*					
		L	**T**	**P**	**C**
		2	**0**	**2**	**3**
PREREQUISITE : NIL		**QUESTION PATTERN: TYPE - 1**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		**Course Outcomes**		**Related Program Outcomes**
1.0	To articulate and enunciate words and sentences clearly and efficiently using grammatical structures.	**1.1**	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.	**f, i, j, l**
2.0	To acquire information through listening and apply it to persuade or articulate one‘s own point of view.	**2.1**	The students will be able to utilize listening skills to articulate one‘s own point of view in different circumstances.	**f, i, j, l**
3.0	To enable students to express themselves fluently and appropriately in social and professional contexts.	**3.1**	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.	**f, i, j, l**
4.0	To summarize and paraphrase information in a text through reading skills.	**4.1**	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.	**f, i, j, l**
5.0	To understand different techniques and contents based on the written communication.	**5.1**	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.	**f, i, j, l**

UNIT I - FOCUS ON LANGUAGE	**(6+6)**
Parts of Speech – Articles - Primary Auxiliaries – Modal Auxiliaries - Questions (_Yes/No‘ & _Wh‘ Type) – Negatives - Prepositions – Conjunctions - Tenses (Simple, Continuous, Perfect, Perfect Continuous) - Vocabulary (Synonyms & Antonyms) - Homophones – Homonyms - One Word Substitution	
UNIT II – LISTENING FOR EFFECTIVENESS	**(6+6)**
Listening to Short Conversations or Monologues - Listening to Verbal and Non-Verbal Communication – Listening to Announcements - Listening and Note-taking – Listening to Telephonic Conversations – Listening to TED/ Ink talks- Intensive listening to fill in the gapped text	
UNIT III – COMMUNICATION BOOSTERS	**(6+6)**
Introducing Oneself – Exchanging Personal information (Likes & Dislikes) – Talking about Family & Friends - Asking about Routine Actions and Expressing Opinions - Participating in Short Conversations - Situational Talk	

UNIT IV – PROFESSIONAL READING	(6+6)
Skimming – Scanning (Short Texts and Longer Passages) – Inferring Technical Texts – Reading for Interrogation – Reading Newspaper, Advertisements and Interpreting – Practicing Speed Reading - Reading Comprehension (Multiple choice / Short / Open ended Questions) - Gap Filling	
UNIT V – TECHNICAL CORRESPONDENCE	**(6+6)**
Seeking Permission for Industrial Visit & In-plant Training – Checklist – Instruction - E-mail Writing - Report Writing (Accident & Survey)	

LIST OF SKILLS ASSESSED IN THE LABORATORY

1. Language Skills.
2. Listening Skills.
3. Speaking Skills.
4. Reading Skills
5. Writing Skills

TOTAL (L:30, P:30) = 60 PERIODS

TEXT BOOKS:

1. Sudharshana, N.Pand Saveetha.C. —Englishfor Technical CommunicationII.Cambridge University Press, NewDelhi, 2016.
2. Jackman, Vanessa and Russell, Whitehead. —Cambridge English Business Preliminary Practice Tests II.Oxford University Press, New Delhi, 2016.
3. Rizvi, Ashraf M. —EffectiveTechnical CommunicationII.Tata McGraw Hill PublishingCompanyLimited, New Delhi, 2006.
4. Hewings,M. —Advanced EnglishGrammarII.Cambridge University Press, Chennai,2000.

17MYB01 - CALCULUS AND SOLID GEOMETRY *(Common to All Branches)*			
L	**T**	**P**	**C**
3	**2**	**0**	**4**

PREREQUISITE : NIL	**QUESTION PATTERN: TYPE - 4**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To develop the use of matrix algebra techniques those are needed by engineers for practical applications.	**1.1**	Apply the concept of orthogonal reduction to diagonalise the given matrix.	**a,b,c,e,i,k,l**
2.0	Use the techniques, Skills and Engineering tools necessary for engineering practice, with Geometric concepts.	**2.1**	Have knowledge about the geometrical aspects of sphere.	**a,b,c,e,f,i,l**
3.0	To improve their ability in solving geometrical applications of differential calculus problems.	**3.1**	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.	**a,b,c,l**
4.0	To learn the important role of Mathematical concepts in engineering applications with the functions of several variables.	**4.1**	Classify the maxima and minima for a given function with several variables, through by finding stationary points.	**a,b,c,d,i,l**
5.0	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.	**5.1**	Demonstrate the use of double and triple integrals to compute area and volume.	**a,b,c,d,f,i,l**

UNIT I – MATRICES	**(9+6)**
Characteristic Equation-Eigen values and Eigen vectors of a matrix –Properties (statement only)- Cayley Hamilton Theorem and its applications- Orthogonal transformation of a symmetric matrix to a diagonal form - Quadratic form- Reduction of a Quadratic form to canonical form by orthogonal transformation.	
UNIT II - ANALYTICAL GEOMETRY OF THREE DIMENSIONS	**(9+6)**
Equation of a Plane – Angle between two planes - Equation of straight lines-Coplanar lines- skew lines- Equation of a sphere – Orthogonal spheres.	
UNIT III - GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	**(9+6)**
Curvature – Curvature in Cartesian co-ordinates-Centre and Radius of curvature-Circle of curvature-Evolutes and Involutes-Envelopes.	
UNIT IV - FUNCTIONS OF SEVERAL VARIABLES	**(9+6)**
Partial derivatives - Euler's theorem on homogeneous function-Jacobian-Maxima and Minima of functions of two variables-Constrained Maxima and Minima by Lagrange's multiplier method.	
UNIT V - MULTIPLE INTEGRALS	**(9+6)**
Double integration in Cartesian Co-ordinates-Change of order of integration-Area as double integral- Triple integration in Cartesian Co-ordinates-Volume as triple integrals.	
TOTAL (L: 45 +T:30) = 75 PERIODS	

Note : Simulation of Engineering Problems (Qualitative Analysis) using open source software

TEXT BOOKS:

1. Dr.B.S.Grewal,―HigherEngineeringMathematics‖,42nded.,Khannapublications,2012.
2. ErwinKreyszig,―AdvancedEngineeringMathematics‖,9thed.,JohnWiley&sons,2013.
3. Veerarajan.T,―EngineeringMathematicsforSemesterI&II‖,3rded.,TataMcGrawHill,2014.

REFERENCES:

1. N.P.Bali,ManishGoyal,―AtextbookofEngineeringMathematics:Sem-III‖,5thed.,LaxmiPublications.2011.
2. Kandasamy .P, Thilagavathy .K , Gunavathy .K , ―Engineering Mathematics for first Year‖, 9th Rv. ed Chand & Co Ltd,2013.
3. Glyn James, ―Advanced Engineering Mathematics‖, 7th ed., Wiley India,(2007).

17PYB02 - PHYSICS FOR COMPUTER ENGINEERS *(Common to CSE and IT Branches)*				
L	**T**	**P**	**C**
3	**0**	**2**	**4**

PREREQUISITE : NIL	**QUESTION PATTERN: TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		**Course Outcomes**		**Related Program outcomes**
1.0	To provide the basic ideas in all the kinds of engineering branches	**1.1**	Acquire knowledge regarding Acoustics and ultrasonic	**a,c,d,e,f,l**
2.0	To develop the skills of the students in physics under various applications	**2.1**	Applying knowledge in the fields of optics & laser technology	**a,c,d,e,f,l**
3.0	To cultivate the censor designing ability of thestudents	**3.1**	Design the sensors using the knowledge of fiber optics	**a,c,d,e,f,l**
4.0	To provide knowledge in wave and particle physics	**4.1**	Gain the knowledge of wave, particle nature and matter waves	**a,b,l**
5.0	To provide the fundamental knowledge in basics of crystals	**5.1**	Analyze the different kind of crystal structures and crystal growth	**a,c,e,f,l**

UNIT I – ULTRASONICS	**(9)**
Ultrasonic: Introduction - Properties of Ultrasonics- Magnetostriction and piezo electric methods. Cavitation- Velocity of ultrasonic waves using acoustic grating- SONAR- NDT- Ultasonic Flaw detector- Ultrasonic A, B & C scan methods- Sonogram – Comparison between ECG and PCG- Ultasonic Imaging system(Scanner)	
UNIT II - OPTICS & LASER TECHNOLOGY	**(9)**
Interference: Air wedge – theory – uses – testing of flat surfaces – determination of thickness of a thin wire. Types of lasers – Nd – YAG laser – CO2 laser – semiconductor laser (homojunction & hetrojuction). Applications: Holography – construction – reconstruction – Lasers in industry (Material Processing) and Medical field (Surgery)	
UNIT III - FIBER OPTICS AND SENSORS	**(9)**
Principle of light transmission through fiber – expression for acceptance angle and numerical aperture – Fabrication of optical fibers- Double crucible method – types of optical fibers (material, refractive Index profile and mode) fiber optic communication system. Splicing – Applications of optical fiber – Sensors- temperature- pressure sensor and displacement sensor Medical Endoscope.	
UNIT IV - QUANTUM PHYSICS	**(9)**
Development of quantum theory – de Broglie wavelength – properties of matter waves – G.P Thomson experiment Schrödinger‘s wave equation – time dependent – time independent wave equations – physical significance – applications – particle in a one dimensional potential box - Compton Effect – theory and experimental verification.	
UNIT V – CRYSTALOGRAPHY	**(9)**
Lattice – unit cell – Bravais lattices – lattice planes – Miller indices – _d‘ spacing in cubic lattice – calculation of number of atoms per unit cell – atomic radius – coordination number – packing factor for SC, BCC, FCC and HCP structures – Crystal growth techniques- Bridgemann and Czochralski Methods	

LIST OF EXPERIMENTS::

1. DeterminationofVelocityofsoundandcompressibilityofliquidusingUltrasonicInterferometer
2. Determination of Wavelength of Mercury spectrum- Spectrometer-Grating
3. Determination of Thickness of a thin wire- Air wedgeMethod
4. DeterminationofWavelengthofgivenlaser,ParticlesizeandAngleofDivergenceoflaserbeam.
5. DeterminationofAcceptanceangleandNumericalofanopticalFiberusingasemiconductorlaser.

TOTAL (L:45+P:30) = 75 PERIODS

1. **TEXT BOOKS**:
2. V. Rajendran, —EngineeringPhysics , Tata McGraw-Hill, NewDelhi,2011.
3. K.Tamilarasan,K.Prabu, —EngineeringPhysicsI ,SecondEdition, TataMcGraw-Hill. NewDelhi.2011.

REFERENCES:

1. P.K.Palanisami, —PhysicsforEngineersII, Vol.1,SciTechPub. (India)Pvt. Ltd.,Chennai,2002.
2. M. N.Avadhanulu andP.G. Kshirsagar, —A TextbookofEngineeringPhysicsII,S. Chand&CompanyLtd.,New Delhi,2005.
3. V. Rajendran and A. Marikani, —Physics III, TMH, NewDelhi, 2004.
4. R.K.GaurandS. L.Gupta, —Engineering Physics II, DhanpatRaiPublishers, NewDelhi, 2006.
5. LaboratoryManualofEngineeringPhysicsbyDr.Y.Aparna&Dr.K.VenkateswaraRao,V.G.SPublishers.
6. G.L.Squires, —PracticalPhysics",CambridgeUniversityPress,Cambridge,1985.11.12.
7. M.H. Shamos, Holt, "Great Experiments in Physics", Rinehart and Winston Inc.,1959.

17CYB03 - ENVIRONMENTAL SCIENCE *(Common to All Branches)*					
			L	**T**	**P**	**C**
			3	**0**	**0**	**3**
PREREQUISITE : NIL		**QUESTION PATTERN: TYPE - 3**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		**Course Outcomes**		**Related Program outcomes**
1.0	To understand the constitutes of the environment	**1.1**	The student will be able to design a system, component, or process to meet desired needs.	**a,b,c,f,g**
2.0	The students should be conversant with valuable resources	**2.1**	The student will be able to identify, formulate, and solve environmental engineering problems	**a,b,c,f,g**
3.0	To know about the role of a human being in maintaining a clean environment.	**3.1**	The student will be able to understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.	**a,b,c,f,g**
4.0	To maintain ecological balance and preserve bio-diversity.	**4.1**	The student will be able to tse the techniques, skills, and modern engineering tools necessary for environmental engineering practice.	**a,b,c,f,g**
5.0	To get knowledge about the conservation of environment for the future generation.	**5.1**	The student will be able to acquire the knowledge of information technology in environmental science.	**a,b,c,f,g**

UNIT I - INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES	**(9)**
Environment: Scope – importance - need for public awareness - Forest resources - Use-over exploitation-deforestation - Water resources - use-over utilization of surface and ground water - conflicts over water - Mineral resources - use-exploitation-environmental effects of extracting and using mineral resources - Food resources - world food problems changes caused by agriculture - Effects of modern agriculture - fertilizer- pesticide problems - Energy resources - Renewable energy sources - solar energy - wind energy. Land resources - land degradation - soil erosion - Role of an individual in conservation of natural resources.	
UNIT II - ECOSYSTEMS AND BIODIVERSITY	**(9)**
Concepts of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Food chains- food webs - types of ecosystem - structure and functions of forest ecosystem and river ecosystem – Biodiversity - value of biodiversity - consumptive use-productive use - social values - ethical values - aesthetic values - Hotspots of biodiversity -Threats to biodiversity - Habitat loss - poaching of wildlife and man wildlife conflicts- Conservation of biodiversity - In-situ and Ex-situ conservation of biodiversity.	
UNIT III - ENVIRONMENTAL POLLUTION	**(9)**
Pollution: Causes - effects and control measures of Air pollution - Water pollution - Soil pollution and Noise pollution - Solid waste management - Causes - effects -control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Disaster managements - Floods - cyclone- landslides.	
UNIT IV - SOCIAL ISSUES AND THE ENVIRONMENT	**(9)**
Water conservation - rain water harvesting - global warming - acid rain - ozone layer depletion - Environment protection act - Air (Prevention and control of pollution) Act - Water (prevention and control of pollution) Act - Green Chemistry – Principle of Green chemistry – Application of Green chemistry.	

UNIT V - HUMAN POPULATION AND THE ENVIRONMENT (9)
Population growth - variation among nations - Population explosion - Family welfare programme - Human rights - HIV/AIDS – Human health and environment - women and child welfare - Role of information technology in environment and human health.
TOTAL (L:45) : 45 PERIODS
TEXT BOOKS: 1. Anubha Kaushik and C.P. Kaushik, Environmental Science and Engineering, New Age International Publishers, New Delhi,2015 2. Dr. A.Ravikrishan, Envrionmental Science and Engineering., Sri Krishna Hitech Publishing co. Pvt.Ltd., Chennai,12th Edition, 2016.
REFERENCES: 1. Masters, Gilbert M, ―Introduction to Environmental Engineering and Science‖, Second Edition, Pearson Education, New Delhi,2012. 2. Santosh Kumar Garg, Rajeshwari garg, smf Ranjni Garg ―Ecological and Environmental Studies‖Khanna Publishers, Nai Sarak, Delhi,2014. 3. MillerT.G.Jr.,―EnvironmentalScience‖,TenthEdition,WadsworthPublishingCo.,2015.

17CSC02 - PYTHON PROGRAMMING *(Common to CSE, ECE, EEE, EIE ,IT&BME Branches)*				
L	**T**	**P**	**C**
3	**0**	**0**	**3**

PREREQUISITE : NIL	**QUESTION PATTERN: TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		**Course Outcomes**		**Related Program outcomes**
1.0	To gain knowledge about the basics of computer to solve problems	**1.1**	The students will be able to understand the working of computers	**a,b,c,d,e, h,j,k,l**
2.0	To impart the fundamental concepts of Python Programming	**2.1**	The students will be able to understand the basics of Python Programming constructs	**a,b,c,d,e, h,i,j,k,l**
3.0	To gain exposure about string manipulation, list, and tuples	**3.1**	The students will be able to realize the need of strings, list, and tuples	**a,b,c,d,e, h,i,j,k,l**
4.0	To get knowledge about dictionaries, function and modules	**4.1**	The students will be able to design programs involving dictionaries and function	**a,b,c,d,e, h,i,j,k,l**
5.0	To learn about exception handling.	**5.1**	The students will be able to develop simple programs using file concept and modules	**a,b,c,d,e, h,i,j,k,l**

UNIT I - BASICS OF COMPUTERS & PROBLEM SOLVING	**(9)**
Computer Basics - Computer organization - Computer Software- Types of software - Software Development steps - Algorithms - Flowchart.	
UNIT II - INTRODUCTION TO PYTHON	**(9)**
History – Features – Execution of python program – Flavors of Python – Comments - Data Types - Built-in data types– Sequences - Literals– Operators – Input and Output Statements - Conditional Statements : if – if-else – Nested if-else – For – While – Nested loops – Break – Continue - pass - assert - return	
UNIT III - STRINGS, LISTS AND TUPLES	**(9)**
Strings and Characters: Creating – Length – Indexing – Slicing – Repeating – Concatenation – Comparing - Removing Spaces - Finding Sub Strings - Counting Substrings in a String - Strings are Immutable - Replacing a String with another String - Splitting and Joining Strings - Changing Case of a String - Checking Starting and Ending of a String - Formatting the Strings - Working with Characters - Sorting Strings - Searching - Finding Number. Lists: Creating Lists – Updating - Concatenation - Repetition - Methods – Sorting. Tuples: Creating - Accessing – Operations – Functions - Nested Tuples - Inserting Elements, Modifying Elements, Deleting Elements from a Tuple.	
UNIT IV - DICTIONARIES AND FUNCTIONS	**(9)**
Dictionaries: Operations – Methods - Using for Loop with Dictionaries – Sorting the Elements of a Dictionary using Lambdas - Converting Lists and Strings into Dictionary - Passing Dictionaries to Functions - Ordered Dictionaries. Functions: Defining – Calling – Returning - Pass by Object Reference – Formal, Actual, Positional, Keyword, Default & Variable Length Arguments - Local and Global Variables - Recursive Functions - Lambdas - Function Decorators.	

UNIT V - FILES AND MODULES	(9)
Files - Types of Files - Opening & Closing a File - Working with Text Files Containing Strings - Working with Binary Files - The with Statement - The seek() and tell() Methods - Random Accessing of Binary Files - Random Accessing of Binary Files using mmap - Zipping and Unzipping Files - Working with Directories. - Modules: Importing module – Features – Built in functions.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Dr. R. NageswaraRao, ―Core Python Programming‖, DreamtechPress, 2017 Edition.

REFERENCES:

1. KennethA.Lambert, ―Fundamentalsof Python: First Programs‖, Cengage Learning, 2012.
2. Wesley J. Chun, ―Core Python Programming‖, Pearson Education, 2nd ed.,2010.

17MEP01 - ENGINEERING GRAPHICS LABORATORY
(Common to CSE and IT Branches)

L	T	P	C
0	0	4	2

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To equip the ability of data extraction and transform it into graphic drawings	**1.1**	The students will be able to construct conic sections and special curves of required specifications	**a, b, c, d, e, f, g, h, i, j ,l**
2.0	To learn basic engineering drawing and standards related to technical drawing	**2.1**	The students will be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section ofsolids	**a, b, c, d, e, f, h, i, k, l**
3.0	To understand and practice the engineering drawings	**3.1**	The students will be able to develop a surface drawing of a solid model with given dimensions	**a ,b,c, d, e, g,h,j,k,l**
4.0	To learn the steps involved in construction of orthographic and isometric projections	**4.1**	The students will be able to build orthographic, isometric projections of a three dimensional object	**a ,b,c, d, e, g , h , i , j , l**
5.0	To understand the practice of creating physical models	**5.1**	The students will be able to make use of the knowledge of engineering drawing to create physical models	**a,b, d,e , g , h , i , l**

LIST OF EXPERIMENTS::

1. Study of basic tools, commands and coordinate system (absolute, relative, polar etc.)usedin2Dsoftware.
2. Draw the conic curves and special curves by using drafting software.
3. Draw the front view, top view, side view of objects from the given pictorial view.
4. Draw the projections of straight lines.
5. Draw the projections of polygonal surface.
6. Draw the projections of simple solid objects.
7. Draw the sectional view and the true shape of the given section.
8. Draw the development of surfaces like prism, pyramid, cylinder and cone.
9. Draw the isometric projections of simple solids. (Prism and Pyramid).
10. Draw the isometric projections of cylinder and cone.

- **TOTAL (P:60) = 60 PERIODS**

REFERENCE:

1. K.Venugopal and V.Prabhu Raja, ―Engineering Graphics‖, New Age International (P) Limited, 2013.

17CSP02 - PYTHON PROGRAMMING LABORATORY
(Common to CSE, ECE, EEE, EIE ,IT&BME Branches)

L	T	P	C
0	0	4	2

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To impart the fundamental concepts of Python Programming	**1.1**	The students will be able to understand the basics of Python Programming constructs	**a,b,c,d,j**
2.0	To learn the operator concepts of Python Programming	**2.1**	The students will be able to understand the various operators of Python Programming.	**a,b,d**
3.0	To gain exposure about string manipulation, list, and tuples	**3.1**	The students will be able to realize the need of string manipulation, list, and tuples	**a,b,c,d,i**
4.0	To get knowledge about dictionaries, function and modules	**4.1**	The students will be able to design programs involving dictionaries, function and modules	**a,b,c,d,i,k,l**
5.0	To learn about exception handling	**5.1**	The students will be able to develop simple programs with exception handling	**a,b,c,d,f,i,k,l**

PYTHON-PROGRAMMING

1. Program using Operators
2. Program using Conditional Statements
3. Program using Looping
4. Program using Strings
5. Program using Lists
6. Program using Dictionaries
7. Program using Tuples
8. Program using Functions
9. Program using File handling
10. Program using Modules

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware

- LAN System with 33 nodes (OR) Standalone
- PCs – 33 Nos,
- Printers – 3Nos.

Software

- OS – Windows / UNIX Clone
- Open Source Software – Python

TOTAL (P:60) = 60 PERIODS

7GEP01 - PERSONAL VALUES *(Common to All Branches)*					
			L	**T**	**P**	**C**
			0	**0**	**2**	**0**
PREREQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To make students to learn individual in knowing them self	**1.1**	The student will be able to become an individual in knowing the self	**a, f**	
2.0	To enable the student to understand Gratitude, Truthfulness, Punctuality, Cleanliness & fitness.	**2.1**	The student will be able to acquire and express Gratitude, Truthfulness, Punctuality, Cleanliness & fitness.	**a, g**	
3.0	To enable the student to understand physical exercise and breathing techniques	**3.1**	The student will be able to practice simple physical exercise and breathing techniques	**a, c**	
4.0	To make the students to do Yoga asana to enhance the quality of life.	**4.1**	The student will be able to practice Yoga asana which will enhance the quality of life.	**a, c, f**	
5.0	To motivate the students to Practice Meditation and get benefited	**5.1**	The student will be able to practice Meditation and get benefited.	**a, f**	

VALUES THROUGH PRACTICAL ACTIVITIES:

1.KNOWING THE SELF

Introduction to value education - Need & importance of Value education – Knowing the self – realization of human life – animal instinct vs sixth sense.

2. MENTALHEALTH

Evolution of senses – functioning steps of human mind – Body and Mind coordination - Analysis of thoughts – moralization of desires– autosuggestions – power of positive affirmations. – Meditation and its benefits.

3.PHYSICALHEALTH

Physical body constitution– Types of food - effects of food on body and mind – healthy eating habits – food as medicine– self healing techniques.

4.CORE VALUE SELF LOVE& SELFCARE

Gratitude - Happiness - Optimistic –Enthusiasm – Simplicity – Punctual - Self Control - Cleanliness & personal hygiene - Freedom from belief systems.

5.FITNESS

Simplified physical exercises – Sun salutation - Lung strengthening practices: Naadi suddhi pranayama – Silent sitting and listening to nature – Meditation.

TOTAL(P:30) = 30 PERIODS

REFERENCES:

1. Know Yourself — Socrates – pdf format at www.au.af.mil/au/awc/awcgate/army/rotc_self-aware.pdf.
2. Steps to Knowledge: the book of Inner Knowing – pdf format at www.newmessage.org/wp content/uploads/pdfs/books/stk_nkl_v1.5.pdf.
3. Promoting Mental Health - World Health Organization – pdf.
4. www.who.int/mental_health/evidence/mh_promotion_book.pdf
5. Learning to be: A Holistic and Integrated Approach to Values – UNESCO pdf formatat www.unesdoc.unesco.org/images/0012/001279/127914e.pdf
6. Personality Development by Swami Vivekananda -www.estudantedavedanta.net/personality- development.pdf

17EYA02 - PROFESSIONAL ENGLISH – II *(Common to All Branches)*				
L	**T**	**P**	**C**	
2	**0**	**2**	**3**	
PREREQUISITE : 17EYA01	**QUESTION PATTERN : TYPE - 1**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To enable students to get familiar with words, phrases and sentences relevant to the immediate communication tasks.	1.1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.	f,i,j,l
2.0	To help students to develop their listening skills and comprehend them by asking questions.	2.1	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly.	f,i,j,l
3.0	To enhance students' speaking skills by making them to participate in Technical Presentation, Group Discussion, etc.	3.1	The students will be able to speak appropriately and effectively in various situations.	f,i,j,l
4.0	To inculcate reading habit and to develop effective reading skills.	4.1	The students will be able to employ active reading strategies to understand texts at the maximum level.	f,i,j,l
5.0	To foster the ability to write convincing Job Application and effective formal Letters.	5.1	The students will be able to equip themselves with writing formal letters and winning Job Application.	f,i,j,l

UNIT I -LANGUAGE DEVELOPMENT	(6+6)
Vocabulary (Prefixes & Suffixes) - Active Voice and Passive Voice - Impersonal Passive Voice – Conditional Clauses – Subject - Verb Agreement - Direct and Indirect Speech - Idioms and Phrases - Discourse Markers - Error Spotting	
UNIT II - LISTENING COMPREHENSION	(6+6)
Listening for Specific Information and Match / Choose / Fill in the texts - Short Films, News, Biographies, Roles and Responsibilities in Corporate, Funny Shows – Listening to Iconic Speeches and making notes – Listening to Interviews	
UNIT III - ACQUISITION OF ORAL SKILLS	(6+6)
Describing a Person - Making Plans – Asking for and Giving Directions - Talking about Places - Talking over Phone – Narrating Incidents – Introduction to Technical Presentation - Story Telling – Group Discussion	
UNIT IV - READING NUANCES	(6+6)
Intensive Reading – Extensive Reading – Finding key information in a given text - Reading and Understanding Technical Articles - Reading and Interpreting Visual Materials	
UNIT V - EXTENDED WRITING	(6+6)
Job Application with Resume – Recommendation – Inviting Dignitaries - Accepting & Declining Invitation - Paragraph Writing (Topics and Images)	

LIST OF SKILLS ASSESSED IN THE LABORATORY:

1. Language Skills.
2. Listening Skills.
3. Speaking Skills.
4. Reading Skills
5. Writing Skills

TOTAL = 60 PERIODS

TEXT BOOKS:

1. Kumar, Suresh. E. “Engineering English”, Orient Blackswan : Hyderabad, 2015.
2. Raman, Meenakshi and Sangeetha Sharma, “Technical Communication Principles and Practice”, Oxford University Press: New Delhi, 2014.
3. Board of Editors, “Fluency in English – A Course Book for Engineering and Technology”,Orient Blackswan: Hyderabad, 2016.
4. Comfort, Jeremy, et al., “Speaking Effectively: Developing Speaking Skills for Business English”,Cambridge University Press: Cambridge, 2011.

17MYB02 - COMPLEX ANALYSIS AND LAPLACE TRANSFORMS *(Common to All Branches)*					
		L	T	P	C
		3	2	0	4
PREREQUISITE : 17MYB01	**QUESTION PATTERN : TYPE - 4**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To expose the concepts of differential equations.	1.1	The student will be able to predict the suitable method to solve second and higher order differential equations	a,b,c,d,f,i,k,l
2.0	To communicate the problem solutions using correct Mathematical terminology of vector calculus.	2.1	The student will be able to apply the concepts of Differentiation and Integration to Vectors.	a,b,c,f,g,l
3.0	Apply rigorous and analytic approach to analyse the conformal mapping.	3.1	The student will be able to compute an analytic function, when its real or imaginary part is known.	a,b,c,d,e,i,l
4.0	Acquiring the knowledge of evaluating contour integrals using residue theorem.	4.1	The student will be able to identify the Singularities and its corresponding Residues for the given function.	a,b,c,d,e,h,j,l
5.0	Apply the concepts of Laplace transforms & its applications to various problems related to Engineering.	5.1	The student will be able to predict a suitable method to evaluate the Contour integration.	a,b,c,d,e,f,i,l

UNIT I - ORDINARY DIFFERENTIAL EQUATIONS	(9+6)
Higher order linear differential equations with constant coefficients - method of variation of parameters - Cauchy's and Legendre's linearequations.	
UNIT II - VECTOR CALCULUS	(9+6)
Gradient and Directional derivative -Divergence and Curl – Irrotational,solenoidal and scalar potential –Line integral over a plane curve-Surface Integral and Volume Integral-Green's theorem in a plane-Gauss divergence theorem and Stokes Theorem (Excluding Proofs)-Simple Applications Involving Square, Rectangles, Cube and Parallelopiped.	
UNIT III- ANALYTIC FUNCTIONS	(9+6)
Functions of a complex variable-Analytic functions– Necessary and sufficient conditions of Cauchy's -Riemann Equations in Cartesian Coordinates (Excluding Proofs) – Properties of Analytic Functions – Harmonic conjugate – Construction of an analytic function by Milne's Thomson Method– Conformal mapping :w = c+z , cz, 1/z and Bilinear Transformation.	
UNIT IV - COMPLEX INTEGRATION	(9+6)
Statement and Simple applications of Cauchy's integral theorem and Cauchy's integral formula(Excluding Proofs) – Taylor's and Laurent's Series Expansions - Singularities - Residues – Cauchy's Residue theorem (Statement only) – Evaluation of contour integration over unit circle and semi circle (Excluding poles on Real axis).	
UNIT V- LAPLACE TRANSFORM	(9+6)
Condition for existence - Transforms of Elementary functions –Basic Properties- First & Second Shifting Theorems (Statement only) –Transforms of derivatives and integrals- Transform of periodic functions - Initial and Final value Theorems. Inverse Laplace transforms -Convolution theorem (Statement only) –Solution of linear second order Ordinary differential equations with constant coefficients using Laplace transforms.	
TOTAL (L: 45+T:30) = 75 PERIODS	

Note : Simulation of Engineering Problems (Qualitative Analysis) using open source software

TEXT BOOKS

1. Dr.B.S.Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna publications, 2012.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & sons, 2013.
3. Veerarajan.T, "Engineering Mathematics for Semester I & II", Third Edition,Tata McGraw Hill,2014.

REFERENCES

1. N.P.Bali, Manish Goyal, "A text book of Engineering Mathematics: Sem-II", 5th Edition, Laxmi Publications.2011.
2. Kandasamy .P, Thilagavathy .K , Gunavathy .K , "Engineering Mathematics for first Year", 9th Rv. Ed. S.Chand & Co Ltd, 2013.
3. Glyn James, "Advanced Engineering Mathematics", 7thEdition, Wiley India, (2007).

17PYB04 - APPLIED PHYSICS *(Common to CSE & IT Branches)*					
		L	**T**	**P**	**C**
		3	**0**	**0**	**3**
PREREQUISITE : 17PYB02		**QUESTION PATTERN : TYPE - 1**			

Course Objectives and Outcomes

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To provide the basic ideas in electrical conduction, conductors, semiconductors and nano technology	1.1	The student will be able to acquire knowledge about electron theory of metals and conductivity	**a,b,l**
2.0	To understand the fundamental concepts in solid state physics	2.1	The student will be able to distinguish between conductors, semiconductors and super conductors	**a,b,d,l**
3.0	To provide the basic knowledge in luminescence and optoelectronic devices	3.1	The student will be able to understand the magnetism and its applications	**a,c,d,l**
4.0	To develop logical thinking in designing of sensors compatible with computers	4.1	The student will be able to design various optoelectronic devices	**a,b,c,d,l**
5.0	To update the recent development in modern engineering materials	5.1	The student will be able to aware of recent trends in nanotechnology	**a,c,d,l**

UNIT I - CONDUCTING MATERIALS **(9)**

Electron theories of conductivity - postulates of classical free electron theory- derivation of electrical conductivity of metals (Drude- Lorentz theory) - merits and demerits. Derivation of thermal conductivity – Weidman-Franz law- verification. Fermi energy - Importance of Fermi energy - Fermi-Dirac distribution function and its variation with temperature - density of energy states- calculation of density of electron.

UNIT II - SEMICONDUCTING MATERIALS & SUPERCONDUCTING MATERIALS **(9)**

SEMICONDUCTORS: Elemental and compound semiconductors - Intrinsic semiconductor – carrier concentration derivation – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors (Qualitative) – variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – Applications.

SUPERCONDUCTIVITY: Properties - Types of super conductors – BCS theory of superconductivity – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT III - MAGNETIC MATERIALS **(9)**

Origin of magnetic moment – Bohr magneton – Types of magnetic materials – Domain theory – Hysteresis – soft and hard magnetic materials. Ferrites – applications – magnetic recording and readout – tapes, floppy and magnetic disc drives.

UNIT IV - OPTICAL DEVICES **(9)**

Optical properties of semiconductor- Excitons-traps-colourcentre- Types of colourcentres- luminescence-fluorescence and phosphorescence-liquid crystal displays-dynamic scattering display-twisted nematic crystal display - Light emitting diodes- solar cell.

UNIT V - MODERN ENGINEERING MATERIALS & NANOTECHNOLOGY **(9)**

Metallic glasses: preparation, properties and applications. Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA. Nanomaterials: synthesis –plasma arcing – chemical vapour deposition – sol-gels – electrodeposition – ball milling - properties of nanoparticles and applications. Carbon nanotubes: fabrication – arc method – pulsed laser deposition –structure – properties and application.

TOTAL (L:45) = 45 PERIODS

TEXT BOOKS:

1. V.Rajendran, “Engineering Physics”, Tata McGraw- Hill, New Delhi.2011.
2. P.K.Palanisami, “Physics for Engineers-Volume I”, Scitech publications (India) Pvt.Ltd, Chennai, 2002.

REFERENCES:

1. Jacob Millman, Charistos C Halkilas, SatyabrataJit “Electronic Devices & Circuits”, Tata McGraw Hill Education Private Limited, 3rded., 2010.
2. Ben G.Streetman, Sanjay Banerjee, “Solid State Electronic Devices”, Pearson Education, 5th ed., 2006.
3. G.Senthil Kumar, N.Iyandurai, “Physics-II”, VRB Publishers, Revised Edition, 2005-2006.
4. S.O. Pillai, “Solid State Physics”, New Age International Publications, New Delhi, 2010.
5. Laboratory Manual of Engineering Physics by Dr. Y. Aparna & Dr. K. Venkateswara Rao, V.G.S Publishers.

17CYB04-CHEMISTRY FOR COMPUTER ENGINEERS

(Common to CSE & IT Branches)

	L	T	P	C
	3	0	2	4

PREREQUISITE : NIL	**QUESTION PATTERN : TYPE - 3**

Course Objectives and Outcomes

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the principles of water characterization and treatment methods.	1.1	The student will be able to apply knowledge of fundamental principles of chemistry.	a,b,c,f,g,i,j,k,l
2.0	To introduce the basic concepts of electrode potential and batteries.	2.1	The student will be able to define and solve engineering problems, including the utilization of creative and innovative skills.	a,b,c,d,f,g
3.0	To understand the principles and applications of corrosion.	3.1	The student will be able to gain practical experience with chemical process equipment as well as to analyze and interpret data.	a, b,d,i
4.0	To provide the knowledge of surface chemistry.	4.1	The student will be able to understand the impact of engineering solutions in a global, economic, environmental and societal content.	a, b,c,g
5.0	To study about the e-waste and its management.	5.1	The student will be able to understand the management of electronic waste.	a,b,c,k

UNIT I - WATER TECHNOLOGY	**(9)**
Hardness - types - estimation by EDTA method - Domestic water treatment - disinfection methods (chlorination, ozonation and UV treatment) - Boiler troubles (scale, sludge, priming, foaming and caustic embrittlement) -Internal conditioning(carbonate, phosphate and calgon) - External conditioning - demineralization process - desalination - reverse osmosis method.	
UNIT II – ELECTROCHEMISTRY	**(9)**
Electrochemistry - electrode potential - Nernst equation and problems - Reference electrode - standard hydrogen electrode - calomel electrode - potentiometric titration (redox) - conductometric titration (strong acid – strong base) - Batteries - types - lead acid battery – fuel cell – hydrogen and oxygen fuel cell.	
UNIT III - CORROSION SCIENCE	**(9)**
Corrosion - definition – types - chemical and electrochemical corrosion (mechanism) – Galvanic corrosion – Differential aeration corrosion - Pitting corrosion – Factors influencing corrosion- Corrosion control - sacrificial anode method.	

UNIT IV - CHEMICAL KINETICS AND SURFACE CHEMISTRY	(9)
Order of a reaction (definition) - kinetics of first order reaction – acid catalysed hydrolysis of ester, - kinetics of second order reaction – base catalysed hydrolysis of ester - Arrhenius equation - effect of temperature on reaction rate - Surface chemistry: Adsorption - types of adsorption - Langmuir adsorption isotherm – role of adsorption in catalytic reactions.	
UNIT V –E - WASTE AND ITS MANAGEMENT	**(9)**
E- Waste – Definition – sources of e-waste – hazardous substances in e-waste – chlorinated compounds – heavy metals - Need for e-waste management - Management of e-waste – Inventory management – production process modification - Disposal treatment of e-waste - incineration - acid baths – landfills.	

LIST OF EXPERIMENTS:

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of chloride content of water sample by argentometric method.
4. Conductometric titration of strong acid vs strong base.
5. Estimation of iron content of the given solution using potentiometer.

TOTAL (L:45+P:30) = 75 PERIODS

TEXT BOOKS:

1. J. Glynn Henry and Gary W.Heinke,"Environmental Science andEngineering,"pretice Hall of India,2014.
2. P.C. Jain.and Monica Jain, "Engineering Chemistry",Vol I & II, DhanpatRaiPub,Co., New Delhi,15th ed., 2015.

REFERENCES:

1. S.S. Dara, "A Text book of Engineering Chemistry",S.Chand& Co. Ltd., New Delhi, 2014.
2. J. Glynn Henry and Gary W.Heinke ,"Environmental Science and Engineering,"pretice Hall of India,2014
3. Electroplating, Anodizing and Metal treatment", Hand book, NIIR board, Delhi, 2004.
4. Ramachandra, T. V. (2013) Management of Municipal Solid Waste. TERI Press, New Delhi.

17CSC03 - STRUCTURED PROGRAMMING
(Common to CSE & IT Branches)

L	T	P	C
3	0	0	3

PRE REQUISITE : NIL | **QUESTION PATTERN: TYPE –I**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To know the correct and efficient ways of solving problems.	**1.1**	The student will be able to understand the terminology used in computer programming.	**a,b,c,d,e, h,j,k,l**
2.0	To learn the basics of C declarations, operators and expressions.	**2.1**	The student can use different data types and operators in a computer program.	**a,b,c,d,e, h,i,j,k,l**
3.0	To work on all the elementary statements (Loop, Branch).	**3.1**	The student will be able to design programs involving decision structures and loops.	**a,b,c,d,e, h,i,j,k,l**
4.0	To learn the manipulation of arrays and strings	**4.1**	The student will be able to write programs using arrays and strings.	**a,b,c,d,e, h,i,j,k,l**
5.0	To learn the manipulation of functions	**5.1**	The student will be able to develop programs using functions by different parameter passing techniques	**a,b,c,d,e, h,i,j,k,l**

UNIT I -OVERVIEW OF C **(9)**

Introduction to C - Structure of C program - Programming Rules - C Declarations: Tokens - keywords - identifiers - constants - data types - variable declaration and initialization - type conversion - constant and volatile variables - operators and expressions

UNIT II -CONTROL STRUCTURES **(9)**

Managing Input and Output operations - Decision Statements: if Statements - if-else Statement - Nested if-else - if-else-if ladder -goto statement – switch statement - nested switch case - Loop Control: for loop - while loop - do while loop - Nested Loop Statements - break and continue statement

UNIT III - ARRAYS AND STRINGS **(9)**

Introduction to Array - Definition - Array initialization - Characteristics - One Dimensional Array - Array operations -Two dimensional arrays -Strings and String handling functions.

UNIT IV – FUNCTIONS **(9)**

Functions: Basics - definition - Elements of User defined Functions - return statement, Function types, Parameter Passing Techniques, Function returning more values - Passing Array to Functions - Recursion - Storage classes.

UNIT V -POINTERS AND FILE MANAGEMENT **(9)**

Pointer concepts - Pointers & Arrays, Structure concepts - Defining, Declaring, Accessing Member Variables, Structure within Structure - Union - File Management in C- Dynamic Memory Allocation

TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Ashok N. Kamthane, “Programming in C”, 2nd ed., Pearson Education, 2013.

REFERENCE:

1. YashavantKanetkar, “Let us C”, BPB publications, New Delhi, 3rded., 2011.
2. PradipDey, ManasGhosh, “Fundamentals of Computing and Programming in C”, 1st ed., Oxford University Press, 2009.
3. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, 2nd ed., Tata McGraw-Hill, 2006.
4. R.G. Dromey, “How to Solve it by Computer”, Pearson Education, 4thReprint, 2007.

17ECC04 - BASICS OF ELECTRONICS ENGINEERING *(Common to CSE & IT Branches)*				
L	**T**	**P**	**C**
3	**0**	**0**	**3**

PREREQUISITE : NIL	**QUESTION PATTERN : TYPE – 3**

Course Objectives and Outcomes

Course Objectives		**Course Outcomes**		**Related Program**
1.0	To make students to learn and understand the basics of Electrical circuits.	**1.1**	The Students can apply the Ohm's law and Kirchhoff's law and investigates the behavior of electric circuits by analytical techniques.	**a,b,c,d**
2.0	To enable the student to understand the analysis of DC and AC circuits using Network theorems.	**2.1**	The Students will be able to analyze and forecast the Network theorems in DC and AC circuits.	**a,b,c,d**
3.0	To enable the student to understand the working of semiconductor devices.	**3.1**	The Students will be able to understand the characteristics of semiconductor devices	**a,c,e**
4.0	To make the students to understand the working of rectifiers, filters and amplifiers.	**4.1**	The students will be able to understand the concept of rectifiers, filters and amplifiers	**a,c,e,f,g**
5.0	To make the students to understand the functions of transducer and measuring instruments.	**5.1**	The students will be able to design transducers, measuring instruments and logic circuits.	**a,c,f,g**

UNIT I - BASIC CIRCUITS ANALYSIS	**(9)**
AC & DC : Current, Voltage, Power - Nodes, Paths, Loops and Branches; Ohm's Law – Kirchhoff's laws-Single loop circuit –Single Node Pair- circuit – Series and parallel connected independent sources- Resistors in series and Parallel-Current and voltage division.	
UNIT II - NETWORK THEOREMS FOR DC AND AC CIRCUITS	**(9)**
Source transformation – Mesh analysis-Node Analysis - Thevenins and Norton Theorem – Superposition Theorem – Maximum power transfer theorem.	
UNIT III - SEMICONDUCTOR DEVICES	**(9)**
Passive Components, PN junction diode - Diffusion and Drift Current – Zener diode - Zener Regulator - BJT: PNP and NPN, CE Configuration of BJT, JFET, MOSFET, UJT.	
UNIT IV - RECTIFIERS, FILTERS AND AMPLIFIERS	**(9)**
Transformers: Construction & Types, Rectifiers: Half Wave, Full Wave and Bridge, Filters: Induction, Capacitor, LC and π (CLC), Introduction to amplifiers, Applications of Amplifier,UPS	
UNIT V - TRANSDUCERS, MEASURING INSTRUMENTS AND DIGITAL CIRCUITS	**(9)**
LED, Piezo electric Transducers, LCD, Moving Coil and Moving Iron Instrument, Digital Voltmeter, CRO, Logic Gates: AND, OR, NOT and Universal Gates-NAND, NOR, Flip Flop: SR, JK.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis," 8th ed., Tata McGraw Hill publishers, New Delhi, 2013.
2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGrawHill 3rd ed. 2013.

REFERENCES:

1. Gupta.J.B, "Electronic Devices and Circuits," S. K. Kataria & Sons, 2009.
2. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.
3. Nageswara Rao.T, "Circuit Theory", A.R. Publications, Chennai, 2014.

17CSP03 -STRUCTURED PROGRAMMING LABORATORY *(Common to CSE & IT Branches)*				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		**Course Outcomes**	**Related Program outcomes**
1.0	To study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language.	1.1	The student will be able to implement programs using decision making statements and looping	**a,b,c,d,j**
2.0	To study, analyze and understand concepts of arrays and functions in 'C'.	2.1	The student will be able to write simple programs on arrays of different dimensions.	**a,b,d**
3.0	To learn the importance of recursive function and pointers.	3.1	The student will be able to develop function programs using recursion and pointers.	**a,b,c,d,i,l**
4.0	To get knowledge of structures and unions in C	4.1	The student will be able to design structure and union programs	**a,b,c,d,i,k,l**
5.0	To gain experience in handling files and allocate memory to a program dynamically.	5.1	The student will be able to handle memory locations manually using dynamic memory allocation functions	**a,b,c,d,f,i,k,l**

C-Programming

1. Program Using Operators, Expressions and IO formatting
2. Program Using Decision Making
3. Program Using Looping
4. Program Using Arrays
5. Program Using Strings
6. Program Using Functions
7. Program Using Recursion
8. Program Using Pointers
9. Program Using Structure and Union
10. Program Using files
11. Program Using Dynamic memory allocation functions

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware

1. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos.
2. Printers – 3 Nos.

Software

1. Compiler – C

TOTAL (P:60) = 60 PERIODS

17ECP02 – ELECTRONICS LABORATORY *(Common to CSE & IT Branches)*				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

PREREQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To make students to learn and practice the basics of Semiconductor Diodes.	**1.1**	The Students can be able to analyze the characteristics of diodes and transistors.	**a,b,e,k**
2.0	To enable the student to analyze the characteristics of BJT,FET and UJT	**2.1**	The Students will be able to evaluate the characteristics of electronic devices such as BJT,FET and UJT	**a,b,f,k**
3.0	To provide the student with practice in the experimental setup of basic electronic circuits.	**3.1**	The Students will be able to verify the Half wave and Full wave Rectifier.	**a,b,j,l**
4.0	To make the students to learn and practice with measurement of electrical networks.	**4.1**	The students will be able to verify the theorems such as Thevenin's theorem, Norton theorems, KVL and KCL	**a,b,d**
5.0	To motivate the students to implement the project using electronic digital devices.	**5.1**	The Students will be able to verify the Logic Gates.	**a,b,c,g**

LIST OF EXPERIMENTS::

1. Characteristics of PN junction diode.
2. Characteristics of Zener diode.
3. Input-Output characteristics of common emitter configuration.
4. FET characteristics.
5. UJT characteristics.
6. Verification of Half Wave Rectifier (HWR) and Full Wave Rectifier (FWR)
7. Verification of Thevenin's theorem.
8. Verification of Norton's theorem.
9. Verification of KVL, KCL.
10. Verification of Logic Gates

TOTAL (P: 60) = 60 PERIODS

17GEP02 – INTERPERSONAL VALUES
(Common to All Branches)

L	T	P	C
0	0	2	0

PRE REQUISITE : 17GEP01

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives	Course Outcomes		Related Program outcomes
1.0 To know interpersonal values	1.1	Develop a healthy & relationship	**a,f**
2.0 To train the students to maneuver their temperaments.	2.1	Practice respecting every human being	**a,g**
3.0 To achieve the mentality of appreciating core values of a person.	3.1	Practice to eradicate e negativ	**a,c**
4.0 To analyze the roots of problems and develop a positive attitude about the life.	4.1	Acquire Respect, Honesty, Empathy, Forgiveness and Equality	**a,c,f**
5.0 To understand the effects of physical activities on mental health.	5.1	Practice Exercises and Meditation to lead a healthy life and Manage the cognitive abilities of an Individual	**a,f**

UNIT I - INTRODUCTION **(9)**

Introduction to interpersonal values – Developing harmony with others –Healthy relationship – Need & importance of interpersonal values for dealing with others and team - Effective communication with others.

UNIT II -MANEUVERING THE TEMPERAMENTS **(9)**

From Greed to Contentment - Anger to Tolerance -Miserliness To Charity – Ego to Equality - Vengeance to Forgiveness.

UNIT III -CORE VALUE **(9)**

Truthfulness - Honesty –Helping–Friendship – Brotherhood – Tolerance –Caring & Sharing – Forgiveness – Charity – Sympathy — Generosity – Brotherhood -Adaptability.

UNIT IV -PATHWAY TO BLISSFUL LIFE **(9)**

Signs of anger – Root cause – Chain reaction – Evil effects on Body and Mind – Analyzing roots of worries – Techniques to eradicate worries.

UNIT V - THERAPEUTIC MEASURES **(9)**

Spine strengthening exercises - Nero muscular breathing exercises - Laughing therapy - Mindfulness meditation.

TOTAL (L: 30) = 30 PERIODS

TEXT BOOKS:

1. Interpersonal Skills Tutorial (Pdf Version) – TutorialsPoint
2. www.tutorialspoint.com/interpersonal_skills/interpersonal_skills_tutorial.pdf
3. Interpersonal Relationships At Work - Ki Open Archive - Karolinska
4. www.publications.ki.se/xmlui/bitstream/handle/10616/39545/thesis.pdf?sequence=1
5. Values Education For Peace, Human Rights, Democracy – UNESCO. www.unesdoc.unesco.org/images/0011/001143/114357eo.pdf
6. Maneuvering Of Six Temperaments - Vethathiri Maharishi. www.ijhssi.org/papers/v5(5)/F0505034036.pdf
7. The Bliss of Inner Fire: Heart Practice of the Six. – Wisdom Publications - www.wisdompubs.org/sites/.../Bliss%20of%20Inner%20Fire%20Book%20Preview.pdf

17MYB04 - PROBABILITY AND STASTISTICS *(Common to CSE and IT Branches)*					
			L	**T**	**P**	**C**
			2	**2**	**0**	**3**
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - IV**				
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**				**Related Program outcomes**
1.0	Acquire knowledge of the random variable and moments & moments generating functions.	**1.1**	The students will be able toinfer expectation, variance, standard deviation moments and moment generating function for discrete and continuous random variables.			**a,b,l**
2.0	Aware the knowledge of applications of discrete & continuous distributions.	**2.1**	The students will be able to apply the concept of expectation and moment generating functions to discrete and Continuous distributions and find the probability values for the defined distributions.			**a,b,e,l**
3.0	Provide the knowledge of transformation of random variables.	**3.1**	The students will be able to Acquire skills in handling situations involving more than one random variable and functions of random variables			**a,b,l**
4.0	To get knowledge on types of hypothesis tests.	**4.1**	The students will be able to select a hypothesis testing method for the given numerical set of data to analyze the significance			**a,b,d,e,l**
5.0	To understand the knowledge of design of experiments.	**5.1**	The students will be able to apply analysis of Variance for the data set of selected number factors for analyzing the significance.			**a,b,d,e,l**

UNIT - I PROBABILITY AND RANDOM VARIABLES	**(6 + 6)**
Random variables-Probability mass function – Probability density function – Properties - Moments –Moment generating functions.	
UNIT - II STANDARD DISTRIBUTIONS	**(6 + 6)**
Discrete distributions: Binomial, Poisson and Geometric- Continuous distribution: Uniform, Exponential and normal distributions.	
UNIT- III TWO DIMENSIONAL RANDOM VARIABLES	**(6 + 6)**
Joint distributions-Marginal and conditional distributions-Covariance-Correlation and Regression.	
UNIT - IV TESTING OF HYPOTHESIS	**(6 + 6)**
Sampling Distributions-Testing of hypothesis for mean, variance. t -distribution, F – distribution- Chi-square - Test for independence of attributes and Goodness of fit.	
UNIT- V DESIGN OF EXPERIMENTS	**(6 + 6)**
Analysis of variance- Completely randomized design - Randomized block design - Latin square design.	
TOTAL (L:30+T:30) = 60 PERIODS	

TEXT BOOKS:

1. Veerarajan.T, "Probability, Statistics and Random Processes with Queuing Theory and Queuing Networks", 4th ed. ,Tata McGraw-Hill, New Delhi 2016.
2. S.C.Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi-2014.

REFERENCES:

1. Allen, O. Arnold, “Probability, Statistics and Queuing Theory with Computer Applications “, 2nd ed., Elsevier, New Delhi, 1990.
2. Taha, H.A., ”Operations Research - An Introduction”, 8th ed., Pearson Education, New Delhi, 2008.
3. Trivedi, S.K, “Probability and Statistics with Reliability, Queuing and Computer Science applications”, 2nd Ed. John Wiley & Sons, New Delhi, 2002.
4. Gross, Donald and Harris, M. Carl,” Fundamentals of Queuing Theory”, 3rd ed., Wiley Publications, New Delhi, 1998.

17CSC04 DATA STRUCTURES USING PYTHON (Common to CSE and IT Branches)					
		L	T	P	C
		3	0	2	4
PRE REQUISITE : 17CSC02	**QUESTION PATTERN: TYPE - I**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To review the Python programming language and learn Stack ADT.	**1.1**	The students will be able to recall and familiarize python programming and implement Stack ADT.	**a,b,c,h,k,l**
2.0	To be able to implement the abstract data type list as a linked list using the node and reference pattern.	**2.1**	The students will be able to compare the performance of our linked list implementation with Python's list implementation.	**a,b,c,h,k,l**
3.0	To understand the abstract data types queue, deque using Python.	**3.1**	The students will be able to implement the ADTs queue, and deque using Python lists.	**a,b,c,h,k,l**
4.0	To understand what a tree data structure is and how it is used.	**4.1**	The students will be able to implement trees using classes and references.	**a,b,c,d,h, k,l**
5.0	To see how graphs can be used to solve a wide variety of problems	**5.1**	The students will be able to design graph abstract data type using multiple internal representations.	**a,b,c,d,g,h, k,l**

UNIT I – INTRODUCTION TO LINEAR DATA STRUCTURES	**(9+6)**
Abstract Data Types (ADTs) and Data Structures – Non Primitive Data structures: array, list, tuples, dictionaries, set. Classes and Objects in Python. Stack ADT – Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression	
UNIT II - LINEAR DATA STRUCTURES - LIST	**(9+6)**
Array Vs List. Concept of linked list –Single linked list –Representation –Methods and functions on list –Operations: Traversing –Insertion – Deletion – Double linked list –Representation –Operations, traversing –Insertion–Deletion– Circular link list.	
UNIT III - LINEAR DATA STRUCTURES – QUEUE AND HASHING	**(9+6)**
Queue: Representation and Implementation –Programs on Queue – Insert & Delete operations –Circular queue – Representation –Deque –Applications of queue. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.	
UNIT IV - NON LINEAR DATA STRUCTURES – TREE	**(9+6)**
Definitions - Binary Trees - The Search tree ADT – Binary Search Trees – AVL Tree – Tree Traversals – B-Tree – B+ Tree - Priority Queues (Heap) – Model – simple implementations of Binary Heap.	
UNIT V - NON LINEAR DATA STRUCTURES – GRAPH	**(9+6)**
Definition – Representation of Graph – Types of graph - Breadth-first traversal - Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.	
TOTAL (L:45+P:30) = 75 PERIODS	

LIST OF EXPERIMENTS:

1. Implementing Stack ADT in Python.
2. Implementing unordered list using Linked list (ADT).
3. Implementing Queue ADT in Python.
4. Implement Binary Search Tree using Python.
5. Implementation of BFS and DFS Graph Traversal using Python.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware:

- LAN System with 33 nodes (OR) Standalone PCs – 33 Nos, Printers – 3Nos.

Software:

1. OS – Windows / UNIX Clone Open Source Software Python

TEXT BOOKS:

1. Dr. R. Nageswara Rao, "Core Python Programming", Dreamtech Press, ed., 2017.
2. Bradley N. Miller, David L. Ranum," Problem Solving with Algorithms and Data Structures Using Python", Franklin, Beedle & Associates, 2011.

REFERENCES:

1. Michael T. Goodrich, Irvine Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", 2013 edition.
2. Kenneth A. Lambert, "Fundamentals of Python: Data Structures", 1st ed., Data Structures, Cengage Learning, 06-Nov-2013.

17ITC01 - OOPS USING JAVA (Common to CSE and IT Branches)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN : TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To impart fundamental concepts of OOP using java	**1.1**	The students will be able to understand the basics of object oriented concepts in java.	**a,b,e,g,h,i,j, k,l**	
2.0	To gain exposure about inheritance, packages and Interfaces	**2.1**	The students will be able to develop applications using inheritance, packages and interfaces.	**a,b,c,d,e,f,g, h,i,j,k,l**	
3.0	To explore about the exception handling mechanism	**3.1**	The students will be able to construct applications with exception handling.	**a,b,c,d,e,f,g, h,i,j,k,l**	
4.0	To understand threads and collection concepts	**4.1**	The students will be able to build applicationsusingthreads and collection framework	**a,b,c,d,e,f,g, i,j,k,l**	
5.0	To know about GUI components and database connectivity	**5.1**	The students will be able to build simple java application with neat GUI and database connectivity	**a,b,c,d,e,f,g, h,i,j,k,l**	

UNIT I - INTRODUCTION TO OOP USING JAVA	(9)
Elements of Object Oriented Programming – Overview of JAVA – Data Types, Variables and Arrays –Operators– Control Statements – Introduction to classes and methods– Keywords: Static, final, this– String –Wrapper Class.	
UNIT II - INHERITANCE,PACKAGESAND INTERFACES	(9)
Inheritance Basics – Using Super – Constructor Call – Method Overriding – Dynamic Method Dispatch – Using Abstract Classes – Using Final with Inheritance – Packages – Access Protection – Interfaces–Exploring java.io Package –File –Byte Streams –Character Streams.	
UNIT III - EXCEPTION HANDLING AND COLLECTIONS	(9)
Exception-Handling Fundamentals – Exception Types – Using try and catch – Multiple catch Clauses – Nested try Statements – throw, throws, finally - Collections Overview – Collection Interfaces – Collection Classes.	
UNIT IV-THREADS	(9)
Java Thread Model – Main Thread – Creating a Thread – Creating Multiple Threads – Using isAlive( ) and join( ) – Thread Priorities – Synchronization – Interthread Communication – Suspending, Resuming, and Stopping Threads – Using Multithreading	
UNIT V - GUI WITH DATABASE CONNECTIVITY	(9)
Applet Basics –AWT classes –Frames –Graphics –AWT controls –Layout managers –Swing – Swing Components: JApplet – Icons and Labels – Text Fields – Buttons – Combo Boxes – Tabbed Panes – Scroll Panes – Trees – Tables.JDBC: Connecting to, querying and Manipulating the database(Create, Insert, Update, Delete).	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Herbert Schildt, "Java:The Complete Reference",McGraw Hill Education, Ninth edition,2017.
2. R.M. Menon, "Expert Oracle JDBC Programming",Apress,First edition, 2005.

REFERENCE:

1. Cay.S.Horstmann,GaryCornell, "Core Java-JAVA Fundamentals", Prentice Hall,Tenth edition, 2016.

17ITC02 - COMPUTER ARCHITECTURE AND ORGANIZATION					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To understand the basic structure of digital computer	**1.1**	The students will be able todefine the Purpose of functional units of the System	**a,c,j,k**
2.0	To study the design of arithmetic and logic unit and implementation of fixed point and Floating-point arithmetic operations	**2.1**	The students will be able tosolve basic binary math operation	**a,c,j,k**
3.0	To perceive knowledge about internal and external memory technologies	**3.1**	The students will be able tounderstand the variety of memory technologies	**a,b,c,j,k**
4.0	To know the different kinds of I/O interfaces, Processing and pipelining	**4.1**	The students will be able toapply the appropriate interfacing techniques for the project	**a,b,c,k**
5.0	To learn about CPU fundamental concepts	**5.1**	The students will be able todescribe the instruction execution and Pipelining concepts	**a,b,c,k**

UNIT I - BASIC STRUCTURE OF COMPUTERS	**(9)**
Functional Units – Basic Operational Concepts – Bus Structures – Performance and Metrics – Instructions and Instruction Sequencing – Hardware – Software Interface – Instruction Set Architecture – Addressing Modes – RISC – CISC.	
UNIT II -COMPUTER ARITHMETIC	**(9)**
Data Representation – Hardware and Software Implementation of Arithmetic Unit for Common Arithmetic Operations: Addition, Subtraction, Multiplication, Division (Fixed point and floating point) – Design of Fast Address – Multiplication of Positive Numbers – Signed Operand Multiplication – Fast multiplication – Integer Division.	
UNIT III -MEMORY SYSTEM	**(9)**
Basic Concepts – Semiconductor RAM – ROM – Speed – Size and Cost – Cache Memories – Improving Cache Performance – Virtual Memory – Memory Management Requirements –Associative memories - Secondary Storage Devices.	
UNIT IV - I/O ORGANIZATION	**(9)**
Accessing I/O Devices – Programmed Input/output – Interrupts – Direct Memory Access – Buses – Interface Circuits – Standard I/O Interfaces (PCI, SCSI, USB).	
UNIT V -PROCESSING UNIT AND PIPELINING	**(9)**
Fundamental Concepts – Execution of Complete Instruction – Multiple bus organization - Hardwired Control – Micro Programmed Control – Data hazards - Instruction Hazards – Data Path and Control Considerations – Performance Considerations.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill,2014.
2. J.S. Leena Jasmine, “Computer Organization And Architecture”, First Edition, Sree Magnus Publications, 2011.

REFERENCES:

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, International Edition, Pearson Education, 2013.
2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Fifth Edition, Elsevier, 2014.

3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.

17ECC22 – DIGITAL ELECTRONICS AND MICROPROCESSOR					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To gain knowledge about logic gates and circuits using logic gates.	**1.1**	The students will be able to understand the knowledge about Simplification of the Boolean equations by K-Map method.	**a,c,j,k**	
2.0	To study the design process for different logic devices.	**2.1**	The students will be able to Design/ test a Combinational and Sequential logic system using gates	**a,c,j,k**	
3.0	To study the concept of microprocessor based system and architecture of a processor.	**3.1**	The students will be able to Identify the basic elements and functions of simple microprocessor.	**a,b,c,j,k**	
4.0	To get knowledge about how to program a microprocessor for different tasks.	**4.1**	The students will be able to design programs in microprocessor to perform various tasks.	**a,b,c,k**	
5.0	To learn about the multicore architectures with examples.	**5.1**	The students will be able to understand the advanced multicore processor architectures.	**a,b,c,k**	

UNIT I- BOOLEAN ALGEBRA AND SIMPLIFICATION METHODS	**(8)**
Review of Number Systems – Complements and Arithmetic Operations using Complements – Binary Codes – Boolean Algebra Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map Method(4 variables only) – NAND and NOR Implementations.	
UNIT II - DIGITAL CIRCUIT DESIGN	**(10)**
Design of Combinational Circuits – Circuits for Arithmetic Operations – Application circuits for Multiplexer, De-multiplexer, Decoder and Encoder – Overview of Flip flops – Application FF: Shift Registers, Counters.	
UNIT III- INTRODUCTION TO MICROPROCESSOR	**(9)**
Basic Concepts of Microprocessors and Microprocessor-based system, 8085 Microprocessor Unit (MPU)- Communication and Bus Timing- functional block diagram, Timing and control unit, op-code fetch, memory read/write, I/O read/write machine cycles.	
UNIT IV- INSTRUCTION SET AND PROGRAMMING	**(9)**
Assembly Language Programming Basics, Classification of Instructions, Addressing Modes, 8085 Instruction Set, Instruction And Data Formats Writing, Assembling & Executing A Program, Debugging The Programs, Writing 8085 assembly language programs with decision making and looping using data transfer, arithmetic, logical and branch instructions	
UNIT V - MULTICORE DESIGN	**(9)**
Multicore, Multicore Architectures, Design Examples: The AMD Multicore Opteron - Opteron's Direct Connect and Hyper Transport- System Request Interface and Crossbar - Cache and the Multiprocessor Opteron, The Sun UltraSparc T1 Multiprocessor- Program Profile- UltraSparc T1 Cores- Cross Talk and The Crossbar- DDRAM Controller and L2 Cache, The IBM Cell Broadband Engine- CBE Memory Models, Intel Core 2 Duo Processor-Intel's PCI Express-Core 2 Duo's Instruction Set.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Morris Mano M. and Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008.
2. Microprocessor Architecture, Programming and Applications with the 8085- Ramesh S Gaonkar, 6th Edition, Oct-2013, Penram International.
3. Professional Multicore Programming Design and Implementation for C++ Developers- Cameron Hughes Tracey Hughes, 2009, Wiley Publishing, Inc.

REFERENCES:

1. D. P. Leach, A. P. Malvino, "Digital Principles and Applications", TMH, 2010.
2. Charles H. Roth Jr, “Fundamentals of Logic Design”, Fifth Edition – Jaico Publishing House, Mumbai, 2003.
3. Advanced Microprocessor and Peripherals- A.K.Ray and K.M. Bhurchandi, 3rd Edition, June- 2012, Tata McGraw Hill.

17ITP01 – OOPS USING JAVA LABORATORY (Common to CSE and IT Branches)					
			L	T	P	C
			0	0	4	2
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To impart basic programming elements of Java	**1.1**	The students will be able to create simple java programs using basic programming elements in java.		a,b,e,g,h,i,j,k,l
2.0	To gain exposure about inheritance, packages and Interfaces	**2.1**	The students will be able to develop applications using inheritance, packages and interfaces.		a,b,c,d,e,f,g,h,i,j,k,l
3.0	To explore about the exception handling mechanism	**3.1**	The students will be able to construct applications with exception handling.		a,b,c,d,e,f,g,h,i,j,k,l
4.0	To understand threads and collection concepts	**4.1**	The students will be able to build applications using threads and collection framework		a,b,c,d,e,f,g,h,i,j,k,l,
5.0	To know about Swing components and database connectivity	**5.1**	The students will be able to build simple java application with neat GUI and database connectivity		a,b,c,d,e,f,g,h,i,j,k,l

LIST OF EXPERIMENTS:

1. Basic programming elements of Java (Arrays, String).
2. Programs using Static, final and this keywords.
3. Programs illustrating the implementation of various forms of inheritance
4. Programs illustrating overloading and overriding methods in Java.
5. Programs to use packages and Interfaces in Java.
6. Develop a Java application using Exception handling.
7. Programs to create and synchronize multiple threads in Java.
8. Programs for collection framework.
9. Programs to use Swing Components.
10. Simple Java application with neat GUI and database connectivity.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE :

1. Java / Equivalent Compiler

HARDWARE:

1. Standalone desktops 30 Nos

TOTAL (L: 60) = 60 PERIODS

17ECP05-DIGITAL ELECTRONICS AND MICROPROCESSOR LABORATORY					
		L	T	P	C
		0	0	2	1
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To gain knowledge about logic gates and circuits using logic gates.	**1.1**	The students will be able to understand the knowledge about Simplification of the Boolean equations by K-Map method.	**a,c,j,k**	
2.0	To study the design process for different logic devices.	**2.1**	The students will be able to Design/ test a Combinational and Sequential logic system using gates	**a,c,j,k**	
3.0	To study the concept of microprocessor based system and architecture of a processor.	**3.1**	The students will be able to Identify the basic elements and functions of simple microprocessor.	**a,b,c,j,k**	
4.0	To get knowledge about how to program a microprocessor for different tasks.	**4.1**	The students will be able to design programs in microprocessor to perform various tasks.	**a,b,c,k**	
5.0	To learn about the Interfacing concept	**5.1**	The students will be able to understand the interfacing of different devices to the microprocessor.	**a,b,c,k**	

LIST OF EXPERIMENTS:

A) Digital Experiments

1. Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR gates (By using 7400-series)
2. Construction of gates using NAND, NOR gates.
3. Construction of Half and Full adders and verifying their truth tables.
4. Operation and verifying truth tables of flip- flops- RS, D, and JK using ICs.
5. Construction of Decade counters (7490).

B) Microprocessor Experiments

1. Binary addition & subtraction. (8-bit & 16-bit)
2. Multiplication & division.
3. Picking up largest/smallest number.
4. Arranging –ascending/descending order.
5. Interfacing R-2R Ladder network (DAC) (4 bits) to generate waveforms.
6. Interfacing a seven segment display.
7. Interfacing ADC for temperature measurement.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

1. IC Trainer Kit – 10 Numbers
2. Breadboard – 10 Numbers
3. ICs as required
4. LEDs, resisters and Connecting wires as required.
5. 8085 kits – 15 Numbers
6. ADC and DAC interfacing kits – 3 each.
7. 8279 interfacing kit – 5 Numbers

TOTAL (P:30) = 30 PERIODS

17GED01 - SOFT SKILLS – LISTENING AND SPEAKING					
		L	T	P	C
		0	0	2	0
PRE REQUISITE - NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To recollect the functional understanding of basic grammar and its structure	**1.1**	Apply the knowledge of basic grammar to classify the types of verbs and questions and to construct the sentences	**i,j,l**	
2.0	To acquire the listening skills through note completion, matching and multiple choice modes	**2.1**	Develop the listening skills through note completion, matching and multiple choice modes	**i,j,l**	
3.0	To develop speaking skills through self introduction, short talk and topic discussion	**3.1**	Organize a presentation on the given topic	**i,j,l**	

UNIT I - GRAMMAR	**(10)**
Tenses - Verb (Auxiliary and Modal) - 'Yes/No' Type Questions - Reported Speech - Gerund - Phrasal Verbs	
UNIT II – LISTENING	**(10)**
Part I : Note completion Part II: Matching Part III: Multiple Choice	
UNIT III -SPEAKING	**(10)**
Part I : Self Introduction Part II: Short talk on business topics Part III: Discussion in pairs	
TOTAL (P:30) : 30 PERIODS	

TEXT BOOKS:

1. Murphy, Raymond, "Essential Grammar in Use", Cambridge University Press, UK, 2007
2. Whitby, Norman ,"Business Benchmark Pre- Intermediate to Intermediate Preliminary, 2nd ed., Cambridge University Press, 2013.

17MYB08 - DISCRETE MATHEMATICS (Common to CSE and IT Branches)					
		L	T	P	C
		2	2	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - IV**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand the basic concepts of logic and their applications.	**1.1**	The students will be able to rephrase real world statements as logical propositions and demonstrate whether the proposition is satisfiable, tautology or a contradiction.	**a,b,d,l**	
2.0	To gain knowledge about these discrete structures include logic, predicate calculus	**2.1**	The students will be able to infer whether a logical argument is valid from the given set of premises by applying the inference rules of predicate calculus.	**a,b,d,l**	
3.0	To get exposed to concepts and properties of set theory and functions.	**3.1**	The students will be able to show mathematical reasoning and arrive at conclusions about sets and relations.	**a,b,d,l**	
4.0	To acquire ideas about thegeneral counting methods involving permutations and combinations. These methods are very useful in constructing computer programs and in mastering many theoretical topics of computer science.	**4.1**	The students will be able to construct the number of arrangements and selections using the principles of counting.	**a,b,d,l**	
5.0	To understand the concepts of Lattices and its properties.	**5.1**	The students will be able to avail the concept of Lattices and its properties.	**a,b,d,l**	

UNIT I - PROPOSITIONAL CALCULUS	**(6 + 6)**
Propositions-Logical connectives-Compound propositions-Conditional and biconditional propositions-Truth tables-Tautologies and Contradictions-Logical and Equivalences and implications-DeMorgan's Laws-Normal forms-Rules of inference-Arguments-Validity of arguments.	
UNIT II - PREDICATE CALCULUS	**(6 + 6)**
Predicates-Statement Function-Variables-free and bound variables-Quantifiers-Universe of discourse-Logical equivalences and implications for quantified statements-Theory of inference-The rules of universal specification and generalization-Validity of arguments.	
UNIT III - SET THEORY AND FUNCTIONS	**(6 + 6)**
Set Operations-Properties-Power set-Relations-Graph and matrix of a relation-Partial Ordering-Equivalence relation-Partitions-Functions-Types of functions-Composition of relation and functions-inverse functions.	
UNIT IV - COMBINATORIC	**(6 + 6)**
Basics of counting-Counting arguments-Pigeonhole Principle-Permutations and Combinations- Recursion and recurrence relations- Generating Functions-Mathematical Induction – Inclusion-Exclusion	
UNIT V – LATTICES	**(6 + 6)**
Posets-Lattices as posets-Properties of lattices-Lattices as Algebraic systems-Sublattices-Direct product and Homomorphism.	
TOTAL (L: 30+T:30) = 60 PERIODS	

TEXT BOOKS:

1. Tremblay J.P and Manohar R,"Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill, New Delhi, Reprint 2010.
2. Veerarajan.T, "Discrete Mathematics with Graph Theory and Combinatorics", 4th ed., Tata McGraw Hill, New Delhi, 2008.

REFERENCES:

1. Kenneth H.Rosen, Discrete Mathematics and its Applications, 5th ed., Tata McGraw- Hill publications,New Delhi 2007.
2. Venkatraman M.K.,"Discrete Mathematics", The National Publishing Company, Chennai,2007.
3. S.Santha,"Discrete Mathematics with Combinatorics and Graph Theory", 2010 Cengag Learning India Pvt. Ltd.
4. Swapan Kumar Sarkar,"A Text Book of Discrete Mathematics", S. Chand & Company Ltd.,New Delhi.

17ITC04 - DESIGN AND ANALYSIS OF ALGORITHMS (Common to CSE and IT Branches)					
		L	T	P	C
		3	2	0	4
PRE REQUISITE : 17CSC04		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To know the fundamental concepts and techniques for problem solving and algorithm design.	**1.1**	The students will be able toanalyze worst, best and average case running times of algorithms using asymptotic notations.		**a,b,l**
2.0	To learn the different sorting algorithms and the strategy followed.	**2.1**	The students will be able to use different sorting techniques such as heap sort, merge sort, and quick sort.		**a,b,c,d,l**
3.0	To be familiar with dynamic and greedy algorithm design techniques	**3.1**	The students will be able to design dynamic-programming algorithms and apply them to test for optimality.		**a,b,c,d,f,i,k,l**
4.0	To learn the different range of behaviors of algorithms, the notion of tractable and intractable problems.	**4.1**	The students will be able to analyze the complexities of various problems in different domain.		**a,b,c,d,f,i,k,l**
5.0	To understand backtracking and Branch bound techniques.	**5.1**	The students will be able to find solutions for problems that are difficult to solve algorithmically.		**b,c,d,e,i,k,l**

UNIT I – INTRODUCTION	**(9+6)**
Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithmic Efficiency –Asymptotic Notations and their properties. Analysis Framework – Empirical analysis - Mathematical analysis for Recursive and Non-recursive algorithms – Visualization.	
UNIT II - BRUTE FORCE AND DIVIDE-AND-CONQUER	**(9+6)**
Brute Force – Computing a^n – String Matching - Selection Sort and Bubble Sort – Sequential Search - Closest-Pair and Convex-Hull Problems - Exhaustive Search: Travelling Salesman Problem - Knapsack Problem - Assignment problem. Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort –Closest-Pair and Convex - Hull Problems.	
UNIT III - DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE	**(9+6)**
Dynamic Programming : Computing a Binomial coefficient – Warshall's and Floyd's Algorithm – Optimal Binary Search trees - 0/1 Knapsack Problem. Greedy Technique: Prim's algorithm and Kruskal's Algorithm - Huffman Trees.	
UNIT IV – ITERATIVE IMPROVEMENT AND LIMITATIONS OF ALGORITHM POWER	**(9+6)**
Iterative Improvement - The Simplex Method - The Maximum-Flow Problem- Maximum Matching in Bipartite Graphs. Limitations of Algorithm Power : Lower bound arguments – Decision trees – P, NP and NP complete Problems.	
UNIT V - COPING WITH THE LIMITATIONS OF ALGORITHM POWER	**(9+6)**
Backtracking: N Queen's problem – Hamiltonian Circuit problem – Subset problem. Branch and Bound: Assignment problem – Knapsack Problem – Travelling Salesman Problem – Approximation algorithms for NP hard problems.	
TOTAL (L:45+T:30) =75 PERIODS	

TEXT BOOK:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2nd ed.., 2013.

REFERENCES:

1. Harsh Bhasin, "Algorithms Design and Analysis ", Oxford university press, 2016.
2. S. Sridhar, "Design and Analysis of Algorithms ", Oxford university press, 2014.

17ITC05-COMPUTER NETWORKS AND INTERNETS					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	Familiarize the student with the basic taxonomy and terminology of the computer networking area.	**1.1**	The students will be able to acquire the knowledge of network layered models, network communication using the layered concept, and able to compare and contrast Open System Interconnect (OSI) and the Internet Model.		**a,c,f,g,j,l**
2.0	To impart the fundamental concepts of Data link layers and IEEE Standards	**2.1**	The students will be able to examine the role of protocols in networking.		**a,c,j,k**
3.0	To learn the functions of network layer and the various routing protocols.	**3.1**	The students will be able to do about internetworking principles and how the Internet protocols IP, IPv6 and ICMP operate. Are aware of the routing protocols used on the Internet such as RIP, OSPF, and BGP.		**a,b,d,j,k,l**
4.0	To familiarize the functions and protocols of the Transport layer.	**4.1**	The students will be able to familiar with the protocols and understanding the concept of Congestion control and its algorithm.		**a,b,c,g,j,k,l**
5.0	Build an understanding about Application Layer concepts.	**5.1**	The students will be able to Analyze the features and operations of various application layer protocols such as Http, DNS and SMTP.		**a,c,e,g,k,j,l**

UNIT I - DATA COMMUNICATIONS	**(9)**
Components of Network – Data Flow – Types of Connection - Networking devices : hubs , switches, gateways, repeaters, Bridges and routers, Modem and its types - Network Topologies -Categories of Network – Internetwork &Intranetwork – Protocols and its standards - ISO / OSI Reference Model -Addressing : Physical, Logical, Port & Specific addresses - Transmission Media : Guided Media and Unguided Media.	
UNIT II - DATA LINK LAYER	**(9)**
Data Link Layer : Duties of DLL –Types of Error - Error Correction & Detection - Framing - Flow and Error Control - Noisy Channels & Noiseless channels - Wired LAN : Ethernet –LLC and MAC - IEEE standards : 802.3,802.4 & 802.5 – Wireless LAN : IEEE 802.11 – Bluetooth.	
UNIT III - NETWORK LAYER	**(9)**
Switching : Packet Switching, Datagram Approach and Virtual Circuit Networks – Logical Addressing : IPv4 – Internet Protocol :Need for Network Layer - IPv4 & IPv6 – Transition from IPv4 to IPv6 – Mapping : ARP,RARP,BOOTP & DHCP - Sub netting –CIDR,BGP – Routing Protocols : RIP,OSPF.	
UNIT IV - TRANSPORT LAYER	**(9)**
Duties of Transport Layer - Sockets - Process to process delivery - Concepts of User Datagram Protocol(UDP) - Concepts of Transmission Control Protocol(TCP) – Congestion Control – Quality of service – Techniques to achieve QoS.	

UNIT V - APPLICATION LAYER	**(9)**
Domain Name Space (DNS) –Remote Logging – Email (SMTP, MIME, IMAP, POP3) – HTTP – SNMP – FTP - WWW.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. James F. Kuros, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Addison Wesley, 2004.
2. Behrouz A. Forouzan, "Data Communication and Networking", 5thEdition, Tata McGraw-Hill, 2013.

REFERENCE:

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Third Edition, Morgan Kauffmann Publishers Inc., 2003.

17CSC07 DATABASE MANAGEMENT SYSTEM (Common to CSE and IT Branches)					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To know the fundamentals of data models.	1.1	The students will be able to identify suitable data models for real time application and conceptualize a database system using ER Diagram		**a,b,c,d,e,f,h,i, k,l**
2.0	To learn about Relational database architecture and querying through SQL.	2.1	The students will be able to write queries in relational algebra and SQL.		**a,b,c,d,e, i,k,l**
3.0	To know about normalization	3.1	The students will be able to normalize the database design.		**a,b,c,d,e,h,i,k ,l**
4.0	To understand the storage structures and the queries processing/optimization.	4.1	The students will be able to choose storage structure and process/optimize Queries.		**a,b,c,d,e,h,i,k ,l**
5.0	To gain knowledge about transaction processing, concurrency control and recovery.	5.1	The students will be able to apply concepts of query processing, transaction processing, and concurrency control.		**a,b,c,d,e,f,h,k ,l**

UNIT I - DATA BASE SYSTEM CONCEPT	**(9)**
Purpose of Database systems – Views of data – Database Languages - Database design – Database system architecture – Data models – Data Dictionary – Database Administration – Entity-Relationship model – EER Model.	
UNIT II - RELATIONAL DATABASE	**(9)**
Structure of Relational Database – Integrity Constraints – Relational Algebra – Relational Calculus – SQL – Views – Joins – Functions and Procedures – Triggers.	
UNIT III - DATABASE DESIGN	**(9)**
Functional Dependencies – Decomposition: Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.	
UNIT IV - PHYSICAL DATABASE DESIGN AND QUERY PROCESSING	**(9)**
Storage and file structure – Indexing and Hashing – Query Processing	
UNIT V -TRANSACTION PROCESSING	**(9)**
Transactions: Desirable properties of Transactions – Serializability – Concurrency Control: Lock-Based Protocols – Timestamp-Based Protocols – Validation-Based Protocols – Recovery systems.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", 6th ed., McGraw Hill, 2011.

REFERENCES:

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", 5th ed., Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", 3rd ed., Pearson Education, 2007.

17ITC06-OPERATING SYSTEM PRINCIPLES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn the basics and various Scheduling algorithms.	**1.1**	The students will be able to learn various Scheduling algorithms.	**a,c,j,k**	
2.0	To justify the principles of concurrency.	**2.1**	The students will be able to justify the principles of concurrency.	**c,j,k**	
3.0	To analyze the deadlock, prevention and avoidance algorithms.	**3.1**	The students will be able to analyze deadlock, prevention and avoidance algorithms.	**a,b,c,d**	
4.0	To compare and contrast various memory management schemes.	**4.1**	The students will be able to compare and contrast various memory management schemes.	**b,c,d**	
5.0	To implement a prototype file systems	**5.1**	The students will be able to implement a prototype file systems	**b,c,i**	

UNIT I - OPERATING SYSTEMS OVERVIEW	**(9)**
Computer System Overview-Basic Elements, Instruction Execution, Operating system overview-objectives and functions, Evolution of Operating System - Computer System Organization- Operating System Structure-System Calls, System Programs, Virtual machine, OS Generation and System Boot.	
UNIT II - PROCESS MANAGEMENT	**(9)**
Processes: Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; Threads- Overview: Multithreading Models- Process Synchronization: Critical Section Problem, Mutex Locks, Semaphores, Monitors-CPU Scheduling - Deadlocks.	
UNIT III - STORAGE MANAGEMENT	**(9)**
Main Memory-Contiguous Memory Allocation-Segmentation-Paging; Virtual Memory: Demand Paging, Page Replacement ,Allocation, Thrashing, Allocating Kernel Memory, OS Examples.	
UNIT IV - MASS STORAGE STRUCTURES	**(9)**
Mass Storage Structure- Overview-Disk Structure-Disk Attachment-Disk Scheduling- Disk Management- Swap-Space Management –RAID Structure – Stable storage Implementation.	
UNIT V - FILE SYSTEM	**(9)**
File- System Interface : File Concepts, Directory Structures, Sharing and Protection-File System Implementation: File System Structure, Allocation Methods, Free Space Management; Protection: Goals – Principles – Domain; Access Matrix – Implementation; Access Control: Revocation of access rights; Capability-Based Systems - Language based protection;Basic Concepts of Linux System- Basics of Virtualization- Windows XP fundamentals.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc., 2012

REFERENCES:

1. William Stallings, “Operating Systems – Internals and Design Principles”, 7th Edition, Prentice Hall, 2011.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Addison Wesley, 2001.
3. Charles Crowley, “Operating Systems: A Design-Oriented Approach”, Tata McGraw Hill Education”,2001.

17ITC07- SOFTWARE ENGINEERING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcome**	
1.0	To outline the concepts of process models and requirements.	**1.1**	The students will be able to use the process models related to their projects	a,b,c,g,j	
2.0	To elucidate the knowledge of project design	**2.1**	The students will be able to design their project using design concepts.	a,b,e,g,j	
3.0	To outline the knowledge representation of testing also.	**3.1**	The students will be able to realize and Model software system.	b,c,e,f,g,j	
4.0	To provide the knowledge of quality management.	**4.1**	The students will be able to testing the different kinds of application according to their project.	g,i,k,l	
5.0	To introduce the software project management concepts.	**5.1**	The students will be able to manage project schedule, estimate project cost and effort required.	a,d,g,i,k,l	

UNIT I - FUNDAMENTALS OF SE AND REQUIREMENT ENGINEERING	**(9)**
Fundamentals-Software Processes-Software process models(Waterfall, V Model, Spiral Model, Incremental Model, Reuse Oriented)- Introduction to Agile Methodology – Functional and Non-Functional requirements- User requirements-System requirements- Requirements elicitation and analysis-Requirement Validation-Software Requirement Specification	
UNIT II - SOFTWARE DESIGN	**(9)**
Fundamental design concepts and principles-Design characteristics-System Modeling- Context Models- Behavioral Models--Architectural design- Design Decisions-Architectural Views-Architectural Patterns-Application Architectures-Object-oriented analysis and design using UML- Design patterns	
UNIT III - SOFTWARE VALIDATION AND MAINTENANCE	**(9)**
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.	
UNIT IV - SOFTWARE QUALITY MANAGEMENT	**(9)**
Quality Concepts-Review Techniques-Software Quality Assurance-Software Testing Strategies-Testing Conventional applications-Object Oriented Applications-Web Applications-Formal Modeling and Verification-Software Configuration Management-Product Metrics.	
UNIT V - SOFTWARE PROJECT MANAGEMENT	**(9)**
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	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. R.S.Pressman,"SoftwareEngineering,apractitioner'sapproach,"7thed,McGrawHill,2010
2. Ian Sommerville, "Software Engineering," 9th ed,Addison-Wesley,2011

REFERENCE:

1. Rajib Mall, —Fundamentals of Software Engineering‖, Third Edition, PHI Learning PrivateLimited, 2009.Pankaj Jalote, —Software Engineering, A Precise Approach‖, Wiley India, 2010.

17ITP02 -COMPUTER NETWORKS AND INTERNETS LABORATORY					
		L	T	P	C
		0	0	2	1

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To have a thorough knowledge in computer networking.	**1.1**	The students will be able to understand the working of network components.	**a,c,j**
2.0	To impart the fundamental concepts of Networking	**2.1**	The students will be able to understand Implementing networking protocols of various OSI layers in C / C++ / Java	**a,b,k**
3.0	To visualize the networking concepts in the real world.	**3.1**	The students will be able to realize the need of Studying client – server programming using TCP and UDP sockets.	**a,b,c,i,k**
4.0	To understand the working & basics of the various networking protocols**.**	**4.1**	The students will be able to understand important command line utilities involved in computer networks	**a,b,c,i,k**

LIST OF EXPERIMENTS:

1. Network layer concepts; to be done with only computer
   - Configuration of IP addresses
   - Configuration of Subnet mask
   - Configuration of Gateway
   - Setting up LAN
   - Connecting two or more different LAN with different subnet mask
   - Making computer to work like router/gateway with the help of IP address
2. Implementation of Network commands.
3. Network Design for an organization.
4. Transport Layer: Datagram (UDP) socket programming.
5. Transport Layer: Stream (TCP) socket Programming.
6. Implementation of Routing and Flow Control algorithms.
7. Application Layer: SMTP and HTTP programming.
8. Experiment on packet capturing and analyzing tools.
9. Design and Demonstrate
   (i) Implementation of Switched local area networks
   (ii) Operation of Ethernet network using Simulator tool.

TOTAL (P: 30) = 30 PERIODS

Hardware or Software Requirement:

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware LAN System with 33 nodes (OR) Standalone PCs – 33 Nos,Printers – 3 Nos.

Software OS – Windows
C/C++/Java
CISCO Packet Tracer Tool
Wire shark Tool

17CSP05- DATABASE MANAGEMENT SYSTEM LABORATORY *(Common to CSE and IT Branches)*					
		L	**T**	**P**	**C**
		0	**0**	**4**	**2**
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To design a database system.	**1.1**	The students will be able to define database with various integrity constraints.		**b,c,j**
2.0	To study the usage of DDL and DML commands.	**2.1**	The students will be able to working with various DDL, DML queries.		**b,c,d,g**
3.0	To learn about joins, views, various built in functions and procedures and functions	**3.1**	The students will be able to create various views and make use of various types of joins and procedures and functions		**a,b,d,e**
4.0	To know about normalization	**4.1**	The students will be able to do conceptual design using E-R model and normalize the design.		**a,b,c,k**
5.0	To work with database connectivity.	**5.1**	The students will be able to work with real time data base connectivity		**a,c,j,k**

LIST OF EXPERIMENTS:

1. Structured Query Language : Creating Database
   - Creating a Table
   - Specifying Relational Data Types
   - Specifying Constraints
   - Creating Indexes
2. Table and Record Handling
   - INSERT statement
   - Using SELECT and INSERT together
   - DELETE, UPDATE, TRUNCATE statements
   - DROP, ALTER statements
3. Retrieving Data from a Database
   - The SELECT statement
   - Using the WHERE clause
   - Using Logical Operators in the WHERE clause
   - Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause
   - Using Aggregate Functions Combining Tables
   - Using JOINS Sub queries
4. Database Management
   - Creating Views
   - Creating Column Aliases
   - Creating Database Users
   - Using GRANT and REVOKE
5. High level language extension with Triggers
6. Database design using E-R model and Normalization
7. Design and implementation of Payroll processing system
8. Design and implementation of Banking system

9. Design and implementation of Library Information System
10. Design and implementation of Student Evaluation System
TOTAL (P: 60) = 60 PERIODS
HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:
HARDWARE: 1. 33 nodes with LAN connection or Standalone PCs **SOFTWARE:** 1. MYSQL 8.0 2. Visual Basic 6.0

17ITP03 - OPERATING SYSTEM PRINCIPLES LABORATORY					
			L	T	P	C
			0	0	2	1
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn shell programming and the use of filters in the UNIX environment.	**1.1**	The students will be able to implement deadlock avoidance, and Detection Algorithms.	**a,c,j**	
2.0	To be exposed to programming in C using system calls.	**2.1**	The students will be able to compare the performance of various CPU Scheduling Algorithm	**a,b,k**	
3.0	To learn to use the file system related system calls.	**3.1**	The students will be able to critically analyze the performance of the various page replacement algorithms.	**b,c,i,k**	
4.0	To be exposed to process creation and inter process communication.	**4.1**	The students will be able to create processes and implement IPC.	**b,c,i,k**	
5.0	To be familiar with implementation of CPU Scheduling, page replacement algorithms and	**5.1**	The students will be able to creating threads and implement synchronization	**b,e,i**	

LIST OF EXPERIMENTS:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies a)Sequential b) Indexed c) Linked
5. Implement Semaphores.
6. Implement all File Organization Techniques.
7. Single level directory a) Two level b) Hierarchical c) DAG
8. Implement Bankers Algorithm for Dead Lock Avoidance.
9. Implement an Algorithm for Dead Lock Detection.
10. Implement e all page replacement algorithms a) FIFO b) LRU c) LFU
11. Implement Shared memory and IPC.
12. Implement Paging Technique of memory management.
13. Implement Threading & Synchronization Applications.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware

1. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos,Printers – 3 Nos.

Software

1. OS – Windows

TOTAL (P:30) = 30 PERIODS

17GED02 – SOFT SKILLS – READING AND WRITING					
			L	T	P	C
			0	0	2	0
PRE REQUISITE – NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To recollect the functional understanding of parts of speech and basic grammar	**1.1**	The students will be able to apply the knowledge to identify the parts of speech and construct the sentences		**i,j,l**
2.0	To acquire the reading skills through cloze texts, matching and multiple choice modes	**2.1**	The students will be able to develop the reading skills through cloze texts, matching and multiple choice modes		**i,j,l**
3.0	To enhance the writing skills for a variety of purposes	**3.1**	The students will be able to interpret effectively through writing for a variety of purposes		**i,j,l**

UNIT I –GRAMMAR	(10)
Articles - Adjectives - Conjunctions - Prepositions - Idioms & Phrases	
UNIT II – READING	(10)
Part I : Matching 7 sentences to four short texts Part II: Text with sentences missing Part III: Text with multiple choice questions Part IV: Text with multiple choice gaps Part V: Identification of additional unnecessary words in text	
UNIT III - WRITING	(10)
Part I : E-mail writing, Writing short notes, Memo, Agenda & Minutes Part II: Report Writing, Complaint Letter, Writing Proposals	
TOTAL (P:30) : 30 PERIODS	

REFERENCES:

1. Murphy, Raymond, “Essential Grammar in Use”, Cambridge University Press, UK, 2007.
2. Whitby, Norman, “Business Benchmark Pre - Intermediate to Intermediate Preliminary”, 2nd ed., Cambridge University Press, 2013

17GED03- PERSONALITY AND CHARACTER DEVELOPMENT

L	T	P	C
0	0	1	0

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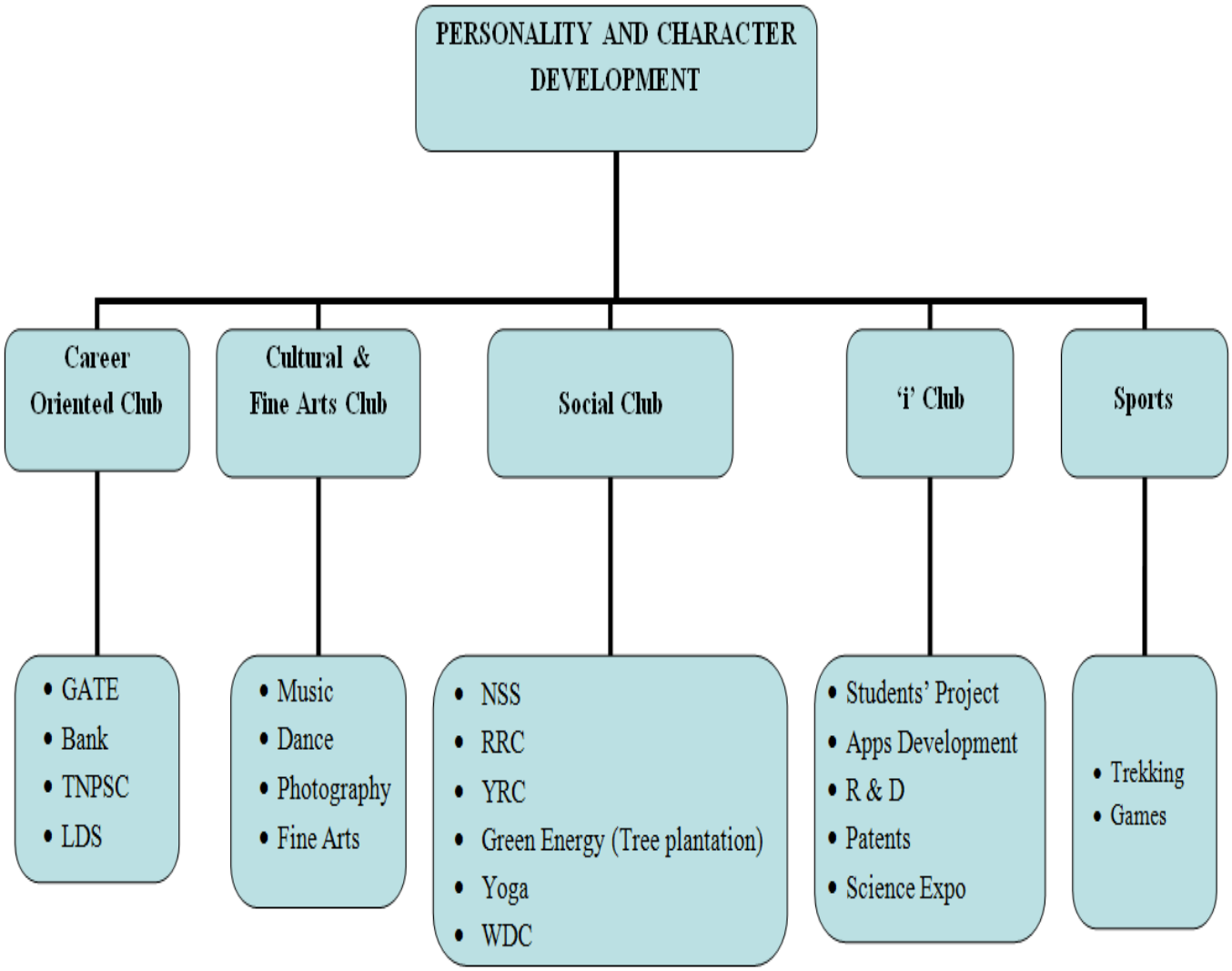

***LDS - Leadership Development Skills**

OBJECTIVES :				
Career Oriented Club	**Cultural & Fine Arts Club**	**Social Club**	**'i' club**	**Sports**
• To provide support for identifying specific career field of interests and career path • To provide support for preparing for competitive exams	• To bring out the hidden talent of students in music, dance and other fine arts. • To promote photography skill among the students • To develop and enhance the performance of students by participating in various events • To inculcate managerial capabilities such as event management and stage organization	• To create social awareness and develop a sense of social and civic responsibility • To inculcate socially and environmentally sound practices and be aware of the benefits • To encourage the students to work along with the people in rural areas, thereby developing their character, social consciousness, commitment, discipline and being helpfultowards the community.	•To inculcate the basic concepts of innovation •To foster the networking between students, build teams, exchange ideas, do projects and discuss entrepreneurial opportunities •To enrich the academic experience, build competencies and relationships beyond the classroom	• To provide opportunities to excel at sports • To promote an understanding of physical and mental well-being through an appreciation of stress, rest and relaxation. • To develop an ability to observe, analyze and judge the performance of self and peers in sporting activities. • To develop leadership skills and nurture the team building qualities. **<u>Trekking:</u>** • To provide opportunities to explore nature and educating about the purity of nature • To improve physical and mental health.

OUTCOMES : At the end of this course, the students will be able to				
• Find a better career of their interest. • Make use of their knowledge during competitive exams and interviews.	• Take part in various events • Develop team spirit, leadership and managerial qualities	•Develop socially responsive qualities by applying acquired knowledge •Build character, social consciousness, commitment and discipline	• Apply the acquired knowledge in creating better solutions that meet new requirements and market needs • Develop skills on transforming new knowledge or new technology into viable products and services on commercial markets as a team	• Demonstrate positive leadership skills that contribute to the organizational effectiveness • Take part an active role in their personal wellness (emotional, physical, and spiritual) that supports a healthy lifestyle • Create inclination towards outdoor activity like nature study and Adventure.

TOTAL [2 x (P: 15)]: 30 PERIODS
(Cumulatively for Two Semesters)

17ECC12-DIGITAL SIGNAL PROCESSING *(Common to ECE,E&I and IT Branches)*					
		L	**T**	**P**	**C**
		2	**2**	**0**	**3**
PREREQUISITE : Nil		**QUESTION PATTERN : TYPE - 3**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn discrete Fourier transforms and Fast Fourier Transform and its properties.	**1.1**	The Students can apply DFT and FFT for the analysis of digital signals & systems.	**a,b,d,f,g,j**	
2.0	To know the characteristics of FIR filters learn the design of finite impulse response filters for filtering undesired signals.	**2.1**	The students will be able to design and implement digital FIR filters.	**a,b,c,d,f,g,j**	
3.0	To know the characteristics of IIR filters learn the design of infinite impulse response filters for filtering undesired signals.	**3.1**	The students will be able to design and implement digital IIR filters.	**a,b,c,d,f,g,j**	
4.0	To understand Finite word length effects.	**4.1**	The students will be able to characterize finite Word length effect on filters.	**a,s,d,g**	
5.0	To study the concept of Digital Signal Processor.	**5.1**	The Students can apply real time applications.	**c,g**	

UNIT I - FAST FOURIER TRANSFORMS	**(6+6)**
Introduction to DFT and IDFT. Properties of DFT. FFT Algorithm-Radix-2 - Decimation in Time (DIT)-Decimation in Frequency (DIF).Fast Convolution-Overlap Save method-Overlap Add Method.	
UNIT II -DIGITAL FIR FILTERS	**(6+6)**
Design characteristics of FIR filters with linear phase – Frequency response of linear phase FIR filters - Design of FIR filters using window functions(Rectangular, Hamming, Hanning, and Blackman)- Realization FIR filter-Direct Form - I only.	
UNIT III -DIGITAL IIR FILTERS	**(6+6)**
Review of design techniques for analog low pass filter (Butterworth and Chebyshev approximations), Frequency transformation in Analogue domain, IIR filter Design: Bilinear and Impulse Invariant Techniques. Realization IIR filters-Direct Form I, Direct Form II.	
UNIT IV -FINITE WORD LENGTH EFFECT	**(6+6)**
Review of Number Representation, Types of Number Representation, Binary Fixed Point and Floating Point – Comparison, Quantization Noise - Truncation and Rounding, Input Quantization Error, Product Quantization Error, Coefficient Quantization error - Steady state Input and Output Noise Power, Zero input Limit Cycle Oscillation-Dead band.	
UNIT V -DIGITAL SIGNAL PROCESSOR	**(6+6)**
Architectural Features-Harvard Architecture, Von Neumann Architecture, VLIW Architecture, DSP Building Blocks-Multiplier, Shifter, MAC Unit, ALU. Pipelining.	
TOTAL (L: 30+T:30) = 60 PERIODS	

TEXT BOOK:

1. J.G.Proakis, D.G.Manolakis and D.Sharma, "Digital Signal Processing, Algorithms and Applications", Pearson Education, 2012.

REFERENCES:

1. S. Salivahanan, A. Vallavaraj and G.Gnanapriya,"Digital Signal Processing", Tata McGraw-Hill Company Publication Limited, 21 st Reprint 2007.
2. Oppenheim V.A.V and Schaffer R.W, "Discrete – time Signal Processing", 2nd Edition, Prentice Hall, 2013.
3. S.K.Mitra, Digital Signal Processing, 4rh Edition, TMH, 2010.
4. Lawrence R Rabiner and Bernard Gold, "Theory and Application of Digital Signal Processing", PHI 2010.
5. http://www.ti.com/lit/ds/symlink/tms320c6713.pdf.

17ITC09 - INTERNET AND WEB PROGRAMMING *(Common to CSE and IT Branches)*					
			L	**T**	**P**	**C**
			2	**0**	**2**	**3**
PRE REQUISITE : 17ITC01		**QUESTION PATTERN: TYPE – I**				
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**			**Related Program outcomes**	
1.0	To discuss the concepts of XHTML and CSS.	**1.1**	The students will be able to design a web page using HTML and CSS		**a,c,d,e,f,g,i,k,l**	
2.0	To infer the basics of JavaScript	**2.1**	The students will be able to make use of JavaScript client side coding		**a,b,c,d,e,f,g,i,k,l**	
3.0	To know about basics Java Servlets	**3.1**	The students will be able to apply servlets for their web development		**a,b,c,d,e,f,g,i,k,l**	
4.0	To know about basic concepts of JSP	**4.1**	The students will be able to make use of JSP		**a,b,c,d,e,f,g,i,k,l**	
5.0	To know about XML and Web services	**5.1**	The students will be able to make use of XML and Web Services		**a,b,c,d,e,f,g,i,k,l**	

UNIT I - HTML 5 and CSS	**(6+6)**
HTML Elements –HTML Forms – Introduction to HTML5 new elements – Semantic elements- CSS-Features–Syntax–Box Model- Selectors – Display Positioning – CSS Floats – CSS Colors – CSS text fonts	
UNIT II –JAVASCRIPT	**(6+6)**
JavaScript Introduction - Basic Elements - Variable - Data Types - Operators and Literals – Functions -Objects-Arrays–Built-in- Object – Event Handling – Validation	
UNIT III - SERVLETS	**(6+6)**
Java Servlets: Architecture–Overview – Servlet Generating Dynamic Content-Life Cycle-Parameter Data-Sessions-Cookies	
UNIT IV – JSP	**(6+6)**
JSP: Overview –Basic JSP: Architecture- Lifecycle– Directives – Actions- Implicit Objects– Java Beans Classes and JSP – MVC Paradigm	
UNIT V - XML and WEB SERVICES	**(6+6)**
XML: Namespaces- XML Processing- -XML Documents- XSL – XSLT; Webservices: WSDL-XMLSchema–Introduction to SOAP	
List of Experiments: 1. Programs with HTML and CSS. 2. Programs with Java script. 3. Programs on basic JSP tags 4. Programs for creating web applications using JSP. 5. Programs on HTTP Servlet. 6. Programs for creating web application using Servlets. 7. Creation of 3 tier Application. 8. Programs on XML	

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

HARDWARE:

1. System with 1 GB RAM minimum.

SOFTWARE:

1. OS – Windows 7 or higher
2. Notepad++
3. Net beans

TOTAL (L: 30+P:30) = 60 PERIODS

TEXT BOOKS:

1. Jeffrey C.Jackson,"WebTechnologies--A Computer Science Perspective", Pearson Education, 2006.
2. DeitelDeitelNieto, “Internet &World Wide Web HowTo Program”, Prentice Hall, 5thed., 2012.

REFERENCES:

1. ThomasA. Powell,“TheComplete Reference HTML &CSS”,New Riders, 5th ed., 2010.
2. SteveSuehring,“JavaScript– Step by Step”, PHI, 2nd ed.,2010.
3. https://www.w3schools.com
4. https://www.tutorialspoint.com/jsp

17ITC10-OBJECT ORIENTED ANALYSIS AND DESIGN					
		L	T	P	C
		3	0	0	3
PRE REQUISITE :17ITC07		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn the basics of object and object oriented methodologies.	**1.1**	The students will be able to interpret the object basics and object oriented life cycle	**a, b, f, i**	
2.0	To familiarize in unified modeling language.	**2.1**	The students will be able to identify the classes and their relationships and methodologies	**e, j**	
3.0	To analyze the object oriented analysis	**3.1**	The students will be able to develop the UML diagrams for various projects.	**i, j, k**	
4.0	To apply techniques of state machines and design patterns to your designs.	**4.1**	The students will be able to construct various UML models using the appropriate notation.	**c, d, e**	
5.0	To test the software testing methodologies and software quality assurance.	**5.1**	The students will be able to recognize need of software quality and testing.	**c, j, l**	

UNIT I – INTRODUCTION	**(9)**
An Overview of Object Oriented Systems Development -Object Basics –Object Oriented Systems Development Life Cycle - Unified Approach.	
UNIT II - OBJECT ORIENTED METHODOLOGY	**(9)**
Rumbaugh Methodology –Booch Methodology -Jacobson Methodology -Patterns –Frameworks —Unified Modeling Language –UML Diagrams - Use case Diagram - class diagram -Interaction Diagram –State chart Diagram - Activity Diagram – UML Meta Model.	
UNIT III - OBJECT ORIENTED ANALYSIS	**(9)**
Identifying use cases -Object Analysis -Classification – Identifying Object - relationships -Attributes and Methods.	
UNIT IV - OBJECT ORIENTED DESIGN	**(9)**
Design process and axioms -Designing Classes –Access Layer -Object Storage and Object Interoperability – View Layer – Designing Interface Objects- Prototyping the user interface.	
UNIT V - SOFTWARE QUALITY	**(9)**
Software Quality Assurance – Testing Strategies – Test cases – Test plan –System Usability and Measuring User Satisfaction – Usability testing – User satisfaction test.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw-Hill, 2015.
2. Carol Britton and Jill Doake, ”Object Oriented Systems Development”, Elsevier Butterworth-Heinemann, 2005.

REFERENCES:

1. Martin Fowler, “UML Distilled”, Second Edition, PHI/Pearson Education, 2002.
2. Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw- Hill, 2003.

17ITC11-COMPUTER GRAPHICS AND MULTIMEDIA					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL	**QUESTION PATTERN: TYPE - I**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To study the basic 2D and 3D graphical structures	**1.1**	The students will be able to implement two and three dimensional graphical structures	a,b,j,k
2.0	To analyse the 2D geometric transformations	**2.1**	The students will be able to enhance the perspective of modern computer system	a,c,j,k
3.0	To illustrate the concept of Management and Transmission of Multimedia objects.	**3.1**	The students will be able to utilize 3Dimensional transformation, projections and various visible surface algorithms	a,b,c,j
4.0	To outline the concept of multimedia system design	**4.1**	The students will be able to gain knowledge of different media streams	a,b,c,j,k
5.0	To analyse different media and design issues related to multimedia systems	**5.1**	The students will be able to determine the design practice used in multimedia authoring tools	a,b,c,k

UNIT I - 2D PRIMITIVES

Elements of pictures created in computer graphics – Graphics input primitives and devices Drawing primitives in open GL and Basic open GL programming - open GL basic Graphics primitives – Output primitives – Line, Circle and Ellipse drawing algorithms – Attributes of output primitives.

UNIT II - 2D and 3D GEOMETRIC TRANSFORMATIONS

Three-Dimensional object representations − Three-Dimensional geometric and modeling transformations − Three-Dimensional viewing − Hidden surface elimination − Color models – Virtual reality - Animation.2D Viewing – Window-Viewport Transformation - Two dimensional Geometric transformations– Line, Polygon, Curve and Text clipping algorithms.

UNIT III - 3D CONCEPTS

Projections - Three dimensional object representation – Parallel and Perspective Polygons, Splines, Quadric Surfaces - Visualization of data sets - 3D affine transformations 3D Rotations using Quaternions – Viewing – Visible surface identification – Color Models, 3D Transformations in open GL

UNIT IV - MULTIMEDIA BASICS

Introduction and definitions – applications – elements – Animations – Compression – Types of Compressions: Lossless – Lossy – Video compression – Image Compression – Audio compression– Data and file format standards.

UNIT V - MULTIMEDIA AUTHORING AND APPLICATIONS
Creating interactive multimedia – Multimedia Authoring Systems – Multimedia Authoring Software Applications – Virtual Reality – Content based retrieval in digital libraries.
TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, "Computer Graphics with OpenGL", Fourth Edition, Pearson Education, 2014.
2. Ze-Nian Li and Mark S.Drew, "Fundamentals of Multimedia", First Edition, Pearson

REFERENCES:

1. F.S.Hill, "Computer Graphics using OPENGL", Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, "Multimedia systems design", First Edition, PHI, 2007.

17ITP04 - CASE TOOLS LABORATORY					
			L	T	P	C
			0	0	4	2
PRE REQUISITE : Nil					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn the basics of OO analysis.	**1.1**	The students will be able to design and implement Object Oriented Concepts	**a,b,j**	
2.0	To learn the basics of Object Oriented design skills.	**2.1**	The students will be able to use the UML and Design Diagrams	**a,j,k**	
3.0	To apply the UML design diagrams.	**3.1**	The students will be able to design the UML Diagrams	**a,l,j,k**	
4.0	To learn to map design to code.	**4.1**	The students will be able to create code from UML Diagrams	**b,c,k**	
5.0	To familiar with the various testing techniques	**5.1**	The students will be able to compare and contrast various design techniques	**a,d,e,i**	

LIST OF EXPERIMENTS:

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

1. Rational Suite 30 user License
2. Open Source Alternatives: ArgoUML, VisualParadigm
3. Eclipse IDE and JUnit
4. PCs 30

TOTAL (P:60) = 60 PERIODS

17ITP05 - COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY					
		L	T	P	C
		0	0	2	1

PRE REQUISITE : Nil

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To interpret the algorithmic development of graphics primitives such as line, circle, ellipse, polygon etc.	**1.1**	The students will be able to create the basic shapes such as lines, circle and ellipse.	**b,c,d,l**
2.0	To demonstrate the concept of 3D Transformation and projection using openGL.	**2.1**	The students will be able to create the 3D graphical scenes using open graphics library suits	**b,c,d,e,l**
3.0	To illustrate the representation and transformation of graphical images and pictures.	**3.1**	The students will be able to apply the transformations to the basic shapes and various clipping algorithms.	**b,c,d,e,l**
4.0	To illustrate the 2D animations using Open source animation Software.	**4.1**	The students will be able to design animation sequences using Open source animation Software.	**b,c,d,e,k**
5.0	To illustrate the impact of videos using video editing Software.	**5.1**	The students will be able to create videos using video editing Software.	**b,c,d,e,f,k,l**

LIST OF EXPERIMENTS:

1. Implementation of Algorithms for drawing 2D Primitives– Line (DDA, Bresenham) – allslopes
   Circle (Midpoint)
2. Composite 2DTransformations
3. 2D Geometric transformations – Translation Rotation Scaling Reflection Shear Window-Viewport
4. Liang - Barsky LineClipping
5. 3D Transformations - Translation, Rotation,Scaling
6. 3D Projections – Parallel,Perspective
7. Creating 3DScenes
8. Compression Algorithms - Toimplement text and image compressionalgorithms.
9. Image Editing and Manipulation - Basic Operations on image using any image editing software, Creating gif animated images, Image optimization
10. 2D Animation – To create Interactive animation using any authoring tool

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:

Hardware

1. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos,Printers – 3 Nos.

Software

1. Turbo C Software
2. OpenGL/Java

TOTAL (P:30) = 30 PERIODS

17GED08 - ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE					
		L	T	P	C
		2	0	0	0
PREREQUISITE : Nil					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To Understand the basics of Indian tradition and Indian traditional knowledge systems	**1.1**	The students will be able to Gain Knowledge about of Indian tradition and Indian traditional knowledge systems	a,f,h	
2.0	To know about basics of technologies and its scientific perspectives.	**2.1**	The students will be able to Understand basics of technologies and its scientific perspectives.	a, f	
3.0	To study the basics of Indian traditional health care ,	**3.1**	The students will be able to **study the** basics of Indian traditional health care	a,f,l	
4.0	To know the basics of Indian artistic tradition knowledge	**4.1**	The students will be able to **know the** basics of Indian artistic tradition	a,f,l	
5.0	To develop the basics of linguistic tradition	**5.1**	The students will be able To develop the basics of linguistic tradition	a,f,h	

UNIT I - Indian Tradition:	**(6)**
Fundamental unity of India, India's heroic role in world civilization, The Indian way of life, Introduction to Indian tradition, The Scientific Outlook and Human Values.	
UNIT II - Indian Knowledge System and Modern Science:	**(6)**
Relevance of Science and Spirituality, Science and Technology in Ancient India, Superior intelligence of Indian sages and scientists	
UNIT III - Indian Traditional Health Care:	**(6)**
Importance and Practice of Yoga, Pranayam and other prevailing health care techniques	
UNIT IV - Indian Artistic Tradition:	**(6)**
Introduction and overview of significant art forms in ancient India such as painting, sculpture, Civil Engineering, Architecture, Music, Dance, Literature etc	
UNIT V - Indian Linguistic Tradition:	**(6)**
Ancient Indian languages and literary Heritages, Phonology, Morphology, Syntax and Semantics	
TOTAL = 30 PERIODS	

Text Books:

1. Sivaramakrishnan, V., *Cultural Heritage of India- Course Material*, Bharatiya Vidya Bhavan, Mumbai 5th Edition, 2014
2. Swami Jitatmananda, *Modern Physics and Vedanta*, Bharatiya Vidya Bhavan, 2004.
3. Raman V.V., *Glimpses of Indian Heritage,* Popular Prakashan,1993
4. Jha V.N., *Language, Thought and Reality*
5. Krishna Chaitanya, *Arts of India*, Abhinav Publications, 1987

17CSC09 - ARTIFICIAL INTELLIGENCE *(Common to CSE and IT Branches)*					
			L	**T**	**P**	**C**
			3	**0**	**0**	**3**
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**				
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**			**Related Program outcomes**	
1.0	To illustrate the basic concepts of logic and knowledge-based agents.	**1.1**	The students will be able to understand the fundamentals of knowledge representation of agents.		**a,b,j,k**	
2.0	To build the most basic concepts, representations and algorithms for planning, to explain the method of achieving goals.	**2.1**	The students will be able to an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.		**a,b,j,k**	
3.0	To introduce the most basic concepts, representations and algorithms for planning, to explain the method of achieving goals.	**3.1**	The students will be able to understand the representation of states, algorithm for planning and real world problems.		**a,b,d,i,j**	
4.0	To understand the concept of uncertainty and to learn the syntax and semantics of probability theory.	**4.1**	The students will be able to analysis and compare the different learning process and apply to the probability theory.		**a,c,i,j**	
5.0	To understand the basic concepts of several learning techniques.	**5.1**	The students will be able to understand the different limitations of current Artificial Intelligence techniques.		**a,b,j,k**	

UNIT I - INTRODUCTION	**(9)**
Introduction–Definition - Future of Artificial Intelligence – Intelligent Agents – Structure of Agents - Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	
UNIT II - KNOWLEDGE AND LOGICAL REASONING	**(9)**
Knowledge Based Agents – Logical Agents – Propositional Logic – Inferences – First-order Logic – Inferences in First order Logic – Forward Chaining – Backward Chaining – Unification and Lifting – Resolution.	
UNIT III - PLANNING STRATAGIES	**(9)**
Introduction – Planning problem – Planning with State Space Search – Partial order Planning – Planning Graphs – Plan graph for Heuristic Estimation – Plan Graph Algorithm – Planning with proportional logic – Planning and Acting in the real world – Time, Schedules, and Resources.	
UNIT IV - UNCERTAIN KNOWLEDGE AND REASONING	**(9)**
Uncertainty – Review of Probability - Probabilistic Reasoning – Bayesian Networks – Inferences in Bayesian Networks – Inference by Enumeration – Variable Elimination Algorithm – Temporal Models – Hidden Markov Models.	
UNIT V - LEARNING TECHNIQUES	**(9)**
Learning from Observation – Forms of Learning – Ensemble Learning – Computational Learning Theory – Inductive Learning – Decision Trees – Decision Trees as Performance Elements – Expressiveness of Decision Tree – Explanation Based Learning – Statistical learning Methods –Reinforcement Learning.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, 3rd ed., Pearson Education, 2009.

REFERENCES:

1. David Poole, Alan Mackworth, Randy Goebel,”Computational Intelligence: a logicalapproach”, Oxford University Press, 2004.
2. G. Luger, “Artificial Intelligence: Structures and Strategies for complex problem solving”, 4th ed., Pearson Education, 2002.
3. J. Nilsson, “Artificial Intelligence: A new Synthesis”, Elsevier Publishers, 1998.

17ITC13- COMPILER DESIGN					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn the design principles of a Compiler	**1.1**	The students will be able to describe each phase of compilation process	**a,b,e**	
2.0	To learn the lexical analysis, NFA and DFA	**2.1**	The students will able to solve the NFA and DFA.	**c,g,j**	
3.0	To learn the different parsing techniques	**3.1**	The students will be able to implement the parsing techniques including Bottom-up and Top-down parsing for the given grammar	**b,c,i**	
4.0	To learn intermediate code generation schemes and run time environment	**4.1**	The students will be able to design experiments for Intermediate Code Generation in compiler	**a,d,g**	
5.0	To learn how to optimize and effectively generate machine codes.	**5.1**	The students will be able to learn how to optimize and effectively generate machine codes	**b,g,i**	

UNIT I - INTRODUCTION	**(9)**
Translators - Compilation and Interpretation - Language processors - Introduction to compiling – Analysis of the source program –The phases of a compiler – Cousins of a compiler – The grouping of phases – Compiler construction tools.	
UNIT II - LEXICAL ANALYSIS	**(9)**
The role of the lexical analyzer – Input buffering – Specification and Recognition of tokens – Finite Automata -Nondeterministic Finite Automata - Acceptance of Input Strings by Automata - Deterministic Finite Automata - Converting Regular Expression to DFA - Converting NFA to DFA - Minimization of DFA.	
UNIT III - SYNTAX ANALYSIS	**(9)**
Syntax Analysis – The role of a parser – Context free grammar – Top down parsing– Recursive descent parsing, Predictive parsing – Bottom up parsing – LR parsers – Construction of a simple SLR, CLR and LALR parsing table.	
UNIT IV - INTERMEDIATE CODE GENERATION AND RUN TIME ENVIROMENT	**(9)**
Intermediate languages – Declarations – Assignment statements – Boolean expressions – Case statements – Back patching – Procedure calls. Run - Time Environments – Source language issues – Storage-allocation strategies.	
UNIT V - CODE GENERATION AND CODE OPTIMIZATION	**(9)**
Issues in the design of a code generator – The Target machine – Run time storage management – Register allocation and assignment – The DAG representation of basic blocks – The Principle sources of Optimization – Peephole Optimization – Optimization of basic blocks.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, “Compilers – Principles, Techniques, and Tools”, Pearson Education Asia, 2013.

REFERENCES:

1. Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Publishers, 2003.
2. C. N. Fisher and R. J. LeBlanc “Crafting a Compiler with C”, Pearson Education, 2011.
3. SudhaSadasivam G, “Compiler Design”, Scitech Publications (India) Private Limited, Chennai, 2010.
4. Dhamdhere D M, "Compiler Construction Principles & Practice", Macmillan India Limited, New Delhi, 1997.

17ITC14 - CRYPTOGRAPHY AND NETWORK SECURITY				
L	T	P	C	
3	0	0	3	
PRE REQUISITE : 17ITC05	**QUESTION PATTERN: TYPE – I**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To be familiar with various cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel	**1.1**	The students will be able to understand the requirement and concepts of security system.	**a,,c,d,e,h,i,j,l**
2.0	To understand the various block cipher and Stream cipher models	**2.1**	The students will be able to analyze a given system with respect to security concepts.	**a,c,e,h,k,l**
3.0	Describe the principles of public key cryptosystems ,Hash Functions & Digital Signature.	**3.1**	The students will be able to create an understanding of public key cryptosystems and ability to solve Hash Functions & Digital Signature.	**a,b,d,e,h,l**
4.0	Gain the knowledge of Authentication Protocols and Firewall	**4.1**	The students will be able to apply the System Security concepts to overcome the attacks.	**a,b,c,e,g,h,j,l**
5.0	To impact knowledge on system security Intruders,Virus, and Evaluate the Security of Email, IP and Web	5.1	The students will be able to design Secure Authentication Protocols ,Email and IP Security.	**a,b,c,e,g,h,l**

UNIT I - COMPUTER SECURITY BASICS	**(9)**
Computer Security Concepts, OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, Model for Network Security, Classical Encryption techniques- Substitution and Transposition methods, Block Cipher Principles.	
UNIT II - ENCRYPTION STANDARDS AND BLOCK CIPHER OPERATION	**(9)**
Data Encryption Standard- DES Encryption- Initial Permutation- Details of Single Round- Key Generation- DES Decryption, Advanced Encryption Standard (AES)- Triple DES- Double DES-Triple DES with Two Keys- Triple DES with Three Keys, Block Cipher Operation- Electronic Code Book- Cipher Block Chaining Mode- Cipher Feedback Mode-Output Feedback Mode- Counter Mode. RSA Algorithm- Diffie-Hellman Key Exchange Algorithm	
UNIT III - HASH FUNCTIONS AND DIGITAL SIGNATURES	**(9)**
Authentication Requirements - Authentication Functions - Message Authentication Code - hash Functions - Security of hash Functions and MAC-Hash and MAC Algorithms - -MD5 – SHA – HMAC – CMAC – Digital signature and authentication protocols	
UNIT IV - SECURITY PRACTICE	**(9)**
Authentication applications – Kerberos – X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems	
UNIT V - SYSTEM & INFORMATION SECURITY	**(9)**
Electronic Mail security – PGP, S/MIME – IP security – Web Security – SYSTEM SECURITY: Intruders – Malicious software – viruses	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. William Stallings ,"Cryptography and Network Security - Principles and Practices" – PEARSON-Fourth Edition 2009.
2. Michael E Whitman and Herbert J Mattord, —Principles of Information Securityll, Vikas Publishing House, New Delhi, 2017.

17CSP09 - INTERNET OF THINGS LABORATORY
(Common to CSE and IT Branches)

L	T	P	C
0	0	4	2

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To learn the operations of 8051 microcontroller.	**1.1**	The students will able to gain programming knowledge in microcontroller.	**a,k,l**
2.0	To show how sensors and embedded systems work	**2.1**	The students will able to outline the basics of IoT applications.	**a,k,l**
3.0	To examine how to program on embedded and arduino platforms including ESP8266	**3.1**	The students will able to categorize and know to implement various sensors	**a,b,c,e,k,l**
4.0	To build a communication with other mobile devices using various communication platforms such as Bluetooth and Wi-Fi.	**4.1**	The students will able to assess their own IoT applications and deploy it.	**a,b,c,k,l**
5.0	To analyze collected data using cloud platform.	**5.1**	The students will able to compare the data and visualize the data received from sensors.	**a,b,c,d,e,g,j,k,l**

LIST OF EXPERIMENTS:

1. Implement a program to Blink LED using Arduino.
2. Implement a program to control intensity light using Arduino.
3. Implement a program for LCD Display using Arduino.
4. Implement a program for Buzzer Indication using Arduino.
5. Implement a program for LDR using Arduino.
6. Implement a program for LM35 Sensor using Arduino.
7. Implement a program for Key Input with LED using Arduino.
8. Implement a program for Servo Motor Control using Arduino.
9. Implement a program for blinking LED using NODEMCU with Blynk.
10. Implement a program for Sensor value logging in Cloud.

Hardware or Software Requirement:

Hardware:

1. 36 nodes with WiFi connection or standalone PCs
2. Temperature sensor, LDR, LCD, Servo motor , buzzer, LEDs,arduino board , IoT core board , ESP01 ESP8266

Software:

1. Arduino 1.8.5
2. Arduino library

TOTAL (P: 60) = 60 PERIODS

17GED06 - COMPREHENSION					
		L	T	P	C
		0	0	2	0
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To encourage the students to comprehend the knowledge acquired from the first Semester to Sixth Semester of B.E Degree Course through periodic exercise	**1.1**	The student will be able to understand and comprehend any given problem related to computer science & engineering field.	**a,b,c,e,k,l**	

METHOD OF EVALUATION

The student will be assessed for his understanding of the basic principles of the core engineering subjects. The internal assessment for a total of 50 marks will be evaluated by a committee comprising of the faculty members of the department. The committee will conduct three written examinations of objective question type from the subjects as follows

- Test1- C Programming, Data Structures, Operating systems, Computer Networks.
- Test 2-Java Programming, Database Systems, Computer Architecture, Software Engineering.
- Test 3-Internet and Web programming, Object Oriented Analysis and Design, Internet of Things.

The end semester examination, which carries a total of 50 marks, will be an objective question type examination conducted by a committee of one internal examiner appointed by the COE of our college.

TOTAL: 30 PERIODS

17GED07- CONSTITUTION OF INDIA					
		L	T	P	C
		2	0	0	0
PREREQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To educate about the Constitutional Law of India	**1.1**	The students will be able to Gain Knowledge about the Constitutional Law	f, h, l	
2.0	To motivate students to Understand the Fundamental Rights and Duties of a citizen	**2.1**	The students will be able to Understand the Fundamental Rights and Duties of a citizen	f, g, h	
3.0	To make students to understand about Federal structure of Indian Government	**3.1**	The students will be able to Apply the concept of Federal structure of Indian Government	f, g, h	
4.0	To understand about Amendments and Emergency provisions in the Constitution	**4.1**	The students will be able to Analyze the Amendments and Emergency provisions in the Constitution	f, g, h	
5.0	To educate a holistic approach in their life as a Citizen of India	**5.1**	The students will be able Develop a holistic approach in their life as a Citizen of India	f, h, l	

UNIT I - Introduction to Indian Constitution	**(6)**
Meaning of the constitution law and constitutionalism - Historical perspective of the Constitution - Salient features and characteristics of the Constitution of India	
UNIT II - Fundamental Rights	**(6)**
Scheme of the fundamental rights - Right to Equality - Fundamental Right under Article 19 - 102 Scope of the Right to Life and Liberty - Fundamental Duties and its legal status - Directive Principles of State Policy – Its importance and implementation	
UNIT III - Federal Structure	**(6)**
Federal structure and distribution of legislative and financial powers between the Union and the States - Parliamentary Form of Government in India - The constitutional powers and status of the President of India	
UNIT IV - Amendment to Constitution	**(6)**
Amendment of the Constitutional Powers and Procedure - The historical perspectives of the constitutional amendments in India	
UNIT V - Emergency Provisions	**(6)**
National Emergency, President Rule, Financial Emergency Local Self Government – Constitutional Scheme in India	
TOTAL = 30 PERIODS	

REFERENCES:

1. Constitution of India - Ministry of Law & Justice – PDF format awmin.nic.in/coi/coiason29july08.pdf
2. . Introduction to the Constitution of India by Durgadas Basu
3. The Constitution of India – Google free material - www.constitution.org/cons/india/const.html

17GEA01 - ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING *(Common to CSE and IT)*					
		L	**T**	**P**	**C**
		3	**0**	**0**	**3**
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - IV**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To manage an Organization; to describe principles of macroeconomics to have the understanding of economic environment of Business.	**1.1**	The students will be able to know the importance of Engineering Economics and Principles of Micro and Macro Economics.	**a,b,c,e,l**	
2.0	To understand the Market demand and supply analysis and the ways in which changes in these determinants affect equilibrium price and output	**2.1**	The students will be able to estimate the market position with the knowledge in demand forecasting and supply.	**a,b,c,e,l**	
3.0	To know the production and cost function in various market condition.	**3.1**	The students will be able to develop and estimate cost for any project.	**a,b,c,e,l**	
4.0	To determine the changes in price of the product, the effect of a price control in different market structure, taxation and services.	**4.1**	The students will be able to fix the price of the product with the knowledge in different market structure and taxation design.	**a,b,c,d,e,f,g,h, i ,k,l**	
5.0	To acquire a reasonable knowledge in Accounts; to analyze and evaluate Financial Statements.	**5.1**	The students will be able to analyze the financial statement to determine the optimal managerial decisions.	**a,b,c,d,e,f,g,h, i,k,l**	

UNIT I - INTRODUCTION	**(9)**
Managerial Economics – Relationship with other disciplines, Firms – Types, Objectives and Goals, Managerial Decisions, Decision Analysis.	
UNIT II - DEMAND AND SUPPLY ANALYSIS	**(9)**
Demand – Types of Demand, Determinants of Demand, Demand Function, Demand Elasticity, Demand Forecasting. Supply – Determinants of Supply, Supply Function, Supply Elasticity.	
UNIT III - PRODUCTION AND COST ANALYSIS	**(8)**
Production Function – Returns to scale, Production Optimization, Isoquants, and Managerial uses of Production Function. Cost Concepts – Cost Function, Determinants of Cost, Estimation of Cost.	
UNIT IV –PRICING AND TAXATION	**(9)**
Determinants of Price, Pricing under different Objectives and different Market Structures, Price Discrimination, Pricing methods in practice. Tax Design: The Structure of Taxation – Taxation of goods and services.	
UNIT V -FINANCIAL ACCOUNTING, CAPITAL BUDGETINGAND ACCOUNTING STANDARDS	**(10)**
Introduction to Financial, Cost and Management Accounting, Accounting Concepts and Conventions ,Final Accounts, Investments – Evaluation of Investment Decision – Average Rate of Return, Payback Period, Net Present Value. Accounting Standard: History – International Financial Reporting Standards – Indian Accounting Standards.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Anjali Bagad, "Engineering Economics and Financial Accounting", Technical Publications 2nd Revised ed., 2011.
2. B. Senthil Arasu, J. Praveen Paul, "Engineering Economics and Financial Accounting", SchiTech Publication (India) Pvt. Ltd.

17ITC15 - MACHINE LEARNING TECHNIQUES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17MYB01		QUESTION PATTERN: TYPE - III			
COURSE OBJECTIVES AND OUTCOMES:					

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To introduce the basic concepts and techniques of Machine Learning	1.1	The students will be able to explain the concepts of supervised, unsupervised and semi-supervised learning	**a,b**
2.0	To have a thorough understanding of the Supervised and Unsupervised learning techniques.	2.1	The students will be able to apply the appropriate machine learning strategy for any given problem	**b,c,e,i,j,k,l**
3.0	To study the various probability based learning techniques	3.1	The students will be able to suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem	**b,c,e,i,j,k,l**
4.0	To study the evolutionary models and genetic algorithm for machine learning	4.1	The students will be able to design systems that uses the appropriate graph models of machine learning	**b,c,d,f,i,j,k,l**
5.0	To understand graphical models of machine learning algorithms	5.1	The students will be able to modify existing machine learning algorithms to improve classification efficiency	**b,c,d,f,i,j,k,l**

UNIT I – INTRODUCTION	**(9)**
Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.	
UNIT II - LINEAR MODELS	**(9)**
Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.	
UNIT III - TREE AND PROBABILISTIC MODELS	**(9)**
Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map.	
UNIT IV -DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS	**(9)**
Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process.	
UNIT V - GRAPHICAL MODELS	**(9)**
Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Stephen Marsland, "Machine Learning –An algorithmic perspective", 2nd ed., Chapman and Hall/CRC Machine learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, "Machine Learning", 1st ed., McGraw Hill Education India Ltd, 2013.

REFERENCES:

1. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", 1st ed., Cambridge University Press, 2012.
2. Jason Bell, "Machine learning –Hands on for Developers and Technical Professionals", 1st ed., Wiley,

2014.

3. Ethem Alpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", 3rd ed., MIT Press, 2014.

17CSC18 - FULL STACK DEVELOPMENT					
		L	T	P	C
		3	0	0	3
PREREQUISITE: NIL		**QUESTION PATTERN : III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program Outcomes**	
1.0	To build strong expertise in developing front end application using HTML5 and CSS3.	**1.1**	The students will be able to understand and develop web page using HTML and CSS	**a,c,j,k**	
2.0	To develop front end application using JavaScript.	**2.1**	The students will be able to design and develop front end application using JavaScript	**a,c,j,k**	
3.0	To become proficient in Bootstrap concepts and to develop web pages based on Bootstrap.	**3.1**	The students will be able to design and develop front end application using Bootstrap.	**a,b,c,k**	
4.0	To build strong expertise in developing front end application with jQuery.	**4.1**	The students will able to implement MVC and responsive design to scale well across PC, tablet and Mobile Phone using jQuery.	**a,b,c,j,k**	
5.0	To build strong expertise in developing front end application jQuery Mobile.	**5.1**	The students will able to implement MVC and responsive design to scale well across PC, tablet and Mobile Phone using jQuery Mobile.	**a,b,c,j,k**	

Unit I - HTML5 and CSS3	**(9)**
Introduction to HTML - HTML Basic Tags - HTML Formatting Tags - HTML Color Coding –HTML Grouping Using Div Span – Lists – Tables – Images – Hyperlink – Iframe – Headers – Classes – Responsive – Layout – HTML Javascript – Entities and URI code - Charset and Forms. Introduction to CSS3 – CSS3 Syntax - Selectors - Color Background Cursor -Text Fonts - Lists Tables - Box Model - Display Positioning - CSS Floats – Animations – Buttons – Pagination - User Interface – Filters – Responsive.	
Unit II - CLIENT SIDE PROGRAMMING	**(9)**
Introduction to JavaScript - Language Basics - JavaScript Objects - Scope – Events - Strings – Numbers – Math – Arrays – Boolean – Comparisons – Conditions – Switch - Loops - Type Conversion – RegExp – Errors - Debugging – Hoisting - Strict Mode - Functions – Objects – Forms - JavaScript HTML DOM - JavaScript BOM.	
Unit III – BOOTSTRAP	**(9)**
Introduction to Bootstrap - Bootstrap Basics - Bootstrap Grids - Bootstrap Themes - Bootstrap CSS - Bootstrap JS – Node.js – MySQL - MongoDB	
Unit IV- jQUERY	**(9)**
Introduction to jQuery - jQuery Syntax - jQuery Selectors - jQuery Events - jQuery Effects - jQuery HTML - jQuery Traversing - jQuery AJAX & Misc.	
Unit V- jQUERY MOBILE	**(9)**
Introduction to jQuery Mobile - jQuery Mobile Pages - jQuery Mobile Transitions - jQuery Mobile Buttons - Mobile Icons - Mobile Popups - Mobile Toolbars - Mobile Navbars - Mobile Panels - Mobile Collapsibles - Mobile Tables - Mobile Grids - Mobile Lists - Mobile Forms - jQuery Mobile Themes - jQuery Mobile Events.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Kogent Learning Solutions Inc. “HTML5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQUERY”, Wiley India Pvt. Limited, 2011.
2. Deitel and Deitel and Nieto, “Internet and World Wide Web – How to Program”, Prentice Hall, 5th Edition, 2011.

REFERENCES:

1. Silvio Moreto, Matt Lambert, Benjamin Jakobus, Jason Marah, “Bootstrap 4–Responsive Web Design” Packt Publishing (6 July 2017)
2. Adriaan de Jonge, Phil Dutson, “jQuery jQuery UI and jQuery Mobile - Recipes and Examples”, Pearson Education India.
3. Thomas Powell, “Web Design: The Complete Reference” ,Osborne / McGraw-Hill
4. https://www.w3schools.com/

17ITP06- MACHINE LEARNING TECHNIQUES LABORATORY					
		L	T	P	C
		0	0	4	2
PRE REQUISITE : Nil					
COURSE OBJECTIVES AND OUTCOMES:					

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To learn hands on coding of popular ML algorithms with Python	**1.1**	Get the knowledge to work in the Python packages.	**a,b,c,e**
2.0	To build Machine Learning applications with Python package Scikit-Learn.	**2.1**	Leverage the full power of the scikit-learn API.	**a,b,c,d,e**
3.0	To learn the knowledge of using specific regression, classification, and clustering models.	**3.1**	Use specific regression, classification, and clustering models skillfully to model their data and solve problems	**a,b,c,d,g**
4.0	To build a Neural Network with Tensor Flow.	**4.1**	Able to design a neural network with Tensor Flow.	**a,b,c,d,e,g**
5.0	To get the knowledge to complete Mini Projects..	**5.1**	Able to complete Mini Project for a classification problem.	**a,b,c,d,e,g**

LIST OF EXPERIMENTS:

1.Study the packages used in Python.
2. Implement the clustering mechanisms such as K-Means,Vector Quantization.
3.Implement the various dimensionality reduction models such as PCA, Feature Selection.
4.Implement the various graphical models.
5.Implement Logistic Regression Using Scikit-Learn.
6. Build a Neural Network with Tensor Flow.
7. Create a Mini Project for a Classification Problem using Tensor Flow.
8. Create a Mini Project on Machine Learning Application using Scikit-Learn.

Hardware or Software Requirement:

Hardware

1. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos,
2. Printers – 3 Nos.

Software

1. Open Source Python Framework – Jupiter Notebook, Google Colab

TOTAL(P:60) =60 PERIODS

17ITD01 - PROJECT WORK I					
			L	T	P	C
			0	0	8	4
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program Outcomes**	
1.0	To identify the problem in the specific domain or enhance the existing product to the next level.	**1.1**	The students will be able to demonstrate a sound technical knowledge of their selected project topic.	**a, b, l**	
2.0	To learn how to formulate solution for the problem.	**2.1**	The students will be able to undertake problem formulation and solution legally for the sustainable development.	**c,d,e,g,h**	
3.0	To be trained to function effectively as an individual and a member in diverse teams.	**3.1**	The students will be able to develop an attitude of team work and independent working on real time problems.	**h,i**	
4.0	To interpret and justify the experimental results	**4.1**	The students will be able to design engineering solutions to complex problems based on engineering and management principles.	**c, d, e, k**	
5.0	To develop an effective communication and be trained to write dissertation report	**5.1**	The students will be able to communicate with engineers and the community at large in written and oral forms.	**f,j**	

DESCRIPTION
Project work may be allotted to a single student or to a group of students not exceeding 4 per group. The title of project work is approved by head of the department under the guidance of a faculty member and student(s) shall prepare a comprehensive project report after completing the work to the satisfaction of the guide. The Head of the department shall constitute a review committee for project work. There shall be three reviews during the semester by the committee to review the progress. Student(s) shall make presentation on the progress made by him / her / them before the committee and evaluation is done as per Rules and Regulations.
TOTAL (P:120) = 120 PERIODS

17ITD02 - PROJECT WORK II					
		L	T	P	C
		0	0	16	8
PRE REQUISITE : 17ITD01					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program Outcomes**
1.0	To identify the problem in the specific domain or enhance the existing product to the next level.	**1.1**	The students will be able to demonstrate a sound technical knowledge of their selected project topic.		**a, b, l**
2.0	To learn how to formulate solution for the problem	**2.1**	The students will be able to undertake problem formulation and solution legally for the sustainable development.		**c,d,e,g,h**
3.0	To be trained to function effectively as an individual and a member in diverse teams.	**3.1**	The students will be able to develop an attitude of team work and independent working on real time problems.		**h,i**
4.0	To interpret and justify the experimental results	**4.1**	The students will be able to design engineering solutions to complex problems based on engineering and management principles.		**c, d, e, k**
5.0	To develop an effective communication and be trained to write dissertation report	**5.1**	The students will be able to communicate with engineers and the community at large in written and oral forms.		**f,j**

DESCRIPTION
Project work may be allotted to a single student or to a group of students not exceeding 4 per group. The title of project work is approved by head of the department under the guidance of a faculty member and student(s) shall prepare a comprehensive project report after completing the work to the satisfaction of the guide. The Head of the department shall constitute a review committee for project work. There shall be three reviews during the semester by the committee to review the progress. Student(s) shall make presentation on the progress made by him / her / them before the committee and evaluation is done as per Rules and Regulations.
TOTAL (P:240) = 240 PERIODS

17ITX04 - DATA MINING AND WAREHOUSING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17CSC07		QUESTION PATTERN: TYPE - I			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		Course Outcomes		Related Program outcomes	
1.0	To introduce the basic concepts of Data Warehouse and Data Mining techniques.	1.1	The students will be able to describe the fundamental concepts, benefits and problem areas associated with data warehousing	a	
2.0	To examine the types of the data to be mined and apply preprocessing methods on raw data.	2.1	The students will be able to describe OLAP and data mining as techniques for extracting knowledge from a data warehouse.	a,b,c,k,l	
3.0	To discover interesting patterns, analyze supervised and unsupervised models.	3.1	The students will be able to process raw data to make it suitable for various data mining algorithms.	a,b,c,d,f,k,l	
4.0	To estimate the accuracy of the algorithms	4.1	The students will be able to measure interesting patterns from different kinds of databases.	a,b,c,d,f,k,l	
5.0	To learn the clustering algorithms	5.1	The students will be able to apply the techniques of clustering, classification, association finding, feature selection and visualization to real world data.	a,b,c,d,f,k,l	

UNIT I - DATA WAREHOUSING	**(9)**
Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DATABASE MANAGEMENT SYSTEM Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.	
UNIT II - BUSINESS ANALYSIS	**(9)**
Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.	
UNIT III - DATA MINING	**(9)**
Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.	
UNIT IV - ASSOCIATION RULE MINING AND CLASSIFICATION	**(9)**
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules– Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.	
UNIT V - CLUSTERING AND TRENDS IN DATA MINING	**(9)**
Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, Third Edition,Elsevier, 2012.

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Person Education, 2007.
2. K.P. Soman, ShyamDiwakar and V. Aja, “Insight into Data Mining Theory and Practice”, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wiley-Interscience, 2006

17ITX05 - PHP PROGRAMMING *(Common to CSE and IT Branches)*					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITC09		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To Learn the basics of PHP	1.1	The students will be able to create programs that include if, else, switch, for, while, and do loops to process statements repeatedly		**a,b,c,d,l**
2.0	To understand the strings, arrays and functions concepts.	2.1	The students will be able to write simple PHP code to perform some functionality for a web application		**a,b,c,d,l**
3.0	To understand, design and build a webpage	3.1	The students will be able to design and implement a typical static web pages and interactive, dynamic web applications		**a,b,c,d,l**
4.0	To learn Object oriented programming concepts	4.1	The students will be able to know the Object oriented programming techniques in PHP		**a,b,c,d,l**
5.0	To learn Database creation and Files	5.1	The students will be able to build, populate, and access a database through server side programming to provide data access for a web application.		**a,b,c,d,l**

UNIT I - INTRODUCTION	**(9)**
Essential PHP: Enter PHP-Getting PHP-Creating Your Development Environment-Creating &Running PHP page– Mixing HTML and PHP-Printing Some Tex t& HTML-More Echo Power-Using PHP ”Here” Documents – Command Line – Comments – Variables - Interpolating Strings – Constants- PHP’s Internal Data Types. Operators and Flow Control: PHP’s Math Operators- PHP Operator - Precedence-if statement - else statement-else if statement – Switch statement – for - while - do…while -foreach Loop – break – continue - PHP Alternate Syntax.	
UNIT II - STRINGS, ARRAYS AND FUNCTIONS	**(9)**
Strings: The sting functions- Converting to and from strings- Formatting Text strings–Arrays: Modifying the data in Arrays – Deleting Array Elements –Handling Arrays with Loops-The PHP Array Functions-Extracting Data from arrays –Sorting Arrays-Using PHP’s Array Operators – Multidimensional Arrays–Splitting and Merging Arrays. Functions: Creating Functions - passing data to functions-passing arrays to functions-passing by reference-Default arguments-passing variable numbers of arguments-returning data from functions –returning arrays–variable functions –nesting functions –creating include files-returning errors from functions.	
UNIT III - PHP WEB PAGE CREATION	**(9)**
Reading data in web pages- PHP Browser and Handling Power - File Handling: Opening files – feof - reading text from a file - closing a file - Reading from a file character by character - reading a whole file at once - Reading a file into an array – checking if a file exists - Getting file size - Reading binary reads - Parsing files with fscanf - copying file - deleting files - writing to a file – Reading and writing binary files – Appending to files - writing a file all at once.	

UNIT IV - OBJECT ORIENTED PROGRAMMING	(9)
Object oriented programming: Creating Classes– creating objects– setting access to properties and methods– constructors – destructors –Basing one class on another with inheritance –Overriding methods –Overloading methods - Autoloading classes. Advanced object oriented programming: Creating static methods –static members and inheritance – creating abstract classes – creating interfaces - creating class constants- using the final keyword – Cloning Objects – Reflection.	
UNIT V - WORKING WITH DATABASES & FILES	**(9)**
Working With Databases: Creating a Mysql Database-Creating a New table-Accessing -Updating -Inserting Data - Deleting Records – Creating Tables-Creating a New Database-Sorting Your Data. Sessions Cookies and FTP: Setting a cookie –Reading a cookie- Setting cookie's Expiration -Delete Cookies – Working with FTP-Downloading files with FTP-uploading Files with FTP-Deleting a File with FTP-creating and removing directions with FTP-sending E-Mail-Storing Data in sessions –Counter Using Sessions .	
	TOTAL (L:45) = 45 PERIODS

TEXT BOOK:

1. Steven Holzner, "The Complete Reference PHP", McGraw Hill Education(India) Pvt.Ltd.2016

REFERENCES:

1. Ashok Appu, "PHP A Beginner's Guide", WILEY-dreamed India Pvt. Ltd.
2. W. Jason Gilmore, "Beginning PHP and MySQL: From Novice to Professional", 3rd ed., Apress, USA, 2010.
3. VikramVaswani, "MYSQL: The Complete Reference", 2nd ed., Tata McGraw- Hill Publishing Company Limited, Indian Reprint 2009.

17ITX06 - PROGRAMMING WITH JAVA 2 ENTERPRISE EDITION (Common to CSE and IT Branches)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITC01	**QUESTION PATTERN: TYPE - I**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To design interactive applications with GUI Components such as JavaFX.	**1.1**	The students will be able to design GUI components with Java FX.	**b,c**
2.0	To develop database applications using JDBC.	**2.1**	The students will be able to develop database applications using JDBC.	**b,c,k**
3.0	To implement Java networking APIs to communicate with processes.	**3.1**	The students will be able to implement Java networking APIs.	**b,c,j,k**
4.0	To develop JSP and Servlet application.	**4.1**	The students will be able to develop JSP and Servlet application.	**b,c,j,k**
5.0	To learn about Java Reflection API and XML.	**5.1**	The students will be able to learn Java Reflection API and XML.	**c,k**

UNIT I - JAVA GUI PROGRAMMING USING JAVA FX	**(9)**
Basics of Java FX – Java FX and Containers – Frames – layout Managers – Menus – Toolbars – Event Handling.	
UNIT II - JAVA DATABASE CONCEPTS & EJB	**(9)**
Database Architecture : Components of JDBC – Two Tier/Three Tier Architecture Processing SQL Statements - Establish Connection ,Types – Concurrency – Read column values from rows – Updating rows in a result set - Exceptions – Prepared Statement Object – EJB – Stateless and Stateful Entity Bean – Message Driven Bean.	
UNIT III - NETWORKING IN JAVA	**(9)**
URL: Creating and Parsing URL – URL Connection:Connecting to a URL - Reading from and Writing to aURLConnection – Socket - InetAddress. Datagram's: Writing a datagram client and server - Datagram Socket, Datagram Packet – Broadcasting to multiple Recipients - Multicast Socket-SSL and HTTPS in Java,RMI	
UNIT IV - SERVER SIDE TECHNOLOGIES WITH JAVA	**(9)**
Overview of JSP2.2 and Servlet 3.1 - Creating dynamic WebPages using JSP and Servlet- Standard Tag Library - Java Beans - Custom Tags - Expression Language – Annotations - Filters-Event handling-Exception Handling – Asynchronous processing.	
UNIT V - REFLECTION &JAVA XML	**(9)**
Introduction – Introspection – Dynamic Proxies – Dynamic class loading and reloading – Java XML : XML Processing – DOM and SAX Parser.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:

1. Elliotte Rusty Harold, "Java Network Programming, 4th Edition Developing Networked Applications "O'Reilly Media, Final Release Date: October 2013
2. Carl Dea, Mark Heckler, GerritGrunwald, José Pereda, Sean Phillips "JavaFX 8: Introduction by Example" Apress 2nd Edition 2014.
3. Kogent Learning Solutions Inc, "Java Server Programming Java EE 7 (J2EE 1.7), Black Book", dreamtechpress 2015.

REFERENCES:

1. http://pdf.coreservlets.com/
2. https://docs.oracle.com/javase/tutorial.

17ITX07 - ADVANCED WEB PROGRAMMING (Common to CSE and IT Branches)			
L	T	P	C
3	0	0	3

PRE REQUISITE : 17ITC09 | **QUESTION PATTERN: TYPE – I**

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To infer the basics of Bootstrap	**1.1**	The students will be able to design a web page using Bootstrap	**a,d,e,i,k,l**
2.0	To extend the concepts of Bootstrap	**2.1**	The students will be able to make use of Bootstrap grids.	**a,b,c,e,i,k,l**
3.0	To know about basics of Node JS	**3.1**	The students will be able to demonstrate use Node JS outside of web browser	**a,b,c,d,e,i,k,l**
4.0	To know about basics of Angular JS	**4.1**	The students will be able to make use of Angular JS for web page designing.	**a,b,c,d,e,f,i,k,l**
5.0	To know about basics of Ajax	**5.1**	The students will be able to make use of AJAX in web page development.	**a,b,c,d,e,f,i,k,l**

UNIT I - BOOTSTRAP 3 BASICS	**(9)**
Grid basic- Typography- Tables- Images- Jumbotron- Wells- Alerts- Buttons- Button groups- Glyphicons- Badges/Labels- Progress Bars- Pagination- Pager- List groups- Panels- Dropdowns	
UNIT II - BOOTSTRAP 3 GRIDS	**(9)**
Collapse- Tabs/Pills- Navbar- Forms- Inputs- Inputs2- Input sizing- Media objects- Carousel- Modal- Tooltip- Popover- Scrollspy- Utilitites- Grid system- Stacked/Horizontal- Grid XSmall- Grid Small- Grid Medium- Grid Large- Grid XLarge.	
UNIT III - NODE JS	**(9)**
Node JS Introduction – HTTP Modules – File System – URL Module – NPM – Events – Upload Files – Email	
UNIT IV -ANGULAR JS	**(9)**
Hello AngularJS- Structuring your AngularJS application- Views and controllers- Models and Services- Animations- Directives- Forms and validations.	
UNIT V – AJAX	**(9)**
XML Http- Request- Response- XML File- AJAX PHP- AJAX ASP- AJAX Database- AJAX Applications.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:

1. Jennifer Kyrnin, “Bootstrap in 24 hours”, Pearson education, 2016.
2. Brad Green, Shyam Seshadri, “AngularJS: Up and Running”, O’Reilly Media, 2014.

REFERENCES:

1. Steve Suehring,“JavaScript– Step by Step”, PHI, 2nd ed.,2010.
2. https://www.w3schools.com/bootstrap/
3. https://www.w3schools.com/js/js_ajax_intro.asp
4. https://www.w3schools.com/nodejs/.

17ITX08 - C# and .Net *(Common to CSE and IT Branches)*					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : 17ITC01		**QUESTION PATTERN: TYPE – II**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To outline the knowledge about basic concepts and functions of c#.	**1.1**	The students will be able to explain the .NET framework.		**a,k,l**
2.0	To show the structure and the object oriented aspects of C#	**2.1**	The students will be able to explain how c# fits into the .NET Platform.		**a,k,l**
3.0	To demonstrate the application development Processes on .NET and building Windows Applications.	**3.1**	The students will be able to analyze the basic structure of a C# application and to develop real time application		**a,b,c,e,k,l**
4.0	To demonstrate the principles of Web based application development on .NET.	**4.1**	The students will be able to debug, compile, and run a simple web based application on .NET.		**a,b,c,k,l**
5.0	To Learn .NET Framework and CLR	**5.1**	The students will be able to develop programs using C# on.NET.		**a,b,c,d,e,g,i,k,l**

UNIT I - INTRODUCTION TO C#	**(9)**
Introducing C#, Understanding.NET, Overview of C#, Literals, Variables, DataTypes, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.	
UNIT II – OBJECT ORIENTED ASPECTS OF C#	**(9)**
Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.	
UNIT III -APPLICATION DEVELOPMENT ON .NET	**(9)**
Building Windows Applications, Accessing Data withADO.NET.	
UNIT IV - WEB BASED APPLICATION DEVELOPMENT ON .NET	**(9)**
Programming Web Applications with Web Forms, Programming Web Services.	
UNIT V - THE CLR AND THE .NET FRAMEWORK	**(9)**
Assemblies, Versioning, Attributes, Reflection, Viewing Meta Data, Type Discovery, Reflecting on a Type, Marshaling, Remoting , Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2010.
2. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2002.

REFERENCES:

1. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
2. Robinson etal, "Professional C#", 2nd ed., Wrong Press, 2002.
3. S. Thamarai Selvi, R. Murugesan, "A Textbook on C#", Pearson Education, 2003.

17ITX09 - RUBY PROGRAMMING *(Common to CSE and IT Branches)*					
		L	**T**	**P**	**C**
		3	**0**	**0**	**3**
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand basic programming constructs of Ruby.	**1.1**	The students will be able to recall and describe basic of ruby programming.	**a,b,c,e,i,k,l**	
2.0	To understand the concepts of operators, statements and control structures.	**2.1**	The students will be able to know the concepts of operators, statements and control structures.	**a,b,c,d,e,i,l**	
3.0	To define classes and modules.	**3.1**	The students will be able to develop a program based on classes and modules	**a,b,c,d,e,f,i,k,l**	
4.0	To describe the Reflection and Meta programming.	**4.1**	The students will be able to generate a Meta programming.	**a,b,c,e,f,g,k,l**	
5.0	To deploy Ruby environment	**5.1**	The students will be able to design a Ruby environment	**a,b,c,d,e,f,g,i,k,l**	

UNIT I - BASICS OF RUBY PROGRAM	**(9)**
The Structure and Execution of Ruby Programs: Lexical Structure, Syntactic Structure, File Structure, Program Encoding, Program Execution. Datatypes and Objects: Numbers, Text, Arrays, Hashes, Ranges, Symbols, True, False, and Nil, Objects	
UNIT II - OPERATORS, STATEMENTS AND CONTROL STRUCTURES	**(9)**
Expressions and Operators: Literals and Keyword Literals, Variable References, Constant References, Method Invocations, Assignments. Operators. Statements and Control Structures : Conditionals, Loops, Iterators and Enumerable Objects, Blocks, Altering Control Flow, Exceptions and Exception Handling, BEGIN and END, Threads, Fibers, and Continuations	
UNIT III - METHOD, CLASSES AND MODULES	**(9)**
Parentheses, Method Arguments, Procs and Lambdas, Closures, Method Objects, Functional Programming. Classes and Modules : Defining a Simple Class, Method Visibility: Public, Protected, Private, Subclassing and Inheritance, Object Creation and Initialization, Modules, Loading and Requiring Modules, Singleton Methods and the Eigenclass, Method Lookup, Constant Lookup	
UNIT IV - REFLECTION AND METAPROGRAMMING	**(9)**
Reflection and Metaprogramming : Types, Classes, and Modules, Evaluating Strings and Blocks, Variables and Constants, Methods, Hooks, Tracing, ObjectSpace and GC, Custom Control Structures, Missing Methods and Missing Constants, Dynamically Creating Methods, Alias Chaining, Domain-Specific Languages	
UNIT V - RUBY PLATFORM AND ENVIRONMENT	**(9)**
The Ruby Platform: Strings, Regular Expressions, Numbers and Math, Dates and Times, Collections, Files and Directories, Input/Output, Networking, Threads and Concurrency. The Ruby Environment: Invoking the Ruby Interpreter, The Top-Level Environment, Practical Extraction and Reporting Shortcuts, Calling the OS, Security	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOK:

1. David Flanagan, Yukihiro Matsumoto, “The Ruby Programming Language”-Everything You Need to Know, O'Reilly Media, 2008.

REFERENCES:

1. Timothy Fisher, “Ruby on Rails Bible”, Wiley India Pvt. Ltd., 2009.
2. Chad Pytel, Tammer Saleh,”Rails AntiPatterns: Best Practice Ruby on Rails Refactoring”, 1st ed, Addison- Wesley, 2010.
3. David A. Black, “The Well-Grounded Rubyist”, Manning Publications, 2nd ed, 2014.
4. Peter Cooper, “Beginning Ruby: From Novice to Professional”, Apress, 3rd ed, 2016.

17ITX11 - PRINCIPLES OF CLOUD COMPUTING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To infer the basics of cloud computing	**1.1**	The students will be able to outline the basic terminologies of cloud computing	**a,e,f,g**	
2.0	To interpret the cloud virtualization techniques	**2.1**	The students will be able to outline the different virtualization techniques	**c,e**	
3.0	To know about cloud security.	**3.1**	The students will be able to apply security features to their cloud application	**c,e,f**	
4.0	To make use of Hadoop and Map Reduce.	**4.1**	The students will be able to able to experiment with Hadoop and Map Reduce	**c,e,f,i**	
5.0	To know the future of cloud	**5.1**	The students will be able to rephrase the extension of cloud in smart devices and also its future.	**g,l**	

UNIT I INTRODUCTION	**(9)**
Introduction – Characteristics of Cloud Computing – Overview of Cloud Application – Cloud Computing Architecture – Logical Architecture, Types of Clouds, Role of Standard. Cloud computing services – Scalability and Fault Tolerance.	
UNIT II CLOUD MANAGEMENT AND VIRTUALIZATION TECHNIQUES	**(9)**
Creating a virtualized architecture – Data Center, Data center Network Architecture. Concepts of Map Reduce- Fundamental concepts of compute Storage- Network Virtualization- Desktop and application Virtualization- Block and File level Storage Virtualization- Infrastructures Requirements- Benefits of Virtualization.	
UNIT III CLOUD SECURITY	**(9)**
Fundamentals- Cloud security services- Design principles- Policy implementation- Security challenges- Security Architecture- Public key infrastructure, Encryption key management, Digital certificates and Key managements. Market based management of clouds.	
UNIT IV HADOOP AND MAP REDUCE	**(9)**
Introduction- Data sources – Data Storage and Analysis – Comparison with other system- Case Study: The Apache HADOOP Project – Cluster Setting. Map Reduce – Weather Dataset – Analyzing the Data with UNIX Tools – Analyzing the Data with HADOOP – HADOOP Streaming- HADOOP Pipes.	

UNIT V THE FUTURE OF THE CLOUD	(9)
How the cloud will change operating systems- location – Intelligent Fabrics, paints - Future of Cloud TV- Future of Cloud based Smart Devices- Cloud and Mobile – Home based Cloud Computing- Business impact and Economics in Cloud.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Pankaj Sharma, Cloud Computing, S.K. Kataria & Sons Publisher of Engineering and Computer Books, 2013.
2. Kris Jamsa , Jones and Bartlett, "Cloud Computing SAAS , PaaS, IaaS, Virualization, Business Models, Security & more", Student Edition , 2014.

REFERENCES:

1. Kailash Jayaswal, Jagannath Kallakurchi, Donald J.Houde, Dr.Deven Shah , "Cloud Computing, Kogent Learning Solutions" , Indispensable Comprehensive Reference, 2014.
2. Michael Miller," Cloud Computing: Web-Based Applications that Change the Way You Work and Collaborate Online". Que Publishing, August 2008.

17ITX14 - SOFTWARE TESTING							
				L	T	P	C
				3	0	0	3
PRE REQUISITE : NIL			**QUESTION PATTERN: TYPE - III**				
COURSE OBJECTIVES AND OUTCOMES:							
Course Objectives		**Course Outcomes**		**Related Program outcomes**			
1.0	To outline the fundamental concepts of Software Quality.	**1.1**	The students will be able to apply the concepts in software testing.	**c,f,k,g**			
2.0	To illustrate knowledge about Software testing process flow and testing documents.	**2.1**	The students will be able to implement the concepts of manual testing.	**b,c,e,f**			
3.0	To study the management concepts and testing techniques.	**3.1**	The students will be able to design the test cases and to getting familiarity over major testing team process.	**e,f,g,i,k**			
4.0	To provide a complete coverage of functionality tools.	**4.1**	The students will be able to apply the testing tools exposure in real time applications.	**a,b,c,d,e,f,i,k,l**			
5.0	To develop test cases using test management tool	**5.1**	The students will be able to use the testing tools to check the behavior of the real time application using management tools.	**a,b,c,d,e,g,k,l**			
UNIT I - INTRODUCTION TO QUALITY AND SOFTWARE QUALITY							**(9)**
Introduction- Software Development Life Cycle (SDLC)-Historical Perspective of Quality-Definition of Quality-Total Quality Management-Continuous Improvement Cycle-Constraints of Software Quality Assessment-Customer is a King-Software Quality Management-Why software has defects?-Important Aspects of Quality Management-Types of Products-Quality Management System Structure-Pillars of Quality Management System							
UNIT II - FUNDAMENTALS OF SOFTWARE TESTING							**(9)**
Definition of Testing-Approaches to Testing-Popular Definitions of Testing-Testing during Development Life Cycle-Requirements Traceability Matrix-Essentials of Software Testing-Workbench-Important Features of Testing Process-Test Planning-Test Team Approach-Testing Process- Black Box Testing-White Box Testing.							
UNIT III - MANAGEMENT CONCEPTS AND TESTING TECHNIQUES							**(9)**
Configuration Management-Configurable Items-Base lining-Configuration Management Planning-Types of Software Risks-Handling of Risks in Testing- Unit Testing- Integration Testing – System Testing – User Acceptance Testing - SRS – Use case Design-Test Case Design-Bug Report Preparation							
UNIT IV - FUNCTIONALITY TOOL							**(9)**
Introduction to Silk Test-Silk Test Architecture-Automated Testing Process-Quick start with Silk Test-Configuring the settings-Exposure to Silk Test IDE-Plug and Play test case.							
UNIT V - TEST MANAGEMENT TOOL							**(9)**
Introduction-Testing Process-Specifying Testing Requirements-Planning Tests-Calling Tests with Parameters-Creating and Viewing Requirements Coverage-Generating Automated Test Scripts-Running Tests-Defining Test Sets							
TOTAL (L: 45) = 45 PERIODS							

TEXT BOOKS:

1. M.G.Limaye , Software Testing, Tata McGraw-Hill, 2009.
2. URL: www.onestoptesting.com/SilkTest
3. URL: www.onestoptesting.com/testdirector

REFERENCE:

1. Dr. K.V.K.K Prasad , Software Testing Tools, Dreamtech 2004.

17CSX19- SOFTWARE AGENTS *(Common to CSE and IT Branches)*					
			L	**T**	**P**	**C**
			3	**0**	**0**	**3**
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**				
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**		**Related Program outcomes**		
1.0	To understand the software agents that reduces information overhead.	**1.1**	The students will be able to define the characteristics of an intelligent agent.	**a,b,c,e,i,k,l**		
2.0	To gain knowledge in use of software agents for cooperative learning and personal assistance.	**2.1**	The students will be able to identify agents for learning and assistance.	**a,b,c,d,g,i,k,l**		
3.0	To know how agent can communicate and share knowledge using agent communication language.	**3.1**	The students will be able to describe the communication and collaboration among agents.	**a,b,c,g,i,k,l**		
4.0	To gain knowledge in design of an agent interpreter and intelligent agent.	**4.1**	The students will be able to understand Agent architectures.	**a,b,c,e,g,i,j,k,l**		
5.0	To understand the concept of mobile technology and mobile agents and its security.	**5.1**	The students will be able to use agent development environment to develop the project.	**a,b,e,i,j,k,l**		

UNIT I - AGENT AND USER EXPERIENCE	**(9)**
Agent Characteristics – Agent Types – Interacting with Agents – Agent from Direct Manipulation to Delegation – Interface Agent, Metaphor with Character – Designing Agents – Direct Manipulation versus Agent Path to Predictable.	
UNIT II - AGENTS FOR LEARNING AND ASSISTANCE	**(9)**
Agents for Information Sharing and Coordination – Agents that Reduce Work Information Overhead – Agents without Programming Language – Life like Computer Character – S/W Agents for Cooperative Learning – The M system.	
UNIT III - AGENT COMMUNICATION AND COLLABORATION	**(9)**
Overview of Agent Oriented Programming – Agent versus Object Oriented Programming – A Generic Agent Interpreter – Agent Communication Language – KQML – Applications – Agent Based Framework for Interoperability.	
UNIT IV - AGENT ARCHITECTURE	**(9)**
Agents for Information Gathering – Agent Organization – Knowledge of an Agent – Communication Language and Protocol – Query Processing – Open Agent Architecture – Communicative Action for Artificial Agent.	
UNIT V - MOBILE AGENTS	**(9)**
Mobile Agent Paradigm – Mobile Agent Concepts – Mobile Agent Technology – Programming Mobile Agents – Application of Mobile Agents – Teleshopping – Mobile Agent Security – Trust, Reliability and Reputation.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Jeffrey M.Bradshaw, "Software Agents", PHI Learning Private Limited, 2010.

REFERENCES:

1. Lin, Fuhua Oscar (Ed.), "Designing Distributed Learning Environments with Intelligent Software Agents", Information Science Publishing, 2004.
2. Knapik, Michael and Jay Johnson "Developing Intelligent Agents for Distributed Systems: Exploring Architecture, Technologies, and Applications", McGraw-Hill, 1998.
3. William R. Cockayne, Michael Zyda, "Mobile Agents", Prentice Hall, 1998.

17CSX11- HUMAN COMPUTER INTERACTION *(Common to CSE and IT Branches)*						
				L	**T**	**P**	**C**
				3	**0**	**0**	**3**
PRE REQUISITE : 17ITC05			**QUESTION PATTERN: TYPE - I**				
COURSE OBJECTIVES AND OUTCOMES:							
Course Objectives		**Course Outcomes**		**Related Program outcomes**			
1.0	To explain the fundamentals of human computer interaction.	**1.1**	The students will be able to explain the capabilities of both humans and computers from the viewpoint of human information processing	**a,c,d,e,h,i,j, l**			
2.0	To create awareness on various models for interaction.	**2.1**	The students will be able to describe the typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms	**a,b,d,e,i,j,l**			
3.0	To learn the design techniques and fundamentals of Human Computer Interaction (HCI).	**3.1**	The students will be able to apply an interactive design process, standards, guidelines and universal design principles to designing HCI systems.	**c,e,h,k,l**			
4.0	To know the various types of existing interfaces and evaluation techniques.	**4.1**	The students will be able to analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.	**e,h,j,l**			
5.0	To implement the applications of HCI in emerging trends.	**5.1**	The students will be able to analyze and discuss HCI issues in groupware, ubiquitous computing, virtual reality, multimedia, and Word Wide Web-related environments.	**c,d,e,g,k,l**			

UNIT I - THE HUMAN AND COMPUTER	**(9)**
The Human: Introduction – Input – output Channels – Human memory – Thinking: reasoning and problem – solving – Individual differences – Psychology and the design of interactive systems – The computer: Introduction – Text entry devices – Positioning – pointing and drawing – Paper: printing and scanning – Memory – Processing and	
UNIT II - INTERACTION AND INTERFACES	**(9)**
The Interaction: Introduction – Models of interaction – Frameworks and HCI – Ergonomics – Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interaction – Experience – Engagement and fun – Paradigms: Introduction – Paradigm for interaction – Expressive interfaces – models of emotions – interface	
UNIT III - DESIGNING RULES	**(9)**
Interaction design basics: Introduction – The process of design – User focus – Scenarios – Navigation design – Screen design and layout – Iteration and Prototyping – HCI in the software process: Introduction – The software life cycle – Usability engineering – Iterative design and prototyping – Design rationale – Design rules: Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns.	
UNIT IV - MODELS AND EVALUATION FRAMEWORK	**(9)**
Cognitive models: Introduction – Goal and task hierarchies – Linguistics models – The challenge of display – based systems – Physical and device models – cognitive architecture – Communication and collaboration model: Introduction – Face-to-face communication – Conversation – Text-based communication – Group working – Models of the system: Introduction – Standard formalisms – Interactive models – Continuous behavior.	

UNIT V - INTERFACING APPLICATIONS	(9)
Groupware: Introduction – Groupware systems – Computer-mediated communication – Meeting and decision support systems – Shared applications and artifacts – Frameworks for groupware – Implementing synchronous groupware – Hypertext – multimedia and the World Wide Web: Introduction – Understanding hypertext – Finding things – Web technology and issues – Static web content – Dynamic web content.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Alan Dix, Janet Finlay, Gregory D.Abowd and Russell Beale. Human-Computer Interaction, Prentice Hall, 3ed, 2004.

REFERENCES:

1. J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland and T. Carey. "Human-Computer Interaction" Addison Wesley, 1994.
2. Andrew Sears, Julie A. Jacko, "The Human-Computer Interaction Handbook Fundamentals, Evolving Technologies, and Emerging Applications", 2nded, Taylor & Francis Group, 2008.
3. Claude Ghaoui, "Encyclopaedia of Human Computer Interaction", Wiley, 2000.

17ITX17 - BUILDING ENTERPRISE APPLICATIONS					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITX06	**QUESTION PATTERN: TYPE - III**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To infer the basics of enterprise applications	**1.1**	The students will be able to outline the basics of enterprise applications.	**a,e,l**
2.0	To interpret the enterprise applications	**2.1**	The students will be able to demonstrate the enterprise applications further	**a,c**
3.0	To build engineering and intriguing of enterprise applications	**3.1**	The students will be able to experiment with various architectures and designs of enterprise applications	**a,c**
4.0	To develop enterprise applications	**4.1**	The students will be able to construct enterprise applications	**c,d,e,i**
5.0	To know about testing and rising of enterprise applications	**5.1**	The students will be able to measure the quality of enterprise applications	**h,k**

UNIT I INTRODUCTION **(9)**

Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications

UNIT II INCEPTING ENTERPRSIE APPLICATIONS **(9)**

Inception of enterprise applications, enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non-functional requirements, requirements validation, planning and estimation

UNIT III ARCHITECTING AND DESIGNING ENTERPRISE APPLICATIONS **(9)**

Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture-design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

UNIT IV CONSTRUCTING ENTERPRISE APPLICATIONS **(9)**

Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage

UNIT V TESTING AND ROLLING OUT ENTERPRISE APPLICATIONS **(9)**

Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu "Raising Enterprise Applications", John Wiley Publication 2015.(Unit 1 to 5)

REFERENCES:

1. Brett McLaughlin, “Building Java Enterprise Applications”, O'Reilly Media Publication 2002.
2. “Software Requirements: Styles & Techniques”, Addison-Wesley Professional.
3. “Software Systems Requirements Engineering: In Practice”, McGraw-Hill Osborne Media.
4. “Managing Software Requirements: A Use Case Approach”, Second Edition, Pearson Publication.
5. “Software Architecture: A Case Based Approach”, Pearson Publication.

17ITX19 - INFORMATION SECURITY MANAGEMENT					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To gain knowledge about the basics of information security	**1.1**	The students will be able to explain the Security Baselines	**a,c,j,k**	
2.0	To impart the fundamental concepts of security investigation	**2.1**	The students will be able to explain the Roles of Computer Forensics and the Law in Information Security	**a,c,j,k**	
3.0	To gain exposure about SDLC and its security	**3.1**	The students will be able to explainmanagement's role in information security	**a,b,c,j,k**	
4.0	To get knowledge about various security model	**4.1**	The students will be able to design programs involving security and privacy issues	**a,b,c,k**	
5.0	To learn about physical security in detail.	**5.1**	The students will be able to design without risk	**a,b,c,k**	

UNIT I - INTRODUCTION	**(9)**
Introduction – What is Information Security?- Critical Characteristics of Information-ISM Security Policy– ISM Framework – Key Element in ISM Framework –Components of an Information System-Securing the Components.	
UNIT II - SECURITY INVESTIGATION	**(9)**
Need for Security-NSTISSC Security Model–Balancing Security and Access– Threats –Attacks-Legal-Ethical-Professional Issues.	
UNIT III - ISRM-INFORMATION SECURITY RISK MANAGEMENT	**(9)**
Stages of ISRM-Identification-Risk Assessment Process-Treatment-Communication-Rinse and Repeat – Controlling Risk- SDLC–The Security SDLC.	
UNIT IV - LOGICAL DESIGN	**(9)**
Blueprint for Security- Information Security Policy-Standards and Practices- ISO 17799/BS 7799-NIST Models-VISA International Security Model- Design of Security Architecture-Planning for Continuity.	
UNIT V - PHYSICAL DESIGN	**(9)**
Security Technology-IDS-Scanning and Analysis Tools-Cryptography-Access Control Devices- Physical Security-Security and Personnel.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2012

REFERENCE:

1. Micki Krause, Harold F. Tipton,"Handbook of Information SecurityManagement", AuerbachPublications ,Sixth Edition,2006.

17ITX20 - FINITE AUTOMATA					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITC13		QUESTION PATTERN: TYPE - III			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		Course Outcomes		Related Program outcomes	
1.0	To provide an understanding of the basic concepts in theoretical computer science.	1.1	The students will learn the key properties of formal languages and finite automata	a,c,j,k	
2.0	To comprehend complex concepts and formal proofs in theoretical computer science in order to improve reasoning and problem solving skills.	2.1	The students will be able to design and describe the strings recognized by regular languages.	a,c,j,k	
3.0	To learn about context free grammar and how to develop context free grammar based on different normal forms.	3.1	The students will be able to understand the properties of context-free languages and grammars	a,b,c,j,k	
4.0	To study about the turing machine and push down automata.	4.1	The students will be able to design a turing machine and push down automata that accomplish a specific task.	a,b,c,k	
5.0	To understand about the different classes of problem.	5.1	The students will be able to demonstrate the undecidable and intractable classes of problems	a,b,c,k	

UNIT I - AUTOMATA	**(9)**
Introduction to finite automata(FA) – Central concepts of automata theory – Deterministic finite automata – Non deterministic finite automata – Finite automata with epsilon transitions – Equivalence between epsilon NFA and DFA - Minimization of automata.	
UNIT II - REGULAR EXPRESSIONS	**(9)**
Regular expressions(RE) - Manipulation of regular expressions - Equivalence between RE and FA - Inter conversion - Pumping lemma - Closure properties of regular sets – Decision properties of Regular Languages.	
UNIT III - CONTEXT FREE GRAMMAR	**(9)**
Context free Grammars (CFG) - Derivation trees - Ambiguity in Context-Free Grammars - Applications of Context Free Grammars - Normal Forms - Chomsky Normal Form (CNF) - Greibach Normal Form (GNF).	
UNIT IV - PUSH DOWN AUTOMATA AND TURING MACHINE	**(9)**
Push Down Automata (PDA) – Languages of PDA – Equivalence of PDA's and CFG's - Turing Machine, Programming techniques of Turing Machine – Types of Turing Machine.	
UNIT V - CLASSES OF PROBLEMS	**(9)**
A language that is not Recursively Enumerable – Universal Turing Machine – Rice's Theorem and properties of the Recursively Enumerable Languages – Post's Correspondence Problem (PCP) – Modified PCP – The Classes P and NP – An NP Complete Problem.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. John E Hopcroft, Rajeev Motwani, Jeffrey D Ullman,.," Introduction to Automata Theory, Languages, and Computation", 3rd Ed, Pearson, 2013.
2. John C Martin, "Introduction to Languages and the Theory of Computation", Fourth Edition, Tata McGraw Hill Publishing Company, New Delhi, 2010

REFERENCES:

1. Kamala Krithivasan and Rama. R, “Introduction to Formal Languages, Automata Theory and Computation”, Pearson Education 2009.
2. Lewis H.P. & Papadimitriou C.H.,” Elements of Theory of Computation”, Prentice Hall of India, 4th edition. 2007.
3. Mishra K L P and Chandrasekaran N, “Theory of Computer Science - Automata, Languages and Computation”, Prentice Hall of India, New Delhi, Third Edition, 2004.
4. Harry R Lewis, Christos H Papadimitriou, “Elements of the Theory of Computation”, Prentice Hall of India/Pearson Education, New Delhi, Second Edition, 2003.

17CSX20 - SOFTWARE QUALITY ASSURANCE *(Common to CSE and IT Branches)*					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**				
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**			**Related Program outcomes**	
1.0	To know the role and planning of quality assurance.	**1.1**	The students will be able tounderstand the quality and configuration management processes.		**a,b,i,l**	
2.0	To illustrate the software quality program concepts.	**2.1**	The students will be able todemonstrate the various activities of quality planning and quality control.		**a,j,l**	
3.0	To understand the software metrics for software quality and maintenance.	**3.1**	The students will be able toanalyze the software metrics and apply the quality tools in software development.		**a,b,i,l**	
4.0	To understand the software configuration management.	**4.1**	The students will be able toanalyze the software configuration standards and activities		**a,b,e,k,l**	
5.0	To learn about software quality assurance standards	**5.1**	The students will be able tocompare the ISO 9000 Model with SEI's CMM Level 5.		**a,e,h,l**	

UNIT I - FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE	**(9)**
The Role of SQA –Launching the SQA Program –SQA considerations –SQA people –Quality Management – Software Configuration Management-Defect Management	
UNIT II - SOFTWARE QUALITY PROGRAM	**(9)**
The Quality Challenges-Quality control v/s Quality Assurance-The SQA function- Quality management system-Quality Assurance-Software Quality Assurance Plans- Product Quality and Process Quality-Software Systems Evolution-Model for Software Product Quality.	
UNIT III - SOFTWARE QUALITY ASSURANCE AND METRICS	**(9)**
Software Measurement and Metrics-Defect Metrics-Metrics for Software Maintenance-Classification of Software Metrics-Requirement Related Metrics-Measurement Principles-Metrics implementation in Projects-planning for metrics program-Issues in Software Measurements and Metrics Program Implementation.	
UNIT IV - SOFTWARE CONFIGURATION MANAGEMENT	**(9)**
Overview-Configuration Management- Software Configuration Management Activities-Standards for Configuration Audit Functions-Personnel in SCM Activities- Software Configuration Management Pitfalls.	
UNIT V - SOFTWARE QUALITY ASSURANCE STANDARDIZATION	**(9)**
ISO 9001-The Origins of ISO 9000-ISO Standards Development Process-ISO 9001:2000-ISO Certification – Assessment/Audit Preparation-The Assessment Process-CMM and ISO-Types of Capability Maturity Models (CMMs)-The People Maturity Model (P-CMM).	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Narosa publishing house PVT Ltd, 2016.
2. Watts S Humphrey, "Managing the Software Process", 5th Indian Impression, Pearson Education, 2008.

REFERENCES:

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", BS Publications, Hyderabad, 2014.
2. Ian Sommerville, "Software Engineering", 10thed, Pearson Education, 2015.
3. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", 4th ed, Artech House Publishers, 2008

17ITX21 - KNOWLEDGE MANAGEMENT TECHNIQUES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To Learn the Evolution of Knowledge management.	**1.1**	The students will be to use the Knowledge management tools.	**c,j,k**	
2.0	To study the technologies for knowledge capturing /acquiring	**2.1**	The students will be to identify technologies that are most useful for capturing/acquiring, organizing, distributing, and sharing knowledge within an enterprise.	**c,j,k**	
3.0	To Learn about Knowledge management application	**3.1**	The students will be to develop knowledge management Applications.	**b,c,d**	
4.0	To expose to Applications.	**4.1**	The students will be to explain how to formulate a knowledge management strategy, identify major requirements	**b,c,d**	
5.0	To familiar with some case studies.	**5.1**	The students will be to design and develop enterprise applications.	**b,c,i**	

UNIT I – INTRODUCTION	**(9)**
Introduction: An Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.	
UNIT II - CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING	**(9)**
Organization and Knowledge Management - Building the Learning Organization. Knowledge Markets: Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance.	
UNIT III - KNOWLEDGE MANAGEMENT- THE TOOLS	**(9)**
Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.	
UNIT IV - KNOWLEDGEMANAGEMENT- APPLICATION	**(9)**
Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).	
UNIT V - FUTURE TRENDS AND CASE STUDIES	**(9)**
Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOK:

1. Srikantaiah,T.K.,Koenig,M.,"KnowledgeManagementfortheInformationProfessional"Information Today, Inc., 2000.

REFERENCE:

1. Nonaka,I.,Takeuchi,H.,"TheKnowledge-CreatingCompany:HowJapaneseCompaniesCreatethe Dynamics of Innovation", Oxford University Press, 1995.

17ITX22 - ENTERPRISE RESOURCE PLANNING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE – III**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To infer the basics of ERP	**1.1**	The students will be able to outline the overview and history of ERP	**a,c,e,f,i**
2.0	To know about ERP implementations	**2.1**	The students will be able to explain implementation strategies of ERP	**c,f,h**
3.0	To list out the supports provided for ERP	**3.1**	The students will be able to summarize the supports provided for ERP	**c,j,k**
4.0	To apply different ERP function modules	**4.1**	The students will be able to make use of different ERP function modules	**c,g**
5.0	To show the technology areas of ERP and for industries	**5.1**	The students will be able to classify the technology areas of ERP	**e,f,l**

UNIT I - INTRODUCTION	**(9)**
ERP overview – Definition of ERP – Need for an ERP- History of ERP Application- Benefits from an ERP system- ERP and Enterprise Applications- ERP A subset of enterprise applications	
UNIT II -ERP IMPLEMENTATIONS	**(9)**
ERP Implementation – Life cycle, methodologies and strategy – Business case and return on investment analysis for ERP- Selecting consulting partner- ERP package selection- ERP project team and project organization structure- ERP Project management- Managing requirements.	
UNIT III - ERP SUPPORT	**(9)**
Business process reengineering- Business process modelling and business modelling- Gaps identification and strategies to bridge the gap- Configuring and testing the solution- Managing ERP security- Data migration- Cut over planning and go live preparation- Training- Change management- Success and failure of ERP implementation	
UNIT IV -ERP FUNCTION MODULES	**(9)**
Human capital management- Financial management- Procurement and inventory management through ERP- Supplier relationship management- Production planning and execution- Supply chain planning- Sales and service- Logistics execution- Warehouse and transport management	
UNIT V -TECHNOLOGY AREAS OF ERP AND ERP FOR INDUSTRIES	**(9)**
CRM- Quality management- Maintenance management and enterprise asset management- Portal, Content management and Knowledge management- Data warehousing, Data mining, Business intelligence and analytics- ERP for different manufacturing industries.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Rajesh Ray, "ENTERPRISE RESOURCE PLANNING", TATAMcGRAW-HILL Edition, 2014.

REFERENCES:

1. Dr.P.C.Reddy, K.Viswaksena Reddy,"ENTERPRISE RESOURCE PLANNING", SK Kataria and Sons, 2012.
2. Ashim Raj Singla," ENTERPRISE RESOURCE PLANNING", Cengage learning, 2010.

17CSX22 - NATURAL LANGUAGE PROCESSING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		QUESTION PATTERN: TYPE -III			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		Course Outcomes		Related Program outcomes	
1.0	To know about tagging a given text with basic Language processing features.	1.1	The students will be able to tag text with basic Language processing features	a, b, c, d, e, h, j, k, l	
2.0	To learn about the application development using NLP components.	2.1	The students will be able to design an innovative application using NLP components.	a, b, c, d, e, h, i, j, k, l	
3.0	To comprehend the rule based system to start analyzing the morphology of a Language.	3.1	The students will be able to implement a rule based system to tackle morphology/syntax of a Language.	a, b, c, d, e, h, i, j, k, l	
4.0	To be familiar with designing a tag set to be used for statistical processing of an application.	4.1	The students will be able to design a tag set to be used for statistical processing keeping an application in mind.	a, b, c, d, e, h, i, j, k, l	
5.0	To propose a Statistical technique for a new application.	5.1	The students will be able to design a Statistical technique for a new application.	a, b, c, d, e, h, i, j, k, l	

UNIT I - INTRODUCTION	**(9)**
Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues - Applications - The role of machine learning - Probability Basics –Information theory – Collocations -N-gram Language Models - Estimating parameters and smoothing - Evaluating language models.	
UNIT II - MORPHOLOGY AND PART OF SPEECH TAGGING	**(9)**
Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields.	
UNIT III - SYNTAX PARSING	**(9)**
Syntax Parsing - Grammar formalisms and tree banks - Parsing with Context Free Grammars - Features and Unification - Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs.	
UNIT IV - SEMANTIC ANALYSIS	**(9)**
Representing Meaning – Semantic Analysis - Lexical semantics –Word-sense disambiguation - Supervised – Dictionary based and Unsupervised Approaches - Compositional semantics, Semantic Role Labeling and Semantic Parsing – Discourse Analysis.	
UNIT V - APPLICATIONS	**(9)**
Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering.	
	TOTAL (L: 45) = 45 PERIODS
TEXT BOOKS:	
1. Daniel Jurafsky and James H. Martin Speech and Language Processing (2nd Edition), Prentice Hall; 2nd ed., 2008. 2. Roland R. Hausser, Foundations of Computational Linguistics: Human- C o m p u t e r Communication in Natural Language, Paperback, MIT Press, 2011.	

17ITX25 - VIDEO PROCESSING AND ANALYTICS						
				L	T	P	C
				3	0	0	3
PRE REQUISITE : NIL			**QUESTION PATTERN: TYPE –I**			
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**		**Related Program outcomes**		
1.0	To learn the fundamental concepts of Java.	**1.1**	The students will be able to learn fundamental concepts of Java.	**a,b,e**		
2.0	To apply inheritance concepts using class.	**2.1**	The students will be able to design concepts with inheritance.	**a,b**		
3.0	To implement exception handling and Files.	**3.1**	The students will be able to implement exception handling and Files.	**a,b,e**		
4.0	To create threads and interfaces in Java classes.	**4.1**	The students will be able to create threads and interfaces in Java classes.	**a,b**		
5.0	To learn GUI and generics concepts	**5.1**	The students will be able to implement GUI and generics concepts.	**a,b,e**		

UNIT I VIDEO FORMATION AND REPRESENTATION	**(9)**
Video formation and representation: Color perception and specification - Video capture and display - Analog video raster - Analog color television systems - Digital video - Fourier analysis of video signals and frequency response of the human visual system- Mixing of Signals and colour perception - Chromaticity Diagram - Colour Television Camera - Colour TV Signals.	
UNIT II VIDEO SAMPLING	**(9)**
Video sampling: Basics of the lattice theory - Sampling over lattices - Sampling of video signals -Filtering operations in cameras and display devices. Video sampling rate conversion: Conversion of signals sampled on different lattices - Sampling rate conversion of video signals.	
UNIT III VIDEO MODELING & TWO DIMENSIONAL MOTION MODELS	**(9)**
Video Modeling: Camera Lenses, Auto Focus Systems, Camera Model - Illumination model – Object model - Scene model - Two dimensional motion models- Motion estimation and Compensation -Block Matching Method, Hierarchical Block Matching, Overlapped Block Motion and compensation, Pel-Recursive Motion Estimation, Mesh Based Method, Optical Flow Method	
UNIT IV SEGMENTATION & MOTION FIELD MODEL	**(9)**
Motion Segmentation - Thresholding for Change Detection, Estimation of Model parameters -Optical Flow Segmentation - Modified Hough Transform Method, Segmentation for Layered Video Representation- Bayesian Segmentation - Simultaneous Estimation and Segmentation- Motion Field Model, Restoration of Degraded Video and Film - InterFrame Coding	
UNIT V VIDEO ANALYTICS	**(9)**
Introduction: Video Analytics. Computer Vision: Challenges- Spatial Domain Processing – Frequency Domain Processing-Background Modeling-Shadow Detection-Eigen Faces - Object Detection-Local Features-Mean Shift: Clustering, Tracking - Object Tracking using Active Contours.	
TOTAL =45 PERIODS	

TEXT BOOKS:

1. Yao Wang, JornOstermann and Ya-Qin Zhang, *"Video Processing and Communications",* Prentice Hall, 2001.
2. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer, 2011
3. Al Bovik, *"Handbook of Image and Video Processing",* Academic Press, 2000.

REFERENCES:

1. Murat Tekalp,"*Digital Video Processing",*Pearson,1995
2. Dhake A.M, *"Television and Video Engineering",* Second Edition, McGraw-HillEducation, 2011

17MYB12 BASIC STATISTICS AND NUMERICAL ANALYSIS					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL		**QUESTION PATTERN: TYPE - IV**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	Understanding of statistical fundamentals to interpret data	**1.1**	The students will be able to use statistical tools to solve problems from different fields.		**a,i,l**
2.0	Find numerical approximations to the roots of an equation by Newton method, numerical solution to a system of linear equations by Gaussian Elimination and Gauss-Seidel.	**2.1**	The students will be able to acquaint the basic concepts in numerical methods and their uses.		**a,k,l**
3.0	Find the Lagrange Interpolation Polynomial for any given set of points.	**3.1**	The students will be able to represent the data and find the intermediate values, when huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial.		**a,e,l**
4.0	Apply several methods of numerical integration, including Romberg integration.	**4.1**	The students will be able to explain the consequences of finite precision and the inherent limits of the numerical methods considered and by using differentiation and integration.		**a,c,d,l**
5.0	Find numerical solution of a differential equation by Euler's, Predictor Corrector and Runge-Kutta Methods	**5.1**	The students will be able to understand the solution of ordinary differential equations will be useful in attempting any engineering problem.		**a,i,l**

UNIT I - BASIC STATISTICS	**(9)**
Measures of central tendency-Arithmetic mean and its properties, weighted arithmetic mean, Geometric mean, Harmonic mean, Median, Mode.	
UNIT II - SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS	**(9)**
Solution of equation – Newton Raphson method – Solution of linear system by Gaussian elimination and Gauss – Jordon method – Iterative methods: Gauss-Seidel method.	
UNIT III - INTERPOLATION AND APPROXIMATION	**(9)**
Divided differences in unequal intervals – Lagrangian Polynomials — Newton's forward and backward difference formulas for equal intervals.	
UNIT IV - NUMERICAL DIFFERENTIATION AND INTEGRATION	**(9)**
Numerical Differentiation using interpolation formulae – Numerical integration by Trapezoidal and Simpson's 1/3 rule – Romberg's method – Two and Three point Gaussian quadrature formulae.	
UNIT V - INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	**(9)**
Single step methods: Taylor series method – Euler's method for first order equation – Fourth order Runge – Kutta method for solving first order equations – Multistep methods: Milne's predictor and corrector methods.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. S.C.Gupta and V. K. Kappor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 11th ed., 2002.
2. T. Veerarajan and T. Ramachandran., "Numerical Methods with programming in C", 2nd ed., Tata McGraw-Hill, 2006, First reprint 2007.
3. P. Kandasamy, K.Thilagavathy and K. Gunavathy, "Numerical Methods – Vol: IV", S.Chand & Co. Ltd. New Delhi, 2003, Reprint 2007.

REFERENCES:

1. C.F Gerald and P.O Wheatley, "Applied Numerical Analysis", 7th ed., Pearson Education Asia, New Delhi 2007.
2. K. Sankar Rao, "Numerical Methods for Scientists and Engineers", 3rd ed., Prentice Hall of India, New Delhi, 2007, 10th reprint 2012.
3. E. Balagurusamy, "Numerical Methods", Tata McGraw-Hill, New Delhi, 1999, 25th Reprint 2008.
4. M.K Venkatraman, "Numerical Methods" National Publication, New Delhi, 2000, Reprint 2005.
5. B.S.Grewal, "Numerical Methods in Engineering & Science", Khanna Publisher, New Delhi, 2012.

17ITX26- PROBLEM SOLVING AND ALGORITHMIC SKILLS					
		L	T	P	C
		3	0	0	3
PREREQUISITE: NIL		**QUESTION PATTERN : TYPE – 1**			
COURSE OBJECTIVES AND OUTCOMES					
Course Objectives		**Course Outcomes**		**Related Program Outcomes**	
1.0	To impart fundamental concepts of OOP using python	**1.1**	The students will be able to understand the basics of object oriented concepts in python.	**a,c,l**	
2.0	To gain exposure about inheritance and polymorphism	**2.1**	The students will be able to develop applications using inheritance and polymorphism	**a,b,c,d,e,k,l**	
3.0	To understand the abstract data types and tree data structures	**3.1**	The students will be able to implement the ADTs and trees	**a,b,c,d,e,k,l**	
4.0	To see how graphs and heaps can be used to solve a wide variety of problems	**4.1**	The students will be able to design graph abstract data type and heap	**a,b,c,d,e,k,l**	
5.0	To understand the sorting techniques and shortest path algorithms.	**5.1**	The students will be able to implement the sorting techniques and shortest path algorithms.	**a,b,c,d,e,k,l**	

UNIT I - MOTIVATION OF FUNDAMENTAL CONCEPT IN PROGRAMMING	**(9)**
Implementation of Classes and Objects in Python - Class Attributes and Instance Attributes - 'self ' parameter - Static Methods and Instance Methods - init() method	
UNIT II - ADVANCED FEATURES IN CONCEPT OF PROGRAMMING	**(9)**
Performing Abstraction and Encapsulation in Python - Single Inheritance - Multiple Inheritance - Multilevel Inheritance - Public, Protected and Private - Naming Conventions. Polymorphism- Overriding and the super() method - Diamond Shape Problem in Multiple Inheritance - Overloading an Operator - Implementing an Abstract Base Class (ABC)	
UNIT III - INTRODUCTION TO ALGORITHMIC THINKING AND PEAK FINDING	**(9)**
Array data structure - Linked List Data Structure and Its Implementation - Stacks and Queues - Binary Search Trees - Balanced Trees: AVL Trees and Red-Black Trees	
UNIT IV - MAPPING VALUES AND PRINCIPLE OF OPTIMALITY	**(9)**
Heaps - Heapsort Algorithm - Associative Arrays and Dictionaries - Ternary Search Trees as Associative Arrays - Basic Graph Algorithms - Breadth - First And Depth - First Search - Spanning Trees	
UNIT V - ANALYZING NUMBER OF EXCHANGES IN CRAZY-SORT	**(9)**
Shortest Path Algorithms, Dijkstra's Algorithm - Bellman-Ford Algorithm - Kruskal Algorithm - Sorting Algorithms- Bubble Sort, Selection Sort and Insertion Sort - Quicksort and Merge Sort, Non-Comparison Based Sorting Algorithms, Counting Sort and Radix Sort	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Dusty Phillips, Python 3 Object-oriented Programming, Packt Publishing, Second Edition.
2. Bradley N. Miller, David L. Ranum,- Problem Solving with Algorithms and Data Structures Using Python, Franklin, Beedle & Associates, 2011.

REFERENCES:

1. Mark Summerfield - Programming in Python 3, Pearson Education, 2nd Edition
2. Michael T. Goodrich, Irvine Roberto Tamassia, Michael H. Goldwasser, - Data Structures and Algorithms in PythonII, 2013 edition.

17CSX31- PROBLEM SOLVING AND PROGRAMMING					
		L	T	P	C
		3	0	0	3
PREREQUISITE : 17CSC01 / 17CSC02		**QUESTION PATTERN : TYPE 1**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program Outcomes**
1.0	To gain knowledge about the basics of programming	**1.1**	The students will be able to understand the basics of Python Programming constructs.		**a,c,l**
2.0	To gain exposure about selection structure	**2.1**	The students will be able to design programs involving selection structure		**a,b,c,d,l**
3.0	To get knowledge about repetition structure, function and modules	**3.1**	The students will be able to design programs involving function, modules and loops.		**a,b,c,d,k,l**
4.0	To gain exposure about string	**4.1**	The students will be able to realize the need of strings.		**a,b,c,d,k,l**
5.0	To get knowledge about mutable and Immutable types	**5.1**	The students will be able to realize the need of list, tuples and dictionary.		**a,b,c,d,k,l**

UNIT I - INTRODUCTION TO BASICS OF PROGRAMMING	**(9)**
Basics - Variables and Assignment - Basic Data Types- Comments - Operators - print() - Floats	
UNIT II - SELECTION STRUCTURE	**(9)**
Introduction to Selection Structure - if statements, else statements, nested elif statements, truthy and falsey values, Control Structure	
UNIT III - VALUE – REPETITION AND RETURNING STRUCTURE	**(9)**
Loops - while loops, for loops - Nested Loops - Functions - modules - variable scope	
UNIT IV - DATA AND STRING PROCESSING	**(9)**
Strings - Accessing the Strings - Traversing the Strings - Working with Strings - Formatting Strings	
UNIT V - MUTABLE AND IMMUTABLE TYPES AND METHODS	**(9)**
Introduction to lists, indexing and slicing of list, del and list methods, Tuples, Dictionary and its methods.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Dr. R. Nageswara Rao, ―Core Python Programming, Dreamtech Press, 2017 Edition.
2. Reema Thareja - Problem Solving and Programming – Python, Oxford University Press, 2nd Edition.

REFERENCE:

1. Wesley J. Chun, ―Core Python Programming, Pearson Education, 2nd edition, 2010.

17CSX29 INTERNET OF THINGS
(Common to CSE and IT Branches)

	L	T	P	C
	3	0	0	3

PRE REQUISITE : 17ITC05 | **QUESTION PATTERN: TYPE - I**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To learn the microcontroller architecture and the basic issues, policy and challenges in the Internet	**1.1**	The students will be able to explain the internal architecture of microcontroller and the concepts and the cause of technology.	**a,k,l**
2.0	To understand the components and the protocols in Internet	**2.1**	The students will be able to classify the sensors and controller as part of IoT.	**a,b,c,e,j,k,l**
3.0	To build a communication technologies with the internet	**3.1**	The students will be able to plan a communication framework with fog computing.	**a,b,c,k,l**
4.0	To apply the various data analytical and visualization tools.	**4.1**	The students will be able to plan the data analytical and data visualization platforms	**a,b,c,d,e,g,j,k,l**
5.0	To learn to manage the security concerns in IoT.	**5.1**	The students will be able to discover knowledge on security in IoT.	**a,b,c,d,e,f,g,h, l**

UNIT I - INTRODUCTION TO IOT AND MICROCONTROLLER **(9)**

Basics of Embedded Systems - Definition of IoT - Evolution of IoT - IoT and related terms – Key Drivers of IoT Discipline – The Diversity of IoT data sources – Architecture of 8051 – 8051 Addressing modes – Interfacing of LCD, Sensors and Servo motor – Popular M2M applications – Emerging IoT Flavors.

UNIT II - ELEMENTS AND IOT GATEWAYS **(9)**

Introduction to Elements of IoT - Sensors & Actuators - Gateways - Layered architecture of IoT - IoT Communication Model – 6LoWPAN – Mobile Technologies for IoT.

UNIT III - COMPUTING AND CONNECTING TECHNOLOGIES **(9)**

Cloud Computing in IoT – Introduction of Fog/Edge Computing – Use Cases of Fog/Edge computing - IoT Communication protocol requirements - BLE,ZigBee , Z-Wave - LPWAN – Sigfox - LoRa – Cloud Connectivity

UNIT IV - DATA ANALYTICS AND IOT PLATFORMS **(9)**

Big Data Analytics - Real Time and Streaming Analytics – Key Drivers for IoT Data analytics – Emergence of Edge Clouds – Renowned Edge Analytics Use Cases - Data Visualization Platform – Modules of IoT Data Analytics Platform

– Renowned Use Cases for IoT Data Analytics.

UNIT V - SECURITY CONCERNS OF IOT PLATFORM **(9)**

Security Requirements of an IoT Infrastructure – AAA Framework – Security concerns of Cloud Platforms – Security concerns in IoT components – Smart Use Cases of IoT.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Pethuru Raj and Anupama C.Raman, "The Internet of Things – Enabling Technologies, Platforms and Use Cases", CRC Press, 2017.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", 2nd ed., Pearson education, 2011.

REFERENCES:

1. Raj Kamal, "Internet of Things Architecture and Design Principles", Tata McGraw Hill Edition, Tata McGraw Hill Publication, 2017.
2. Fortino, Giancarlo, Liotta, Antonio, "Internet of Things", Springer.

17ITX28 AGILE SOFTWARE DEVELOPMENT					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand the fundamental concepts of agile	**1.1**	Deploy automated build tools and continuous integration	**c,d**	
2.0	Learn the different concepts involved in scrum framework	**2.1**	Explain the concepts of agile scrum framework	**c,d,e**	
3.0	Understand the different agile testing methodologies	**3.1**	Drive development with unit tests using Test Driven Development	**c,d,e**	
4.0	Learn the principles of agile development process	**4.1**	Apply design principles and refactoring to achieve Agility	**c,d**	
5.0	Understand the role of agile in different fields	**5.1**	Deploy different industrial trends of agile technologies	**c,d**	

UNIT I – FUNDAMENTALS OF AGILE	**(9)**
The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools	
UNIT II - AGILE SCRUM FRAMEWORK	**(9)**
Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management	
UNIT III - AGILE TESTING	**(9)**
The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester	
UNIT IV - AGILE SOFTWARE DESIGN AND DEVELOPMENT	**(9)**
Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control	

UNIT V - INDUSTRY TRENDS	(9)
.Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies	
TOTAL (L: 45) = 45 PERIODS	

REFERENCES:

1. www.it-ebooks.info/tag/agile
2. http://martinfowler.com/agile.html
3. Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, Pearson Publication
4. Lisa Crispin, Janet Gregory, ”Agile Testing: A Practical Guide for Testers and Agile Teams”, Addison Wesley publication
5. Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, Prentice Hall
6. Alistair Cockburn, “Agile Software Development: The Cooperative Game”, Addison Wesley publication
7. Mike Cohn, “User Stories Applied: For Agile Software”, Addison Wesley publication

17ITX29 IT OPERATIONS (Common to CSE and IT Branches)					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL		**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand the basics of IT operations and differentiate IT Operation Management & IT Service Management.	**1.1**	The student will be able to identify the operation policies and procedures.	**a,b,c,d,g,l**	
2.0	To learn policies and procedures to achieve a safe working environment in terms of health and safety regulations.	**2.1**	The student will be able to apply the Corporate Etiquettes and make the working environment safer.	**c,d,f,g,h,i,l**	
3.0	To know the basic principles of an Organization in IT Operations.	**3.1**	The student will be able to recognize the Key Concepts of Service Management in IT - enabled services.	**a,b,c,d,g,i,l**	
4.0	To learn the basics of information security in IT environments.	**4.1**	The student will be able to design IT infrastructure and security mechanism in networks.	**a,b,c,d,e,f,g,h,l**	
5.0	To learn the basics of Microsoft 365 in IT Operations.	**5.1**	The student can Implement the policies in Microsoft 365.	**a,b,c,d,e,f,g,l**	

UNIT I - IT OPERATIONS	**9**
IT Operation Definition - Roles & Responsibilities of IT Operations - IT Monitoring - IT operations Management - Responsibilities of IT operations Management. IT Service Management: IT Service Management Best Practices - The Service Life Cycle(Service Strategy - Service Design - Service Transition - Service Operation - Continual Service Improvement) Functions of IT Service Management (Incident Management, Event Management, Request fulfillment, Problem Management, Change Management, Availability Management - The Service Desk) - Escalation & Governance Management.	
UNIT II - HEALTHY SAFE AND SECURE WORKING ENVIRONMENT & ETIQUETTE	**9**
Health and Safety Essentials - Control and Management Systems - Facilities Management and Ergonomics - Managing Equipment - Managing Material. Etiquette: Professionalism in Relationships - First Impressions - Conducting Yourself in a Working Environment - Make Your Work Place Healthy - Dinning Etiquette - Elevator Etiquette - Cafeteria Etiquette - Meeting Etiquette - Telephone Etiquette - Dealing with Difficult People and Conflicting Situations.	
UNIT III - ITIL	**9**
Introduction –Understanding ITIL Guiding Principles in an Organization–Optimize and Automate – Four Dimensions of Service Management – Key Activities of the Service Value Chain	

UNIT IV - IT INFRASTRUCTURE & INFORMATION SECURITY	9
Definition - Components of IT Infrastructure (Hardware, Software, Network) - Types of IT infrastructure (Traditional, Cloud, Hyperconverged)- Risk, Response and Recovery: Risk Management and Information Security - The Risk Management Process - Business Continuity Management - Backing Up Data and Applications - Incident Handling - Recovery From a Disaster.	
UNIT V – AMS & Tools	**9**
Introduction – Support Models – Activities Type – Audits – Microsoft 365 – Domain Management – Licensing – Managing Teams – Meeting Policies – Messaging Policies	
TOTAL (L:45) : 45 PERIODS	

REFERENCE BOOKS:

1. IT Service Management Support for your ITSM Foundation exam by John Sansbury, Ernest Brewster, Aidan Lawes, Richard Griffiths.
2. Managing Health, Safety and Working Environment Revised Edition: Management Extra 1st Edition by Elearn
3. Everything About Corporate Etiquette by Vivek Bindra
4. AXELOS, "ITIL® Foundation ITIL 4 Edition", TSO, 2019
5. Fundamentals of Information Systems Security 3rd Edition by David Kim, Michael G. Solomon
6. https://docs.microsoft.com/en-us/learn/m365/

17ITX30 ADVANCED IT OPERATIONS (Common to CSE and IT Branches)					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL		**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand basic concepts of cloud platform & design intelligent Cloud Services and Applications.	**1.1**	The student will be able to Recognize the essentials of Cloud Computing.	**a,b,c,e,g,i,k,l**	
2.0	To explore the concepts of Map Reduce Programming.	**2.1**	The student will be able to work with Big Data Platform and its Use cases	**a,b,c,d,e,f,i,k,l**	
3.0	To introduce the basic concepts and techniques of Machine Learning, Deep Learning and Artificial Intelligence.	**3.1**	The student will be able to use ML and other AI technologies to automate the identification and Resolution of common IT issues.	**a,b,c,d,e,i,k**	
4.0	To understand the key concepts of intelligent automation.	**4.1**	The student will be able to identify different types of Variables, control flow and data table automation.	**a,b,c,d,e,f,g,h,i,j,k,l**	
5.0	To learn how to use ServiceNow to manage IT tasks at any organization.	**5.1**	The student will be able to do Site Reliability Engineering and to do simulation using SeriveNow.	**a,b,c,e,f,g**	

UNIT I - CLOUD COMPUTING	**8**
Introduction – Characteristics of Cloud computing – Architecture – Types – Service Models – SaaS, IaaS, PaaS – Regions – Cloud Security	
UNIT II - BIG DATA & DATA SCIENCE	**10**
Introduction – Data science and Challenges – HDFS & Hadoop – Structured and Unstructured data – Processing Big Data – Supervised & Unsupervised Learning – Text Analysis – Data visualization	
UNIT III - AI/ML & AIOps	**10**
Introduction – Structure of Intelligent Agents – Knowledge and Reasoning – Machine Learning – Deep Learning – Applications of AI – AIOps Technologies – AIOps Benefits – Implementation.	
UNIT IV - ROBOTIC PROCESS AUTOMATION (RPA)	**8**
Introduction – Variables – Control flow – Data Tables and Excel Automation – UI Automation – Selectors – Email Automation	
UNIT V - SRE & SERVICENOW	**9**
Introduction – Adopting a DevOps & SRE Model – SRE vs DevOps – Architecture & Lifecycle – Practices – Error Budgets – Toil Management – DevOps Tools – Introduction to ServiceNow – Reporting & Managing Issue – Benefits.	
TOTAL (L:45) : 45 PERIODS	

REFERENCE BOOKS:

1. Cloud Computing: Concepts, Technology & Architecture by Erl, Thomas, Puttini, Ricardo, Mahmood, Zaigham
2. Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem (Addison-wesley Data & Analytics Series) 1st Edition, Kindle Edition by Douglas Eadline
3. EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley, 2015.
4. Machine Learning in the AWS Cloud - Add Intelligence to Applications with Amazon Sage Maker and Amazon Recognition By Abhishek Mishra
5. Deep Learning for Vision Systems By Mohamed Elgendy ·
6. Learning Robotic Process Automation - Create Software Robots and Automate Business Processes with the Leading RPA Tool – UiPath By Alok Mani Tripathi
7. Ui Path, "RPA Design and Development", UiPath Academic Alliance Resource.
8. Hands-on Site Reliability Engineering - Build Capability to Design, Deploy, Monitor, and Sustain Enterprise Software Systems at Scale By Shamayel Mohammed Farooqui Vishnu Vardhan Chikoti.
9. Tim Woodruff, "Learning ServiceNow", 2nd Edition, 2018

17ITX31 – PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP				
L	T	P	C	
1	0	4	3	
PREREQUISITE : NIL	**QUESTION PATTERN : TYPE -NIL**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To give practice to access the resources, gain knowledge about the technology used and list the ideas for project in the chosen domain.	**1.1**	The students will be able to access the resources, gain knowledge about the technology used and list the ideas for project in the chosen domain.	**a,b,c,d,e,f,g,h,i,j, k,l**
2.0	To develop an ability to propose a solution document fit to the problem, prepare Solution Architecture, Data Flow Diagram and Technology Architecture.	**2.1**	The students will be able propose a solution document fit to the problem, prepare Solution Architecture, Data Flow Diagram and Technology Architecture.	**a,b,c,d,e,f,g,h,i,j, k,l**
3.0	To prepare milestones and tasks, sprint schedules, coding and Testing.	**3.1**	The students will be able to prepare milestones and tasks, sprint schedules, coding and Testing.	**a,b,c,d,e,f,g,h,i,j, k,l**

PHASE I – PREPARATION PHASE	**(3+3)**
Access the resources - Join the mentoring channel - Register on IBM academic Initiative - Create Github account – Setup the System based on pre-requisites.	
PHASE II – IDEATION PHASE	**(3+15)**
Literature Survey – Technology Trainings – Empathy Canvas map Preparation – List the ideas.	
PHASE III – PROJECT DESIGN PHASE - I	**(3+9)**
Proposed solution document preparation – Problem solution fit - Solution Architecture Preparation.	
PHASE IV – PROJECT DESIGN PHASE - II	**(3+9)**
Requirement Analysis - Customer Journey – Data Flow Diagrams – Technology Architecture.	
PHASE V – PROJECT PLANNING PHASE	**(3+3)**
Milestones and Tasks preparation – Sprint Schedules	
PHASE VI – PROJECT DEVELOPMENT PHASE	**(0+21)**
Coding & Solutioning – Acceptance Testing – Performance Testing	
TOTAL (T:15+P:60) = 75 PERIODS	

17CSX05 NETWORK ANALYSIS AND MANAGEMENT					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17CSC08	**QUESTION PATTERN: TYPE - I**				

COURSE OBJECTIVES AND OUTCOMES:

Course objectives		Course outcomes		Related program outcomes
1.0	To be familiar with basics of network design and requirement analysis.	**1.1**	The students will be able to explain basics of network design and requirement analysis.	**a,b,c,e,g,h,i, j,l**
2.0	To understand the network flow analysis.	**2.1**	The students will be able to apply a range of techniques for characterizing network structure.	**a,b,c,i,j,k,l**
3.0	To be aware of network logical design.	**3.1**	The students will be able to explain the methodologies for developing logical design of networks.	**a,b,c,e,f,g,h, i,j,k,l**
4.0	To understand network management and security concepts.	**4.1**	The students will be able to explore the network management and security concepts.	**a,b,c,d, g,h,i,j,k,l**
5.0	To understand network physical design and routing.	**5.1**	The students will be able to apply network physical design and routing for building networking applications.	**a,b,c,d,e,f, h,j,k,l**

UNIT I - A SYSTEM APPROACH TO NETWORK DESIGN AND REQUIREMENT ANALYSIS	**(9)**
Introduction- Overview Of Analysis, Architecture And Design Process –System Methodology - System Description - Service Description - Service Characteristics-Performance Characteristics; User Requirements-Application Requirements-Device Requirements-Network Requirements –Requirement Analysis: Guidelines –Requirements Gathering And Listing-Developing Service Metrics To Measure Performance –Characterizing Behavior-Developing RMA Requirements.	
UNIT II - FLOW ANALYSIS: CONCEPTS, GUIDELINES AND PRACTICE	**(9)**
Background-flows-identifying and developing flows- data sources and sinks-flow model – flow prioritization – flow specification- examples of applying flow specs-case study.	
UNIT III - NETWORK ARCHITECTURE	**(9)**
Background- component architectures-reference architecture-architecture models- systems and network architectures; addressing and routing architecture-addressing mechanisms-routing mechanisms-address strategies-routing strategies- architectural considerations.	
UNIT IV- MANAGEMENT ARCHITECTURE AND PERFORMANCE ARCHITECTURE	**(9)**
Network Management Mechanisms- Architectural Considerations; Performance Architecture-Goals- Performance Mechanisms-Architectural Considerations	
UNIT V - SECURITY, PRIVACY AND NETWORK DESIGN	**(9)**
Developing a security and privacy plan- security and privacy administration- security and privacy mechanisms-architectural considerations; design concepts- design process- vendor, equipment and service-provider evaluations-network layout- design traceability- design metrics.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. James. D. Mccabe, “Practical Computer Network Analysis and Design”, 3rd ed., Morgan Kaufaman, 2014.

REFERENCES:

1. J. Radz,”Fundamentals of computer network analysis and engineering: basic approaches for solving problems in the networked computing environment”, universe, 2005.
2. Laura Chappell and Gerald Combs, “Wireshark 101: Essential Skills for Network Analysis”, Kindle Edition, 2013.

17CSX30 AGILE METHODOLOGIES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course objectives		**Course outcomes**		**Related program outcomes**	
1.0	To provide students with a theoretical as well as practical understanding of Agile software development practices and how small teams can apply them to create high-quality software	**1.1**	The student will able to interact with business stakeholders in determining the requirements for a software system.	**a,b,c,d,j,k**	
2.0	To provide a good understanding of software design and a set of software technologies and APIs	**2.1**	The student will able to perform iterative software development processes: how to plan them, how to execute them.	**a,b,j,k**	
3.0	To do a detailed examination and demonstration of Agile development and testing techniques	**3.1**	The student will able to point out the impact of social aspects on software development success.	**a,b,c,j,k**	
4.0	To understand the benefits and pitfalls of working in an Agile team	**4.1**	The student will able to develop techniques and tools for improving team collaboration and software quality.	**a,b,c,j,k**	
5.0	To understand Agile development and testing	**5.1**	The student will be able to perform Software process improvement as an ongoing task for development teams.	**a,c,k**	

UNIT I:AGILE METHODOLOGY	**(9)**
Theories for Agile Management –Agile Software Development –Traditional Model vs. Agile Model -Classification of Agile Methods –Agile Manifesto and Principles –Agile Project Management –Agile Team Interactions –Ethics in Agile Teams -Agility in Design, Testing –Agile Documentations Agile Drivers, Capabilities and Values.	
UNIT II: AGILE PROCESSES	**(9)**
Lean Production -SCRUM, Crystal, Feature Driven Development-Adaptive Software Development - Extreme Programming: Method Overview –Lifecycle –Work Products, Roles and Practices.	
UNIT III: AGILITY AND KNOWLEDGE MANAGEMENT	**(9)**
Agile Information Systems –Agile Decision Making -Earls' Schools of KM Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging –KM in Software Engineering –Managing Software Knowledge –Challenges of Migrating to Agile Methodologies –Agile Knowledge Sharing –Role of Story-Cards – Story-Card Maturity Model (SMM).	
UNIT IV: AGILITY AND REQUIREMENTS ENGINEERING	**(9)**
Impact of Agile Processes in RE–Current Agile Practices –Variance –Overview of RE Using Agile –Managing Unstable Requirements –Requirements Elicitation –Agile Requirements Abstraction Model –Requirements Management in Agile Environment, Agile Requirements Prioritization –Agile Requirements Modeling and Generation –Concurrency in Agile Requirements Generation.	

UNIT V: AGILITY AND QUALITY ASSURANCE	(9)
Agile Product Development –Agile Metrics –Feature Driven Development (FDD) –Financial and Production Metrics in FDD – Agile Approach to Quality Assurance -Test Driven Development –Agile Approach in Global Software Development.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. David J. Anderson and Eli Schragenheim, "Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results", Prentice Hall, 2003.
2. Hazza and Dubinsky, "Agile Software Engineering, Series: Undergraduate Topics in Computer Science", Springer, 2009.

REFERENCES:

1. CraigLarman, —Agile and Iterative Development: A manager s Guide, Addison-Wesley, 2004.
2. .Kevin C. Desouza, —Agile information systems: conceptualization, construction, and management, Butterworth- SHeinemann, 2007.

17ITX32- TEST DRIVEN PROGRAMMING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil					
COURSE OBJECTIVES AND OUTCOMES:					
Course objectives		**Course outcomes**		**Related program outcomes**	
1.0	To understand Object Oriented Programming concepts and basic characteristics of Java	**1.1**	The students will be able to implement fundamental concepts of Java.	**a,b,c,e,g,h,i, j,l**	
2.0	To gain exposure about Abstract classes and collection framework	**2.1**	The students will be able to develop applications using Abstract classes and collection framework	**a,b,c,i,j,k,l**	
3.0	To develop a java application with multiple threads and to access database through Java programs, using Java Data Base Connectivity (JDBC)	**3.1**	The students will be able to access database through Java programs, using Java Data Base Connectivity (JDBC)	**a,b,c,e,f,g,h, i,j,k,l**	
4.0	Design and develop Web applications	**4.1**	The students will be able to Design and develop Web applications	**a,b,c,d, g,h,i,j,k,l**	
5.0	To know about Servlet, XML and AJAX	**5.1**	The students will be able to apply servlets and AJAX for their web development	**a,b,c,d,e,f, h,j,k,l**	

UNIT I - JAVA FUNDAMENTALS	**(9)**
Java Architecture, Environment Setup, Variables, Data Types, Assignment, Operators. **Flow Control Statements**: If statement, If--Else Statement, Nested--If Statement, Switch Statement, While Statement, For Loop Statement, Enhanced For Loop Statement, Do while loop, Break and Continue Statement. **Arrays:** One dimensional and Two Dimensional Array. **OOPS / Inheritance:** Classes and Objects, Constructor, Return Statements. Encapsulation/Abstraction, Inheritance, Overriding/Polymorphism, Method Overloading, Garbage Collection, String, String Buffer. **Eclipse Overview:** Creating packages, classes, Adding Jar Files, Setting eclipse Preferences, Refactoring renaming classes or interfaces	
UNIT II - COLLECTION AND ABSTRACTION	**(9)**
Abstraction /Packages / Exception Handling: Abstract Classes, Final Keyword, Packages-import, Interfaces, Introduction to Exception Handling, Exception types, Try and Catch Block, Throws, Throw clause, Finally clause, Runtime exception. **Wrapper Classes:** Autoboxing, Unboxing and Cloneable Interface **I/O Streams:** Introduction to I/O, I/O Operations, Object Serialization **Collection Framework:** Introduction to Collection, List, Array Lists, Linked Lists, Sorting Lists, Using Iterators, Generics, Set, Map, HashMap, SortedMaps, Using Custom Objects, Map	
UNIT III - TEST CASES AND DATABASE CONNECTIVITY	**(9)**
Junit: Introduction to Junit, Junit Features, Junit with Eclipse, Assert Methods, Annotations, Test Suite, Introduction to Mockito **Multithreading I / II:** Introduction to Multithreading, Thread Creation-Thread class and Runnable Interface,Thread Control and Priorities, Thread Synchronization.	

RDBMS / SQL / JDBC: Introduction to RDBMS, Oracle 11g Introduction, Select Statement, Restricting and Sorting Data, DML, DDL, Introduction to JDBC, Establishing Connection, Executing Query and Processing Results, Meta data & Prepared Statement, Using Callable Statement and Transactions

UNIT IV- ANT,HTML & JAVASCRIPT	**(9)**

ANT: Introduction to ANT, Building sample java projects,

HTML : Introduction to HTML and its elemets, Basic Tags, Basic Elements, Formatting Tags, Layout tags and Semantic Tags, Tables, Forms and Frames, Style and div tags, Introduction to HTML5

JavaScript / CSS: Introduction to CSS, Styles and Style sheets, Formatting with CSS, Links and Lists, CSS Box Model, CSS3, Introduction to Javascripts, JS Functions, JS Strings, JS Events, JS Objects, JS Validations, JS Regular Expressions, Introduction to Bootstrap, Formatting and styling using Boostrap, Table, Bootstrap Grid System.

UNIT V - SERVLET, XML AND AJAX	**(9)**

Servlets and JSP: Introduction to Servlets, Servlet-Get and Post Requests, Servlet Config and Servlet Context, Servlet-Cookies and Session Management, Introduction to JSP, JavaBeans in JSP.

XML-I and XML-II: Introduction to XML, Document Type Definition, XML Namespaces, XML Schema, XSLT.

AJAX: Introduction to AJAX, AJAX working principle, AJAX Application, AJAX Database Application.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Core Java Volume I- Fundamentals, Cay S. Horstmann, Gary Cornell, Pearson India Education Services Pvt. Ltd., 11th Edition,
2. Java: The Complete Reference, Eleventh Edition, 11th Edition by Herbert Schildt Released December 2018
3. HTML 5 Black Book, Kogent Learning Solutions Inc., ISBN:978-93-5004-095-9

REFERENCES

1. Head First EJB 3.0 by Kathy Sierra, Bert Bates, Publisher: O'Reilly Media
2. Head First Servlets and JSP by Bryan Basham, Kathy Sierra & Bert Bates, Publisher: O'Reilly Media

17ITX33 JAVA-FULL STACK IMPLEMENTATION				
L	T	P	C
3	0	0	3

PRE REQUISITE : Nil

COURSE OBJECTIVES AND OUTCOMES:

	Course objectives		Course outcomes	Related program outcomes
1.0	Designing Enterprise based applications by encapsulating an application's business logic.	**1.1**	The students will be able to map Java classes and object associations to relational database tables with Hibernate mapping files	**a,b,c,e,g,h,i, j,l**
2.0	Learn Spring configuration using Java Configuration and Annotations	**2.1**	The students will be able to implement Spring configuration using Java Configuration and Annotations	**a,b,c,i,j,k,l**
3.0	Simplifying application development with Spring Boot	**3.1**	The students will be able to simplify application development using Spring Boot.	**a,b,c,e,f,g,h, i,j,k,l**
4.0	Consume REST services using observables	**4.1**	The students will be able to use REST web services	**a,b,c,d, g,h,i,j,k,l**
5.0	Utilizing AngularJS formats adequately	**5.1**	The students will be able to use various Angular features including directives, components, and services.	**a,b,c,d,e,f, h,j,k,l**

UNIT I - HIBERNATE	**(9)**
Hibernate Overview, Architecture, Configuration, Sessions, Annotations, Query Language, Native SQL, Batch Processing, Interceptors	
UNIT II -SPRING CORE	**(9)**
Spring Overview, Architecture, IoC Containers, Bean Definition and Scope, Bean Life cycle, Bean inheritance, Dependancy injection, Beans auto wiring, java based configuration, event handling, Custom events, AOP with spring framework, JDBC framework, transaction management.	
UNIT III - SPRING BOOT	**(9)**
Spring Boot-Introduction, Boostrapting, Tomcat deployment, Build systems, code structure, Spring beans and dependancy, Spring boot runners, Application properties, Logging, Building RESTful web services, Exception handling, Interceptor, Servlet filter, tomcat port number, File handling, Consuming RESTful web services, Internationalization, Spring boot scheduling	
UNIT IV - REST WEB SERVICE	**(9)**
RESTful-Introduction, Environment setup, Resources, Messages, Addressing, Methods, Statelessness, Caching, Security, JAX-RS.	
UNIT V - ANGULAR	**(9)**
Angular Introduction, Features, Apps Loading, Architecture, Directives, ngIf Directive, ngFor Directive, ngSwitch Directive, Data Binding, Property Binding, String Interpolation, Event Binding, Two way data binding, Forms.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Soni, R. K. (2017). Full stack angularJS for java developers: Build a full-featured web application from scratch using angularJS with spring RESTful. Apress.
2. Duldulao, D. B., & Villafranca, S. R. (2022). Spring Boot and Angular: Hands-on full stack web development with Java, Spring, and Angular. Packt Publishing Ltd.
3. Fisher, P. T., & Murphy, B. D. (2010). Spring persistence with Hibernate. Apress.

REFERENCES

1. Just Hibernate, A Lightweight Introduction to the Hibernate Framework by Madhusudhan Konda, Publisher: O'Reilly Media

17ITX01 - DATA SCIENCE AND BIG DATA ANALYTICS					
		L	T	P	C
		2	0	2	3
PRE REQUISITE : 17MYB04,17CSC07		**QUESTION PATTERN: TYPE - I**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	Understand the competitive advantages of data science	**1.1**	The students will be able to understand the basic terminology of Data Science	**a,b,c**
2.0	To learn tips and tricks for Big Data use cases and solutions..	**2.1**	Students will get knowledge about the basic terminology of Big Data Analytics.	**a,b,c**
3.0	To understand data analysis methods.	**3.1**	Students will get knowledge of Data mining tool and practical experience of applying data mining algorithms.	**a,b,j**
4.0	Understand the basics of R programming including vectors, list, etc.	**4.1**	Students will be able to recognize and make appropriate use of different types of data structures	**a,b,c**
5.0	Become proficient in writing a fundamental program and perform analytics with R	**5.1**	Students will be able to design and write functions in R and to create sophisticated figures and graphs	**a,b,c**

UNIT I – INTRODUCTION	**(9)**
Data Science – Related fields – Data Scientist – Roles - Data mining – limits on data mining - Big Data - Computing Environment - NoSQL Stores – Hadoop and Map Reduce Architecture - Life cycle of data science project.	
UNIT II - BIG DATA	**(8)**
Big Data overview – State of the practice in Analytics - Key Roles for the new Big data Ecosystem – Examples- Data Analytics Lifecycle: Discovery-Data preparation – Model Planning – Model Building – Communicate results – Operationalize ,Big data applications- Case Studies.	
UNIT III - ADVANCED ANALYTICS THEORY AND METHODS	**(8)**
Clustering: Overview-K means Algorithm – Association Rules: Apriori Algorithm- Evaluation of Candidate Rules- Applications of Association Rules - Regression: Linear Regression –Logistic Regression.	
UNIT IV - R PROGRAMMING: INTRODUCTION	**(10)**
Overview – Environment Setup – Data Types – Variables – Operators – Decision Making – Loops Statements – Function – Strings – Vectors: Scalars, Recycling, Operations – Function: All and Any, Vectorized operations, NA and NULL values, Filtering , Vectorized if-then else, Vector Equality, Vector Element names. Lists: Creation, Operations – Accessing List Components and Values, Applying functions to lists, Recursive List. Matrices: Creation, Operations – Applying functions to Matrix Rows and Columns – Adding and deleting rows and columns – Vector/Matrix Distinction- Avoiding Dimension Reduction, Higher Dimensional arrays.	
UNIT V - ARRAYS,DATA FRAMES,INTERFACING AND GRAPHICS	**(10)**
Arrays: Creating, Accessing, Manipulating Array Elements – Factors: Factors and Tables, Factors and Levels, Functions, Working with tables. Data Frames: Creation, Matrix-like Operations, and Merging Data frames – Applying functions to Data Frames. R Data Interfaces: CSV Files – Excel files – Binary files – XML files – Databases. Graphics: Creating Graphs, Customizing Graphs, Saving graphs to files, Creating three-dimensional plots. Charts: Pie chart – Bar Chart – Box plots – Histograms – Line Graphs – Scatter plots.	
TOTAL (L: 30:P30) = 60 PERIODS	

LIST OF EXPERIMENTS:

1. Program using control structures.
2. Program using array, list and vectors.
3. Program using matrix.
4. Program using Data Frames
5. Program to implement function
6. Program to exploring different plots
7. Program to implement K means algorithm
8. Program to implement Association rules
9. Program to implement logistic Regression
10. Program to implement linear Regression

Hardware or Software Requirement:

Hardware:

1. Pc 30 Nos

Software:

1. R studio

TEXT BOOKS

1. John Mount, Nina Zumel, "Practical Data Science with R", Manning Publications, 2016
2. EMC Education Services, "Data Science and Big Data Analytics : Discovering, Analyzing, Visualizing and Presenting Data", John Wiley & Sons Publications, 2015
3. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011

REFERENCES

1. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
2. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.
3. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.

17ITX02 - ADVANCED DATABASE MANAGEMENT SYSTEM					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17CSC07		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To demonstrate about the state- of-art techniques in database systems	**1.1**	The students will be able to model procedural and structured query language.	**a,c,j,**	
2.0	To infer the fundamental concepts Information management that you can apply to your future research and/or your practical work.	**2.1**	The students will be able to classify how transactions are processed in a database.	**a,b,j**	
3.0	To learn database threats and levels of security.	**3.1**	The students will be able to assess the concepts of Distributed Databases and Data Warehousing and some database security issues.	**a,b,e,l**	
4.0	To recall knowledge about Database Security	**4.1**	The students will be able to analyze different techniques in Concurrency Control, Tune and Optimize some Database applications.	**a,b,d,e**	
5.0	To illustrate nested and complex queries.	**5.1**	The students will be able to organize various kinds of database.	**b,d,e,k**	

UNIT I – OVERVIEW	**(9)**
PL/SQL – Introduction to PL/SQL – Declare, begin statements, Variables, Control Structure, PL/SQL Transactions – Savepoint, Cursor, PL/SQL Database Objects – Procedures, Functions, Packages, Triggers. Programmatic SQL – Embedded SQL, Dynamic SQL, and ODBC Standard	
UNIT II - TRANSACTION PROCESSING AND CONCURRENCY CONTROL	**(9)**
Definition of Transaction and ACID properties.TransactionProcessingTransaction-processingmonitors,transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction managementinmulti-databases.ConcurrencyControl–Locks,OptimisticConcurrencyControl(Backwardand Forward validations) Time stamping Concurrency Control	
UNIT III - DATABASE SECURITY	**(9)**
Security and integrity threats, Defence mechanisms, Statistical database auditing & control. Security issue based on Granting/revoking of privileges, Introduction to statistical database security. PL/SQL Security – Locks – Implicit locking, types and levels of locks, explicit locking, Oracles' named Exception Handlers.	
UNIT IV - COMPLEX QUERIES	**(9)**
Logic of Query Languages – Relational Calculi – Recursive rules – Syntax and semantics of Data log – Fix point semantics – Implementation Rules and Recursion – Rule rewriting methods – Compilation and Optimization – Recursive Queries in SQL – Open issues.	

UNITV - SPATIAL,TEXT AND MULTIMEDIA DATABASE	(9)
Traditional Indexing Methods (Secondary Keys, Spatial Access Methods) – Text Retrieval – Multimedia Indexing – 1D Time Series – 2d Color images – Sub pattern Matching – Open Issues – Uncertainties.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Shilbhadra Dasgupta, Subhash K. ShindeRiniChakrabarti," Advanced Database Management System", DreamtechPress ,2014.

REFERENCE:

1. Mandeep Singh Bhatia ,"Advance Databases ", Khanna BookPublishing,2014.

17ITX03 - OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITC01,17CSC07		QUESTION PATTERN: TYPE – I			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		Course Outcomes		Related Program outcomes	
1.0	To demonstrate knowledge about the basics of database system	1.1	The student will be able to model basic concepts of relational databases.	a,c,j,	
2.0	To infer the fundamental concepts of Normalization	2.1	The student will be able to analyze relational model in non-normalized	a,b,j	
3.0	To learn the exposure about OOPS	3.1	The student will be able to evaluate object hierarchies.	a,b,e,l	
4.0	To recall knowledge about Object database management systems	4.1	The student will be able to assess the relation between the OQL and EOQL.	b,d,e	
5.0	To illustrate about database system architecture.	5.1	The student will be able to acquire knowledge about OO database management System Architecture.	b,d,e,k	

UNIT I – INTRODUCTION	(9)
Extension and formalization of basic concepts in object oriented programming and relational databases. Classes, objects, inheritance, polymorphism, encapsulation, static and dynamic binding, message sending, relational mathematics, normal forms.	
UNIT II - NON-NORMALIZED STRUCTURES	**(9)**
Handling of non-normalized structures. Extensions and generalizations of the relational model and the corresponding mathematics, modeling. Object management systems. Concepts and problems. Persistent programming. Methods and systems.	
UNIT III -OBJECT ORIENTED DATABASE CONCEPT	**(9)**
Data types and Object, Evolution of Object Oriented Concepts, Characteristics of Object Oriented Data Model. Object Hierarchies–Generalization, Specialization, Aggregation. Object Schema. Inter-object Relationships, Similarities and difference between Object Oriented Database models.	
UNIT IV -OBJECT DATABASE MANAGEMENT SYSTEMS	**(9)**
Modeling, Meta programming, transactions, garbage collection, query handling. Prototypes and user interfaces. Problems related to temporal and spatial aspects. OODATABASE MANAGEMENT SYSTEM Architecture Approach: The Extended Relational Model Approach. Semantic Database Approach, Object Oriented Programming Language Extension Approach, DATABASE MANAGEMENT SYSTEM Generator Approach, the Object Definition Language and the Object Query Language.	

UNIT V - OBJECT ORIENTED DATABASE MANAGEMENT SYSTEM ARCHITECTURE	(9)
Performance Issue in Object Oriented DATABASE MANAGEMENT SYSTEM, Application Selection for Object Oriented DATABASE MANAGEMENT SYSTEM, the Database Design for an Object Relational DATABASE MANAGEMENT SYSTEM. The Structured Typed and ADTs, Object identity, Extending the ER Model ,Storage and Access Methods, Query Processing Query Optimization, Data Access API(ODBC, DB Library, DAO, ADO, JDBC, OLEDB), Distributed Computing Concept in COM, COBRA.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Ozsu, M. Tamer and Patrick Valduriez , "Principles of Distributed Database Systems;"Pearson Education,2014

REFERENCES:

1. C.S.R. Prabhu, "Object Oriented Database System – Approaches and Architectures",2012.
2. Silberschatz, Abraham, Henry F. Korth and S. Sudarshan: "Database System Concepts" McGrawHill International Edition,2011.

17ITX15 - INFORMATION STORAGE MANAGEMENT					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17CSC07		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To gain knowledge about the basics of storage system.	**1.1**	The students will be able to explain the concepts of Storage technology.	**a,c,j,k**	
2.0	To impart the fundamental concepts of storage system.	**2.1**	The students will be able to explain the storage system architecture.	**a,c,j,k**	
3.0	To gain exposure about cloud storage.	**3.1**	The students will be able to realize the Understand network storage concepts.	**a,b,c,j,k**	
4.0	To learn basic concepts of storage concepts.	**4.1**	The students will be able to explain Virtualization.	**a,b,c,k**	
5.0	To learn about security in storage technology.	**5.1**	The students will be able to develop and Understand the concepts of Information storage on cloud.	**a,b,c,k**	
UNIT I - INTRODUCTION TO STORAGE TECHNOLOGY					**(9)**
Data creation and The value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Centre infrastructure, role of each element in supporting business activities.					
UNIT II - STORAGE SYSTEMS ARCHITECTURE					**(9)**
Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Integrated and Modular storage systems, high-level architecture and working of an intelligent storage system.					
UNIT III - INTRODUCTION TO NETWORKED STORAGE					**(9)**
Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfill the need, Understand the appropriateness of the different networked storage options for different application environments.					
UNIT IV - SECURING STORAGE AND STORAGE VIRTUALIZATION					**(9)**
Information Security, Critical security attributes for information systems, Storage security domains, Analyze the common threats in each domain. Storage Virtualization: Forms, Configurations and Challenges. Types of Storage Virtualization: Block-level and File-Level.					
UNIT V - INFORMATION STORAGE ON CLOUD					**(9)**
Introduction – Cloud computing models – Benefits – Challenges – Storage on cloud – Vocabulary – Applications and Services on Cloud – Architectural Framework – Applications in Cloud computing Architecture – Cloud Security and Integration					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOK:

1. Pankaj Sharma, “Information Storage &Management”,S.KKataria& Sons,2012.

REFERENCES:

1. G.Somasundaram, AlokShrivastava, EMC Education Series, “Information Storage and Management”, Wiley, Publishing Inc., 2011.
2. Robert Spalding, “Storage Networks: The Complete Reference”,TataMcGrawHill,Osborne, 2003
3. Marc Farley, “Building Storage Networks”,TataMcGraw Hill, Osborne. 2001.
   MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002

17ITX18 - BUSINESS INTELLIGENCE					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To understand the fundamentals of Business intelligence.	**1.1**	The students will be able to explain the technology and process associated with Business Intelligence.	**a,c,j,k**
2.0	To demonstrate understanding of Business Intelligence technology.	**2.1**	The students will be able to explain the methodology and technology.	**a,c,j,k**
3.0	To identify the efficiency of various models.	**3.1**	The students will be able to identify various models and their efficiencies.	**a,b,c,j,k**
4.0	To learn about the business Intelligence Application.	**4.1**	The students will be able to learn the business intelligence application.	**a,b,c,k**
5.0	To know about the future scope of BI.	**5.1**	The students will be able to know about the scope of BI.	**a,b,c,k**

UNIT I - BUSINESS INTELLIGENCE	**(9)**
Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence – Quick overview.	
UNIT II - KNOWLEDGE DELIVERY	**(9)**
The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.	
UNIT III - EFFICIENCY	**(9)**
Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis	
UNIT IV - BUSINESS INTELLIGENCE APPLICATIONS	**(9)**
Marketing models – Logistic and Production models – Introduction to BI Integration with soft wares - Case studies.	
UNIT V - FUTURE OF BUSINESS INTELLIGENCE	**(9)**
Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Carlo Vercellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, Wiley Publications, 2009.
2. Efraim Turban, Ramesh Sharda, DursunDelen, “Decision Support and Business Intelligence Systems”, 9th Edition, Pearson 2013.
3. CindiHowson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, McGraw-Hill, 2007.
4. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making”, Addison Wesley, 2003.

REFERENCES:

1. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, “The Data Warehouse Lifecycle Toolkit”, Wiley Publication Inc.,2007.
2. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager"s Guide”, Second Edition, 2012.

17ITX23 - TEXT MINING TECHNIQUES					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil		**QUESTION PATTERN: TYPE - III**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To understand the tools to manage the high volume of information that is easily available	**1.1**	The students will be able to analyze the natural language text.	**a,c,j,k**
2.0	To learn how search engine work and how they present information	**2.1**	The students will be able to generate the document text.	**a,c,j,k**
3.0	To organize, analyze and monitor collected information	**3.1**	The students will be able to do machine translation.	**a,b,c,d**
4.0	Understand the word sense disambiguation	**4.1**	The students will be able to apply information retrieval techniques.	**a,b,c,d**
5.0	Learn Crawler in text mining	**5.1**	The students will be able to develop Text Language Generator	**a,b,c,i**

UNIT I – INTRODUCTION	**(9)**
Origin of Text Mining - Understanding Text – Applications – Information Visualization - Architecture for Text Mining Applications. Mathematics Background: Probability-Bayes's Rule-Probability Distribution-Sampling Distribution-Hypothesis Testing-Matrices. Exercises-Text Mine Installation	
UNIT II -EXPLORING TEXT	**(9)**
Words-Sentences-Indexing Document Text	
UNIT III -MARKOV MODELS AND POS TAGGING	**(9)**
Hidden Markov Models - POS Taggers - Word Sense disambiguation. Exercises: creation of text statistics, entity extraction, POS tags for words (using Text Mine).	
UNIT IV -INFORMATION EXTRACTION	**(9)**
IE Application - Entity Extraction - IE Systems - Phrase Extraction. Search Engines: Early Search Engines- Indexing text for Search-Indexing Multimedia-Queries-Searching an index-Viewing search results. Exercises: index scripts search and create an index for local files (using TextMine).	
UNIT V -SEARCHING THE WEB	**(9)**
Web Structure-Search Engine Coverage-A distributed Search-Crawlers-Visualization Summarization: Training a summarizer- Sentence Selection-Information Monitor. Exercises: Implementation of crawler in text mine – News collection using RSS	
	TOTAL = 45 PERIODS

TEXT BOOK:

1. Manu Konchady "Text Mining Application Programming", Cengage Learning, Fourth Indian Reprint, 2009.

REFERENCE:

1. Thomas W. Miller, Prentice Hall, "Data and Text Mining-A Business Applications Approach", Second impression, 2011.publishing company, 1995.

17ITX27 DATA SCIENCE TECHNIQUES (Common to 17CAX29 and 17RAX31 Courses)					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To Understand Data Science concepts and formulate the problems.	**1.1**	Students will be able to use metrics to analyze the predications for the problem.		**a,b,c,d,l**
2.0	To make the students to know how to handle the data.	**2.1**	Students will be able to extract the data using tools like SSIS, RPA.		**a,b,d,e,l**
3.0	To make the students understand how to explore the data.	**3.1**	Students will be able to explore and analyze the data.		**a,b,d,l**
4.0	To make the students to know about Machine Learning and Python.	**4.1**	Students will be able to code Python for manipulating data.		**a,b,c,d,e,l**
5.0	To apply visualization techniques to clearly communicate analytic insights to business sponsors, analytic audiences and use Tabluea.	**5.1**	Students will be able to apply tool like Tableau to visualize data.		**a,b,d,e,l**
UNIT I - INTRODUCTION					**(9)**
Introduction to Data Science Need of Data Engineer - Basic Statistics - Data Types - Problem Definition Classification - Regression: Linear and Logistics - Metrics to analyze the Prediction: Confusion matrix, Least Square, R^2.					
UNIT II - DATA HANDLING					**(9)**
Different Tools used to extract data from client server: SSIS, RPA - Sample server and domain information to get started with tools - Data Preparation: SQL, Python Testing.					
UNIT III - DATA ANALYSIS					**(9)**
Exploratory Data Analysis - Exercises for EDA - Insights and Testing.					
UNIT IV - MACHINE LEARNING AND BIG DATA ANALYTICS					**(9)**
Introduction to ML Python - Programming with IPython Arrays - Data Frame Grouping Merging, Joining, Concatenate Input and Output - Working with the Data Testing - Analytics with Data Robot - Machine learning Tool.					
UNIT V VISUALIZATION					**(9)**
Introduction to visualization Tools Tabluea, Power BI, Kibana - Working with Tabluea Import the data Options filtering Calculative Field Geographic representation Graph Histogram, Scatter plot, Gain chart Workbook Creating Story.					
TOTAL (L: 45) = 45 PERIODS					

TEXTBOOKS:

1. Thomas. A. Runkler, “Data Analytics: Models and algorithms for Intelligent Data Analysis”, Springer, Germany, 2012.
2. Suresh Kumar Mukhiya, Usman Ahmed, “Hands-On Exploratory Data Analysis with Python”, Packt Publishing Ltd., UK, 2020.
3. Jared Dean, “Big Data, Data Mining and Machine Learning”, Wiley Publication, 2014.

WEB REFERENCES:

1. https://www.tutorialspoint.com/machine_learning_with_python/machine_learning_with_python_jupyter_notebook.htm
2. https://www.tutorialspoint.com/tableau/index.html

17ITX34 CLOUD SERVICES MANAGEMENT					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : Nil		**QUESTION PATTERN: TYPE - I**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To Introduce Cloud Service Management terminology, definition & concepts	**1.1**	The students will be able to Explain the fundamentals of cloud computing	**a,b,c,d,e,i,j, k,l**	
2.0	To Compare and contrast cloud service management with traditional IT service management	**2.1**	The Students will be able to compare and contrast cloud and traditional IT service management	**a,b,c,d,e,i,j, k,l**	
3.0	To Identify strategies to reduce risk and eliminate issues associated with adoption of cloud services	**3.1**	The students will be able to Exhibit cloud-design skills to build and automate business solutions using cloud technologies	**a,b,c,d,e,i,j, k,l**	
4.0	To Select appropriate structures for designing, deploying and running cloud-based services in a business environment	**4.1**	The students will be able to Possess Strong theoretical foundation leading to excellence and excitement towards adoption of cloud-based services	**a,b,c,d,e,i,j, k,l**	
5.0	To Illustrate the benefits and drive the adoption of cloud-based services to solve real world problems	**5.1**	The students will be able to Solve the real world problems using Cloud services and technologies	**a,b,c,d,e,i,j, k,l**	
UNIT I - CLOUD SERVICE MANAGEMENT FUNDAMENTALS					**(9)**
Cloud Ecosystem, The Essential Characteristics, Basics of Information Technology Service Management and Cloud Service Management, Service Perspectives, Cloud Service Models, Cloud Service Deployment Models					
UNIT II - CLOUD SERVICES STRATEGY					**(9)**
Cloud Strategy Fundamentals, Cloud Strategy Management Framework, Cloud Policy, Key Driver for Adoption, Risk Management, IT Capacity and Utilization, Demand and Capacity matching, Demand Queueing, Change Management, Cloud Service Architecture					
UNIT III - CLOUD SERVICE MANAGEMENT					**(9)**
Cloud Service Reference Model, Cloud Service Lifecycle, Basics of Cloud Service Design, Dealing with Legacy Systems and Services, Benchmarking of Cloud Services, Cloud Service Capacity Planning, Cloud Service Deployment and Migration, Cloud Marketplace, Cloud Service Operations Management					
UNIT IV - CLOUD SERVICE ECONOMICS					**(9)**
Pricing models for Cloud Services, Freemium, Pay Per Reservation, Pay per User, Subscription based Charging, Procurement of Cloud-based Services, Capex vs Opex Shift, Cloud service Charging, Cloud Cost Models					
UNIT V - CLOUD SERVICE GOVERNANCE & VALUE					**(9)**
IT Governance Definition, Cloud Governance Definition, Cloud Governance Framework, Cloud Governance Structure, Cloud Governance Considerations, Cloud Service Model Risk Matrix, Understanding Value of Cloud Services, Measuring the value of Cloud Services, Balanced Scorecard, Total Cost of Ownership					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Cloud Service Management and Governance: Smart Service Management in Cloud Era by Enamul Haque, Enel Publications
2. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, Ricardo Puttini, Zaigham Mohammad 2013
3. Cloud Computing Design Patterns by Thomas Erl, Robert Cope, Amin Naserpour

REFERENCES:

1. Economics of Cloud Computing by Praveen Ayyappa, LAP Lambert Academic Publishing
2. Mastering Cloud Computing Foundations and Applications Programming Rajkumar Buyya, Christian Vechhiola, S. Thamarai Selvi

17ITX10 - MOBILE COMMUNICATION					
		L	T	P	C
		3	0	0	3
PRE REQUISITE :17ITC05	**QUESTION PATTERN: TYPE - III**				

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To study the concept of Mobile radio propagation, cellular system design.	**1.1**	The students will be able to understand GSM, CDMA concepts and architecture, frame structure, system capacity, services provided.	**a,c,d,f**
2.0	To understand mobile technologies like GSM and CDMA	**2.1**	The students will be able to understand the Study of evolution of mobile communication generations 2G, 2.5G, 3G with their characteristics and limitations.	**a,c,g,k**
3.0	To know the mobile communication evolution of 2G, 3G and 3 GPP in detail.	**3.1**	The students will be able to analyze the Understand emerging technologies required for fourth generation mobile systems such as SDR, MIMO etc.	**a,b,c,j,k**
4.0	To have overview of immerging technologies for 4 G standards.	**4.1**	The students will be able to understand different indoor and outdoor propagation models related to losses and different types of fading	**a,b,c,k**
5.0	To have overview of wireless systems.	**5.1**	The students will be able to have overview of wireless systems.	**a,b,c,k**

UNIT I CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS	**(9)**
Overview of Communication System: Components of Communication system, Block diagram and wave form for Amplitude Modulation and Frequency modulation system. Introduction to wireless communication: Cellular Concept: Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems.	
UNIT II MOBILE RADIO PROPAGATION	**(9)**
Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels	
UNIT III MODULATION TECHNIQUES AND EQUALIZATION	**(9)**
Modulation Techniques: ASK, FSK, PSK, Minimum Shift Keying, Gauss ion MSK, M-ary QAM, M-ary FSK, Orthogonal Frequency Division Multiplexing. Equalization: Survey of Equalization Techniques, Linear Equalization, Non-linear Equalization, Algorithms for Adaptive Equalization. Diversity Techniques, RAKE receiver.	

UNIT IV CODING AND MULTIPLE ACCESS TECHNIQUES	(9)
Coding: Vocoders, Linear Predictive Coders, Selection of Speech Coders for Mobile Communication, GSM Codec, RS codes for CDPD. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA	
UNIT V WIRELESS SYSTEMS AND STANDARDS	**(9)**
Second Generation and Third Generation Wireless Networks and Standards, WLL, Blue tooth. AMPS, GSM, IS-95 and DECT.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. S.Rappaport, "Wireless Communications: Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint 2003.
2. Simon Haykin and Michael Moher, "Introduction to Analog and Digital Communications", John Wiley, Second Edition 2007.

REFERENCES:

1. R. Blake, " Wireless Communication Technology", Thomson Delmar, 2003.
2. W.C.Y.Lee, "Mobile Communications Engineering: Theory and applications, Second Edition, McGraw-Hill International, 1998.
3. Stephen G. Wilson, " Digital Modulation and Coding", Pearson Education, 2003.

17ITX12 - ETHICAL HACKING					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 17ITC13		**QUESTION PATTERN: TYPE - III**			

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To identify and analyze the stages an ethical hacker requires taking in order to compromise a target system.	**1.1**	The students will be able to realize the basic hacking tricks.	**c,d,l**
2.0	To Identify tools and techniques to carry out a penetration testing.	**2.1**	The students will be able to familiar about hack networking, web and password.	**e,f,h**
3.0	To learn security techniques used to protect system and user data.	**3.1**	The students will be able to categorize the types of hacking attacks.	**b,c,l**
4.0	To demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system.	**4.1**	The students will be able to apply security threats and Hacking Techniques.	**a,c,f**
5.0	To learn cyber security issues and engineering tools	**5.1**	The students will be able to develop knowledge of contemporary cyber security issues, and use techniques, skills and modern engineering tools necessary for computer security engineering practice.	**a,c,e**

UNIT I – INTRODUCTION **(9)**

Hacking Windows: BIOS Passwords – Windows Login Passwords - Changing Windows Visuals –Cleaning Tracks – Internet Explorer users – Cookies – Netscape Communicator – Register - The Registry Editor – Description of reg file - other systems files – The Untold – Windows Tips – Tricks –Manual – Cleaning Recent Docs Menu and RUN MRU - Internet Explorer Tricks and Tips.

UNIT II - NETWORK HACKING & WEB HACKING **(9)**

Network Hacking: Telnet – Domain Name Systems – Sockets and Ports – PING – Tracert – Netstat – Getting Information about a Domain – Port 23 – FTP Port – FTP Client – FTP commands – FTP Hacks. Web Hacking: HTTP Torn Apart – Get Method – Post Method –Head Method – Web Browser – Post Dial Up Screen Hacking – Making Own Browser – Removing Banners from Free ISPs – Difficult to Detect Port Scanner – GEOCITIES-TRIPOD – XOOM.

UNIT III - PASSWORD HACKING **(9)**

Introduction – Password Cracking – Cracking the Windows – Glide Code – Windows Screen Saver Password – XOR – Internet Connection Password – Windows NT Password – Cracking Unix Password Files – HTTP authentication – BIOS Passwords – Cracking other passwords – Remote Access Sharing Password Decoding – Breaking DES Algorithm – Brute Force Password Cracking –Default Passwords.

UNIT IV – ATTACKS **(9)**

Input Validation Attacks: The Art of Input Validation Attacks – Input Validation Dangers – Hotmail.com- Apache Web Server. Buffer Overflow Attacks: Types of Buffer Overflows – Basic Programming Errors. Privacy Attacks: Trojan Attacks – Detection – Countermeasures – Key logger Attacks – Working.TCP/IP: Checksums – Packet Sequencing – Handshaking –Transport Layer – TCP/UDP Protocols – Link layer. Denial of Services Attacks: Ping of Death – DOS Attacks – Teardrop –SYN Attack – Smurf Attacks – UDP Flooding.

UNIT V - PERL PROGRAMMING	(9)
Basics – Scalars – Interacting with User by getting Input – Chomp and Chop – Operators – Exponentiation Operators – Binary Arithmetic Operators – Unary Arithmetic Operators – Conditional Statements – Other General Operators – Assignment Operators – Loops – Arrays – Input/output – Opening, Moving, Truncating Files – Accessing Directories.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK :

1. AnkitFadia, “An Unofficial Guide To Ethical Hacking”, Macmillan India Ltd, 2006.

REFERENCE:

1. Matt Walker, “CEH Certified Ethical Hacker All-in-One Exam Guide”, Second Edition McGraw-Hill Osborne Media, 2014.

17ITX13 - SOCIAL MEDIA NETWORK ANALYSIS					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : 17ITC05		**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To demonstrate the concept of semantic web and related applications.	**1.1**	The students will be able to develop semantic web related applications	**b,c,k**	
2.0	To impart the fundamental concepts of social network.	**2.1**	The students will be able to represent knowledge using ontology	**c,f,j,k**	
3.0	To outline the knowledge representation of Web Mining.	**3.1**	The students will be able to realize and Predict human behavior in social web and related communities	**c,f,j,k**	
4.0	To show the human behavior in social web and related communities.	**4.1**	The students will be able to Visualize Web Social Networks.	**b,c,f,k,g**	
5.0	To infer the knowledge in visualization of social networks.	**5.1**	The students will be able to personalize and develop Web Linkage Mining.	**b,c,k,l,g**	

UNIT I – INTRODUCTION **(9)**

IntroductiontoSemanticWeb:LimitationsofcurrentWeb-DevelopmentofSemanticWeb-EmergenceoftheSocial Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis- Electronicsourcesfornetworkanalysis:Electronicdiscussionnetworks,Blogsandonlinecommunities-

Web-based networks - Applications of Social Network Analysis.

UNIT II - MODELLING, AGGREGATING AND KNOWLEDGE **(9)**

OntologyandtheirroleintheSemanticWeb:Ontology-basedknowledgeRepresentation-Ontologylanguagesforthe Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontologicalrepresentationofsocialrelationships-Aggregatingandreasoningwithsocialnetworkdata-Advanced representations.

UNIT III - EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS **(9)**

Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.

UNIT IV - WEB CONTENT MINING **(9)**

Web Content Mining: Vector Space Model, Web Search, Activities on Web archiving, Personalized Web Search, Feature Enrichment of Short Texts, Latent Semantic Indexing, Automatic Topic Extraction from Web Documents Opinion.

UNIT V - WEB LINKAGE MINING **(9)**

Hyperlinks- co-citation and bibliographic coupling- page rank and HITS algorithm – web community discovery – web graph measurement and modeling- using link information for web page classification.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Guandongxu and Yanchunzhang, “Web mining and social networking: techniques”, “Springer Science and Business Media”,2011
2. Bing Liu, “Web Data Mining”, Springer,2010
3. BorkoFurht, “Handbook of Social Network Technologies and Applications”, 1st Edition, Springer,2010.
4. Peter Mika, “Social Networks and the Semantic Web”, First Edition, Springer2007.

REFERENCES:

1. GuandongXu ,Yanchun Zhang and Lin Li, “Web Mining and Social Networking – Techniques and applications”, First Edition Springer,2011.
2. Dion Goh and Schubert Foo, “Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively”, IGI Global Snippet,2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, “Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling”, IGI Global Snippet,2009.

17ITX16 - COMPOSING MOBILE APPS						
				L	T	P	C
				3	0	0	3
PRE REQUISITE : NIL			**QUESTION PATTERN: TYPE – III**			
COURSE OBJECTIVES AND OUTCOMES:						
Course Objectives		**Course Outcomes**		**Related Program outcomes**		
1.0	To infer the basics of mobility.	**1.1**	The student will be able to outline the basics of mobility and scape.	**a,c,e**		
2.0	To know basic building blocks of mobile apps.	**2.1**	The student will be able to rephrase about user interface designing and native data handling.	**b,e,f**		
3.0	To extend the mobile apps with add on features.	**3.1**	The student will be able to make use of add on features such as native hardware play, location awareness, graphics, and Multimedia.	**b,e**		
4.0	To demonstrate various mobile application testing techniques	**4.1**	The student will be able to experiment with various testing techniques available	**e,h,k**		
5.0	To show the application marketing strategies.	**5.1**	The student will be able to summarize the techniques of apps marketing.	**g,l**		
UNIT I - GETTING STARTED WITH MOBILITY						**(9)**
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.						
UNIT II –BUILDING BLOCKS OF MOBILEAPPS						**(10)**
App user interface designing–mobile UI resources(Layout, UIelements, Draw-able, Menu),Activity-states and life cycle, Interaction amongst activities. App functionality beyond user interface - Threads, sync task, Services – states and lifecycle, Notifications, Broadcast receivers, Telephony and SMS APIs						
UNIT III -SPRUCINGUP MOBILEAPPS						**(10)**
Native data handling– on device file I/O, Shared preferences, Mobile databases such as SQLite, Enterprise data access (viaInternet/Intranet)Graphicsandanimation–customviews,canvas,AnimationAPIs,Multimedia–audio/video play back and record						
UNIT IV –TESTING MOBILE APPS						**(10)**
Location awareness, Native hardware access(sensors such as accelerometer and gyroscope), Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, Monkey Talk.						
UNIT V -TAKINGAPPSTOMARKET						**(6)**
Versioning, signing and packaging mobile apps, distributing apps on mobile marketplace.						
TOTAL (L: 45) = 45 PERIODS						

TEXT BOOK:

1. Anubhav Pradhan, Anil V Deshpande, “Mobile Apps Development”, First Edition, 2013.

REFERENCE:

1. Barry Burd, “Android Application Development All in one for Dummies”, First Edition, 2013.
2.“Teach Yourself Android Application Development in 24 Hours”, SAMS Publication.

17ITX24 - DISTRIBUTED SYSTEMS CONCEPTS AND DESIGN					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL		**QUESTION PATTERN: TYPE - III**			
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program outcomes**
1.0	To gain knowledge about foundations of distributed systems and distributed computations.	**1.1**	The students will be able to describe the foundations of distributed systems, design issues and distributed computations.		**b,c**
2.0	To learn issues related to clock Synchronization and the need for global state in distributed systems.	**2.1**	The students will be able to distinguish various synchronization issues and global state for distributed systems.		**b,c**
3.0	To get knowledge about distributed mutual exclusion and deadlock detection algorithms.	**3.1**	The students will be able to relate the Mutual Exclusion and Deadlock detection algorithms in distributed systems		**a,b,c**
4.0	To impart the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.	**4.1**	The students will be able to describe the agreement protocols and fault tolerance mechanisms in distributed systems.		**a,b,c**
5.0	To learn the characteristics of peer-to-peer and distributed shared memory systems.	**5.1**	The students will be able to outline the features of peer-to-peer and distributed shared memory systems.		**a,b,c**

UNIT I- INTRODUCTION **(9)**

Introduction: Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication – Synchronous versus asynchronous executions –Design issues and challenges. A model of distributed computations: A distributed program –A model of distributed executions –Models of communication networks – Global state – Cuts –Past and future cones of an event –Models of process communications. Logical Time: A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

UNIT II - MESSAGE ORDERING & SNAPSHOTS **(9)**

Message ordering and group communication: Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. Global state and snapshot recording algorithms: Introduction –System model and definitions –Snapshot algorithms for FIFO channels.

UNIT III- DISTRIBUTED MUTEX & DEADLOCK **(9)**

Distributed mutual exclusion algorithms: Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala algorithm – Maekawa's algorithm – Suzuki–Kasami's broadcast algorithm. Deadlock detection in distributed systems: Introduction – System model – Preliminaries – Models of deadlocks – Knapp's classification – Algorithms for the single resource model, the AND model and the OR model.

UNIT IV- RECOVERY & CONSENSUS	(9)
Check pointing and rollback recovery: Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated check pointing algorithm – Algorithm for asynchronous check pointing and recovery. Consensus and agreement algorithms: Problem definition – Overview of results – Agreement in a failure – free system – Agreement in synchronous systems with failures.	
UNIT V - P2P & DISTRIBUTED SHARED MEMORY	**(9)**
Peer-to-peer computing and overlay graphs: Introduction – Data indexing and overlays – Chord – Content addressable networks – Tapestry. Distributed shared memory: Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Kshemkalyani, Ajay D., and Mukesh Singhal. "Distributed computing: principles, algorithms, and systems". Cambridge University Press, 2011.

REFERENCES:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. George Coulouris, Jean Dollimore and Tim Kindberg, —"Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.
3. Tanenbaum A.S., Van Steen M., —"Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
4. Liu M.L., —"Distributed Computing, Principles and Applications", Pearson Education, 2004.
5. Nancy A Lynch, —"Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.
6. Mukesh Singhal and Niranjan G. Shivaratri. Advanced concepts in operating systems. McGraw-Hill, Inc., 1994

17ECX16 – INTERNET OF THINGS AND ITS APPLICATIONS			
L	T	P	C
3	0	0	3

PREREQUISITE : NIL | **QUESTION PATTERN : TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To make the students to know about basics of Electrical and Electronic devices	**1.1**	The students will be able to understand basics of Electrical circuits and Electronic devices	**a,c,d,i**
2.0	To make the students to know about basics and block diagram of IoT	2.1	The students will be able to understand IOT characteristics and its essential components.	**a,b,d,e**
3.0	To make the students to know about Arduino processor and working of Analog and Digital I/O pins	3.1	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins	**a,b,c,g**
4.0	To make the students to know about Raspberry pi and its interface with other devices	4.1	The students will be able to understand Raspberry pi and its interface with other devices	**a,b,c,j**
5.0	To motivate the students to implement the IoT using Arduino/ Raspberry Pi.	5.1	The students will be able to implement a IoT system using Arduino/Raspberry Pi.	**a,f,k,l**

UNIT I - BASIC ELECTRICAL CIRCUITS AND ELECTRONICS	**(9)**
Introduction - Current, voltage and resistance - Analog and Digital Signal - conductors Vs Insulators – KCL- KVL - Basic Electronics components - calculating equivalent resistance for series and parallel circuits- Ohm's law- Color coding for a resistor – LED – LCD - LDR.	
UNIT II - INTRODUCTION TO INTERNET OF THINGS	**(9)**
Introduction - Definition and characteristics of Internet of Things - General Block Diagram and essential components of IOT - Role of microprocessor & Micro controller- communication of things - IOT connection with internet.	
UNIT III- ARDUINO PROCESSOR	**(9)**
Introduction to Arduino processor- General Block diagram- Working of Analog and Digital I/O pins- Serial (UART) , I2C Communications and SPI communication - Arduino Boards: Mega, Due, Zero and 101 - Prototyping basics - Technical description - Setting Up Arduino IDE- Introduction to Arduino programming.	
UNIT IV - RASPBERRY PI	**(9)**
Technical Description of Raspberry Pi - comparison of Raspberry Pi Vs Arduino - Operating Systems for RPi - Preparing SD Card for Pi - Connecting Raspberry Pi as PC - Exploring Raspberry Pi Environment- Logical design using Python.	
UNIT V- APPLICATIONS OF IOT	**(9)**
Various Real time applications of IoT- automation - Smart Parking - Environment: Weather monitoring system - Agriculture: Smart irrigation – Domain Specific applications.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things-A hands-on approach", Universities Press, 2015.

REFERENCES :

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics and Computer Engineering”,Tata McGraw Hill, Second Edition, (2006).
2. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things: Key applications and Protocols”, Wiley Publications 2nd edition, 2013.
3. Marco Schwartz, — Internet of Things with the Arduino Yun, Packt Publishing, 2014.
4. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley Publications, 2012.

17ITX35 CYBER SECURITY					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : 17ITC14					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn cybercrime and cyber law.	**1.1**	The students will be able to Explain the basics of cyber security, cyber crime and cyber law	**a,,c,d,e,h,i,j,l**	
2.0	To understand the cyber attacks and tools for mitigating them.	**2.1**	The students will be able to Classify various types of attacks and learn the tools to launch the attacks	**a,c,e,h,k,l**	
3.0	To understand information gathering	**3.1**	The students will be able to Apply various tools to perform information gathering	**a,b,d,e,h,l**	
4.0	To learn how to detect a cyber attack	**4.1**	The students will be able to Apply intrusion techniques to detect intrusion	**a,b,c,e,g,h,j,l**	
5.0	To learn how to prevent a cyber attack	**5.1**	The students will be able to Apply intrusion prevention techniques to prevent intrusion.	**a,b,c,e,g,h,l**	
UNIT I - INTRODUCTION					**(9)**
Cyber Security – History of Internet – Impact of Internet – CIA Triad; Reason for Cyber Crime – Need for Cyber Security – History of Cyber Crime; Cybercriminals – Classification of Cybercrimes – A Global Perspective on Cyber Crimes; Cyber Laws – The Indian IT Act – Cybercrime and Punishment.					
UNIT II - ATTACKS AND COUNTERMEASURES					**(9)**
OSWAP; Malicious Attack Threats and Vulnerabilities: Scope of Cyber-Attacks – Security Breach – Types of Malicious Attacks – Malicious Software – Common Attack Vectors – Social engineering Attack – Wireless Network Attack – Web Application Attack – Attack Tools – Countermeasures.					
UNIT III - RECONNAISSANCE					**(9)**
Harvester – Whois – Netcraft – Host – Extracting Information from DNS – Extracting Information from E-mail Servers – Social Engineering Reconnaissance; Scanning – Port Scanning – Network Scanning and Vulnerability Scanning – Scanning Methodology – Ping Sweer Techniques – Nmap Command Switches – SYN – Stealth – XMAS – NULL – IDLE – FIN Scans – Banner Grabbing and OS Finger printing Techniques.					
UNIT IV - INTRUSION DETECTION					**(9)**
Host -Based Intrusion Detection – Network -Based Intrusion Detection – Distributed or Hybrid Intrusion Detection – Intrusion Detection Exchange Format – Honeypots – Example System Snort.					
UNIT V - NTRUSION PREVENTION					**(9)**
Firewalls and Intrusion Prevention Systems: Need for Firewalls – Firewall Characteristics and Access Policy – Types of Firewalls – Firewall Basing – Firewall Location and Configurations – Intrusion Prevention Systems – Example Unified Threat Management Products.					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Anand Shinde, “Introduction to Cyber Security Guide to the World of Cyber Security”, Notion Press, 2021 (Unit 1)
2. Nina Godbole, Sunit Belapure, “Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley Publishers, 2011 (Unit 1)

REFERENCE:

1. David Kim, Michael G. Solomon, “Fundamentals of Information Systems Security”, Jones & Bartlett Learning Publishers, 2013 (Unit 2)
2. Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made easy”, Elsevier, 2011 (Unit 3)
3. Kimberly Graves, “CEH Official Certified Ethical hacker Review Guide”, Wiley Publishers, 2007 (Unit 3) William Stallings, Lawrie Brown, “Computer Security Principles and Practice”, Third Edition, Pearson Education, 2015 (Units 4 and 5)
4. Georgia Weidman, “Penetration Testing: A Hands-On Introduction to Hacking”, No Starch Press, 2014 (Lab)

17ITX36 SECURITY AND PRIVACY IN CLOUD					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : 17ITC14					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To Introduce Cloud Computing terminology, definition & concepts	**1.1**	The Students will be able to Understand the cloud concepts and fundamentals.	**a,b,c,d,e,i,j,k,l**	
2.0	To understand the security design and architectural considerations for Cloud	**2.1**	The Students will be able to Explain the security challenges in the cloud.	**a,b,c,d,e,i,j,k,l**	
3.0	To understand the Identity, Access control in Cloud	**3.1**	The Students will be able to Define cloud policy and Identity and Access Management	**a,b,c,d,e,i,j,k,l**	
4.0	To follow best practices for Cloud security using various design patterns	**4.1**	The Students will be able to Understand various risks and audit and monitoring mechanisms in the cloud.	**a,b,c,d,e,i,j,k,l**	
5.0	To be able to monitor and audit cloud applications for security	**5.1**	The Students will be able to Define the various architectural and design considerations for security in the cloud.	**a,b,c,d,e,i,j,k,l**	
UNIT I - FUNDAMENTALS OF CLOUD SECURITY CONCEPTS					**(9)**
Overview of cloud security- Security Services - Confidentiality, Integrity, Authentication, Nonrepudiation, Access Control - Basic of cryptography - Conventional and public-key cryptography, hash functions, authentication, and digital signatures.					
UNIT II - SECURITY DESIGN AND ARCHITECTURE FOR CLOUD					**(9)**
Security design principles for Cloud Computing - Comprehensive data protection - End-to-end access control - Common attack vectors and threats - Network and Storage - Secure Isolation Strategies - Virtualization strategies - Inter-tenant network segmentation strategies - Data 143 Protection strategies: Data retention, deletion and archiving procedures for tenant data, Encryption, Data Redaction, Tokenization, Obfuscation, PKI and Key					
UNIT III - ACCESS CONTROL AND IDENTITY MANAGEMENT					**(9)**
Access control requirements for Cloud infrastructure - User Identification - Authentication and Authorization - Roles-based Access Control - Multi-factor authentication - Single Sign-on, Identity Federation - Identity providers and service consumers - Storage and network access control options - OS Hardening and minimization - Verified and measured boot - Intruder Detection and prevention					
UNIT IV - CLOUD SECURITY DESIGN PATTERNS					**(9)**
Introduction to Design Patterns, Cloud bursting, Geo-tagging, Secure Cloud Interfaces, Cloud Resource Access Control, Secure On-Premise Internet Access, Secure External Cloud					
UNIT V MONITORING, AUDITING AND MANAGEMENT					**(9)**
Proactive activity monitoring - Incident Response, Monitoring for unauthorized access, malicious traffic, abuse of system privileges - Events and alerts - Auditing – Record generation, Reporting and Management, Tamper-proofing audit logs, Quality of Services, Secure Management, User management, Identity management, Security Information and Event Management					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Raj Kumar Buyya , James Broberg, andrzejGoscinski, ―Cloud Computing:ll, Wiley 2013
2. Dave shackleford, ―Virtualization Securityll, SYBEX a wiley Brand 2013.
3. Mather, Kumaraswamy and Latif, ―Cloud Security and Privacyll, OREILLY 2011

REFERENCE:

1. Mark C. Chu-Carroll ―Code in the Cloudll,CRC Press, 2011
2. Mastering Cloud Computing Foundations and Applications Programming RajkumarBuyya, Christian Vechhiola, S. ThamaraiSelvi .

17ITM01- FUNADAMENTALS OF PROBLEM SOLVING AND PROGRAMMING					
			L	T	P	C
			3	0	0	3
PREREQUISITE : Nil					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program Outcomes**	
1.0	To gain knowledge about the basics of programming	**1.1**	The students will be able to understand the basics of Python Programming constructs.	**a,c,l**	
2.0	To gain exposure about selection structure	**2.1**	The students will be able to design programs involving selection structure	**a,b,c,d,l**	
3.0	To get knowledge about repetition structure, function and modules	**3.1**	The students will be able to design programs involving function, modules and loops.	**a,b,c,d,k,l**	
4.0	To gain exposure about string	**4.1**	The students will be able to realize the need of strings.	**a,b,c,d,k,l**	
5.0	To get knowledge about mutable and Immutable types	**5.1**	The students will be able to realize the need of list, tuples and dictionary.	**a,b,c,d,k,l**	

UNIT I - INTRODUCTION TO BASICS OF PROGRAMMING	**(9)**
Basics - Variables and Assignment - Basic Data Types- Comments - Operators - print() - Floats	
UNIT II - SELECTION STRUCTURE	**(9)**
Introduction to Selection Structure - if statements, else statements, nested elif statements, truthy and falsey values, Control Structure	
UNIT III - VALUE – REPETITION AND RETURNING STRUCTURE	**(9)**
Loops - while loops, for loops - Nested Loops - Functions - modules - variable scope	
UNIT IV - DATA AND STRING PROCESSING	**(9)**
Strings - Accessing the Strings - Traversing the Strings - Working with Strings - Formatting Strings	
UNIT V - MUTABLE AND IMMUTABLE TYPES AND METHODS	**(9)**
Introduction to lists, indexing and slicing of list, del and list methods, Tuples, Dictionary and its methods.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Dr. R. Nageswara Rao, ―Core Python Programming, Dreamtech Press, 2017 Edition.
2. Reema Thareja - Problem Solving and Programming – Python, Oxford University Press, 2nd Edition.

REFERENCE:

1. Wesley J. Chun, ―Core Python Programming, Pearson Education, 2nd edition, 2010.

17ITM02 – JAVA PROGRAMMING BASICS					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand Object Oriented Programming concepts and basic characteristics of Java	**1.1**	The students will be able to implement fundamental concepts of Java.	**a, b, c, d**	
2.0	To implement the keywords and inheritance concepts using class.	**2.1**	The students will be able to gain the knowledge on inheritance	**b, c, d, k**	
3.0	To define exceptions and use I/O streams	**3.1**	The students will be able to understand the knowledge on handling exceptions and using Files	**b, c, d, k**	
4.0	To know the principles of packages and interfaces	**4.1**	The students will be able to use packages and implement interfaces in Java classes.	**b, c, d, k**	
5.0	To develop a java application with threads.	**5.1**	The students will be able to gain the knowledge about threads and advantages of multithreading.	**b, c, d, k, l**	
UNIT I INTRODUCTION					**(9)**
Introduction of Java - Features of Java – Application of Java – Data Types –Statements – Operators – Control statements - Basics of Oops Concepts: Class – Objects – Methods –Constructor – finalizer –Access Control.					
UNIT II INHERITANCE AND KEYWORDS					**(9)**
Inheritance: Types of Inheritance – Polymorphism – Method Overloading – Method Overriding- super – final with inheritance – Abstract Class - Keywords : static –final - this - String – Arrays					
UNIT III EXCEPTION HANDLING AND FILES					**(9)**
Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses, Using Exceptions. I/O Basics- Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files					
UNIT IV PACKAGES AND INTERFACES					**(9)**
Packages and Interfaces: Packages, Access Protection, Importing Packages. Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces.					
UNIT V THREADS					**(9)**
Java Thread Model - Main Thread - Creating a Thread - Creating Multiple Threads - Thread Priorities - Synchronization - Interthread Communication - Suspending, Resuming, and Stopping Threads- Using Multithreading.					
TOTAL (L: 45) = 45 PERIODS					
TEXT BOOK: 1. Herbert Schildt, "The Complete Reference (Fully updated for jdk7)", Oracle press Ninth Edition,2014. **REFERENCE:** 1. Deitel&Deitel, "Java How to Program", Prentice Hall, 10th Edition, 2016.					

17ITM03 – DATABASE SYSTEM CONCEPTS
(Common to 17CSM03)

L	T	P	C
3	0	0	3

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the different issues involved in the design and implementation of a database system.	**1.1**	The students will be able to describe the role of Database Management System in an Organization.	**a,c,j,k**
2.0	To study the physical and logical database designs, database modeling.	**2.1**	The students will be able to study basic database concepts including the structure and operations of the relational data model.	**a,c,j,k**
3.0	To understand and use data manipulation language to query, update, and manage a database	**3.1**	The students will be able to construct simple and Moderately advanced database queries using SQL	**a,b,c,j,k**
4.0	To develop an understanding of essential DBMS concepts.	**4.1**	The students will be able to apply logical database design principles includes E-R diagrams & Normalization.	**a,b,c,k**
5.0	To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS	**5.1**	The students will be able to explain various file organizing & Indexing structure	**a,b,c,k**

UNIT I INTRODUCTION **(9)**

Introduction to database systems - Definition of DBMS - Advantages of dbms - Views of data - Levels of data abstraction - Data Models and types - Database architecture - Entity relationship model - ER diagram.

UNIT II - RELATIONAL DATA MODEL **(9)**

Relational database structure - Procedural and Non procedural languages - Relational algebra : operations - Relational Calculus : Tuple relational calculus - Domain Relational Calculus - Integrity Constraints - SQL Commands : DDL - DML - TCL

UNIT III - DATABASE DESIGN **(9)**

Functional dependency: Full functional Dependency - Partial dependency - Transitive dependency - multi valued dependency - Decomposition - Normalization - Normal Forms: 1NF - 2NF - 3NF - BCNF - 4NF - 5NF

UNIT IV - TRANSACTIONAL PROCESSING **(9)**

Transaction - Properties of transaction - Transaction state - Serialization : types - Need for Serialization - Two Phase Commit - Save Point - Concurrency - Advantages of concurrency - Concurrency control mechanism - Locking protocols

UNIT V - MEMORY STRUCTURES AND FILE ORGANIZATION **(9)**

Memory hierarchy - Disk storage - Raid levels - Indexing: types - Hashing techniques - Query Processing tool - Query Evaluation.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Seventh Edition, McGraw Hill, 2020.

REFERENCES:

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.

17ITM04 – UI and UX DESIGN (Common to 17CSM07)					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To provide a sound knowledge in UI & UX	**1.1**	The students will be able to Build UI for user Applications	**a,b,c,d,e,i,j,k,l**	
2.0	To understand the need for UI and UX	**2.1**	The students will be able to Evaluate UX design of any product or application	**a,b,c,d,e,i,j,k,l**	
3.0	To understand the various Research Methods used in Design	**3.1**	The students will be able to Demonstrate UX Skills in product development	**a,b,c,d,e,i,j,k,l**	
4.0	To explore the various Tools used in UI & UX	**4.1**	The students will be able to Implement Sketching principles	**a,b,c,d,e,i,j,k,l**	
5.0	Creating a wireframe and prototype	**5.1**	The students will be able to Create Wireframe and Prototype	**a,b,c,d,e,i,j,k,l**	
UNIT I FOUNDATIONS OF DESIGN					**(9)**
UI vs. UX Design - Core Stages of Design Thinking - Divergent and Convergent Thinking - Brainstorming and Game storming - Observational Empathy					
UNIT II FOUNDATIONS OF UI DESIGN					**(9)**
Visual and UI Principles - UI Elements and Patterns - Interaction Behaviors and Principles – Branding - Style Guides					
UNIT III FOUNDATIONS OF UX DESIGN					**(9)**
Introduction to User Experience - Why You Should Care about User Experience - Understanding User Experience - Defining the UX Design Process and its Methodology - Research in User Experience Design - Tools and Method used for Research - User Needs and its Goals - Know about Business Goals					
UNIT IV WIREFRAMING, PROTOTYPING AND TESTING					**(9)**
Sketching Principles - Sketching Red Routes - Responsive Design – Wireframing - Creating Wireflows - Building a Prototype - Building High-Fidelity Mockups - Designing Efficiently with Tools - Interaction Patterns - Conducting Usability Tests - Other Evaluative User Research Methods - Synthesizing Test Findings - Prototype Iteration					
UNIT V RESEARCH, DESIGNING, IDEATING, & INFORMATION ARCHITECTURE					**(9)**
Identifying and Writing Problem Statements - Identifying Appropriate Research Methods - Creating Personas - Solution Ideation - Creating User Stories - Creating Scenarios - Flow Diagrams - Flow Mapping - Information Architecture					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Joel Marsh, “UX for Beginners”, O’Reilly , 2022
2. Jon Yablonski, “Laws of UX using Psychology to Design Better Product & Services” O’Reilly 2021.

REFERENCES:

1. Jenifer Tidwell, Charles Brewer, Aynne Valencia, “Designing Interface” 3 rd Edition , O’Reilly 2020
2. Steve Schoger, Adam Wathan “Refactoring UI”, 2018
3. Steve Krug, “Don't Make Me Think, Revisited: A Commonsense Approach to Web & Mobile”, Third Edition, 2015
4. https://www.nngroup.com/articles/
5. https://www.interaction-design.org/literature.

17ITM05 – WEB ESSENTIALS					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To comprehend and analyze the basic concepts of web programming and internet protocols.	**1.1**	The students will be able to Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites	**a,b,c,d,e,f,i,j,k,l**
2.0	To describe how the client-server model of Internet programming works.	**2.1**	The students will be able to Design and deploy simple web-applications	**a,b,c,d,e,f,i,k,l**
3.0	To demonstrate the uses of scripting languages	**3.1**	The students will be able to Handle multimedia components	**a,b,c,d,e,f,i,j,k,l**
4.0	To write simple scripts for the creation of web sites	**4.1**	The students will be able to Create simple PHP scripts	**a,b,c,d,e,f,i,j,k,l**
5.0	To create database applications	**5.1**	The students will be able to Create simple database applications.	**a,b,c,d,e,f,k,l**

UNIT I WEBSITE BASICS	**(9)**
Internet Overview - Fundamental computer network concepts - Web Protocols - URL – Domain Name- Web Browsers and Web Servers- Working principle of a Website –Creating a Website - Client-side and server-side scripting	
UNIT II WEB DESIGNING	**(9)**
HTML – Form Elements - Input types and Media elements - CSS3 - Selectors, Box Model, Backgrounds and Borders, Text Effects, Animations, Multiple Column Layout, User Interface.	
UNIT III CLIENT-SIDE PROCESSING AND SCRIPTING	**(9)**
JavaScript Introduction – Variables and Data Types-Statements – Operators - Literals-FunctionsObjects-Arrays-Built-in Objects- Regular Expression, Exceptions, Event handling, Validation - JavaScript Debuggers	
UNIT IV SERVER SIDE PROCESSING AND SCRIPTING – PHP	**(9)**
PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - File Uploading – Email Basics - Email with attachments - PHP and HTML - Simple PHP scripts - Databases with PHP	
UNIT V SERVLETS AND DATABASE CONNECTIVITY	**(9)**
Servlets: Java Servlet Architecture – Servlet Life cycle- Form GET and POST actions -Sessions – Cookies – Database connectivity - JDBC Creation of simple interactive applications - Simple database applications	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'Reilly publishers, 2014. 84
2. Paul Deitel, Harvey Deitel, Abbey Deitel, “Internet & World Wide Web - How to Program”, 5th edition, Pearson Education, 2012.

REFERENCES:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2. James F. Kurose, “Computer Networking: A Top-Down Approach”, Sixth Edition, Pearson Education, 2012
3. Steven Holzener , “PHP – The Complete Reference”, 1st Edition, Mc-Graw Hill, 2017
4. Fritz Schneider, Thomas Powell , “JavaScript – The Complete Reference”, 3rd Edition, McGraw Hill Publishers, 2017
5. Bates, “Developing Web Applications”, Wiley Publishers, 2006

17ITM06 – FULL STACK WEB DEVELOPMENT					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To understand the various components of full stack development	**1.1**	The students will be able to Understand the various stacks available for web application development.	**a,b,i,j,k,l**	
2.0	To learn Node.js features and applications	**2.1**	The students will be able to Use Node.js for application development	**a,b,c,d,e,f,i,k,l,**	
3.0	To develop applications with MongoDB	**3.1**	The students will be able to Develop applications with MongoDB	**a,b,c,d,e,f,i,j,k,l,**	
4.0	To understand the role of Angular and Express in web applications	**4.1**	The students will be able to : Use the features of Angular and Express	**a,b,c,d,e,f,i,j,k,l,**	
5.0	To develop simple web applications with React	**5.1**	The students will be able to Develop React applications	**a,b,c,d,e,f,i,j,k,l,**	
UNIT I BASICS OF FULL STACK					**(9)**
Understanding the Basic Web Development Framework - User - Browser – Webserver - Backend Services – MVC Architecture - Understanding the different stacks –The role of Express – Angular – Node – Mongo DB – React					
UNIT II NODE JS					**(9)**
Basics of Node JS – Installation – Working with Node packages – Using Node package manager – Creating a simple Node.js application – Using Events – Listeners –Timers - Callbacks – Handling Data I/O – Implementing HTTP services in Node.js					
UNIT III MONGO DB					**(9)**
Understanding NoSQL and MongoDB – Building MongoDB Environment – User accounts – Access control – Administering databases – Managing collections – Connecting to MongoDB from Node.js – simple applications					
UNIT IV EXPRESS AND ANGULAR					**(9)**
Implementing Express in Node.js - Configuring routes - Using Request and Response objects - Angular - Typescript - Angular Components - Expressions - Data binding - Built-in directives					
UNIT V REACT					**(9)**
MERN STACK – Basic React applications – React Components – React State – Express REST APIs - Modularization and Webpack - Routing with React Router – Server-side rendering					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley, 'Node.js, MongoDB and Angular Web Development', Addison-Wesley, Second Edition, 2018
2. Vasan Subramanian, 'Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node', Second Edition, Apress, 2019.

REFERENCES:

1. Chris Northwood, 'The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', Apress; 1st edition, 2018
2. Kirupa Chinnathambi, 'Learning React: A Hands-On Guide to Building Web Applications Using React and Redux', Addison-Wesley Professional, 2nd edition, 2018
3. https://www.tutorialspoint.com/the_full_stack_web_development/index.asp
4. https://www.coursera.org/specializations/full-stack-react
5. https://www.udemy.com/course/the-full-stack-web-development/

17ITM07 – APP DEVELOPMENT					
			L	T	P	C
			3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcomes**	
1.0	To learn development of native applications with basic GUI Components	**1.1**	The students will be able to Develop Native applications with GUI Components.	**a,b,c,d,e,i,j,k,l**	
2.0	To develop cross-platform applications with event handling	**2.1**	The students will be able to Develop hybrid applications with basic event handling.	**a,b,c,d,e,i,j,k,l**	
3.0	To develop applications with location and data storage capabilities	**3.1**	The students will be able to Implement cross-platform applications with location and data storage capabilities	**a,b,c,d,e,i,j,k,l**	
4.0	To Develop applications with GUI and Event handling	**4.1**	The students will be able to Implement cross platform applications with basic GUI and event handling.	**a,b,c,d,e,i,j,k,l**	
5.0	To develop web applications with database access	**5.1**	The students will be able to Develop web applications with cloud database access.	**a,b,c,d,e,i,j,k,l**	
UNIT I FUNDAMENTALS OF MOBILE & WEB APPLICATION DEVELOPMENT					**(9)**
Basics of Web and Mobile application development, Native App, Hybrid App, Cross-platform App, What is Progressive Web App, Responsive Web design					
UNIT II NATIVE APP DEVELOPMENT USING JAVA					**(9)**
Native Web App, Benefits of Native App, Scenarios to create Native App, Tools for creating Native App, Cons of Native App, Popular Native App Development Frameworks, Java & Kotlin for Android, Swift & Objective-C for iOS, Basics of React Native, Native Components, JSX, State, Props					
UNIT III HYBRID APP DEVELOPMENT					**(9)**
Hybrid Web App, Benefits of Hybrid App, Criteria for creating Native App, Tools for creating Hybrid App, Cons of Hybrid App, Popular Hybrid App Development Frameworks, Ionic, Apache Cordova					
UNIT IV CROSS-PLATFORM APP DEVELOPMENT USING REACT-NATIVE					**(9)**
What is Cross-platform App, Benefits of Cross-platform App, Criteria for creating Cross-platform App, Tools for creating Cross-platform App, Cons of Cross-platform App, Popular Crossplatform App Development Frameworks, Flutter, Xamarin, React-Native, Basics of React Native, Native Components, JSX, State, Props					
UNIT V NON-FUNCTIONAL CHARACTERISTICS OF APP FRAMEWORKS					**(9)**
Comparison of different App frameworks, Build Performance, App Performance, Debugging capabilities, Time to Market, Maintainability, Ease of Development, UI/UX, Reusability					
TOTAL (L: 45) = 45 PERIODS					

TEXT BOOKS:

1. Head First Android Development, Dawn Griffiths, O'Reilly, 1st edition
2. Apache Cordova in Action, Raymond K. Camden, Manning. 2015
3. Full Stack React Native: Create beautiful mobile apps with JavaScript and React Native, Anthony Accomazzo, Houssein Djirdeh, Sophia Shoemaker, Devin Abbott, FullStack publishing

REFERENCES:

1. Android Programming for Beginners, John Horton, Packt Publishing, 2nd Edition
2. Native Mobile Development by Shaun Lewis, Mike Dunn
3. Building Cross-Platform Mobile and Web Apps for Engineers and Scientists: An Active Learning Approach, Pawan Lingras, Matt Triff, Rucha Lingras
4. Apache Cordova 4 Programming, John M Wargo, 2015
5. React Native Cookbook, Daniel Ward, Packt Publishing, 2nd Edition

17ITM08 – WEB APPLICATION SECURITY					
		L	T	P	C
		3	0	0	3

PRE REQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

Course Objectives		Course Outcomes		Related Program outcomes
1.0	To understand the fundamentals of web application security	**1.1**	The students will be able to Understand the basic concepts of web application security and the need for it.	**a,b,c,d,e,i,j,k,l**
2.0	To focus on wide aspects of secure development and deployment of web applications	**2.1**	The students will be able to be acquainted with the process for secure development and deployment of web applications	**a,b,c,d,e,i,j,k,l**
3.0	To learn how to build secure APIs	**3.1**	The students will be able to Acquire the skill to design and develop Secure Web Applications that use Secure APIs	**a,b,c,d,e,i,j,k,l**
4.0	To learn the basics of vulnerability assessment and penetration testing	**4.1**	The students will be able to get the importance of carrying out vulnerability assessment and penetration testing	**a,b,c,d,e,i,j,k,l**
5.0	To get an insight about Hacking techniques and Tools	**5.1**	The students will be able to Acquire the skill to think like a hacker and to use hackers tool sets	**a,b,c,d,e,i,j,k,l**

UNIT I FUNDAMENTALS OF WEB APPLICATION SECURITY **(9)**

The history of Software Security-Recognizing Web Application Security Threats, Web Application Security, Authentication and Authorization, Secure Socket layer, Transport layer Security, Session Management-Input Validation

UNIT II SECURE DEVELOPMENT AND DEPLOYMENT **(9)**

Web Applications Security - Security Testing, Security Incident Response Planning,The Microsoft Security Development Lifecycle (SDL), OWASP Comprehensive Lightweight Application Security Process (CLASP), The Software Assurance Maturity Model (SAMM)

UNIT III SECURE API DEVELOPMENT **(9)**

API Security- Session Cookies, Token Based Authentication, Securing Natter APIs: Addressing threats with Security Controls, Rate Limiting for Availability, Encryption, Audit logging, Securing service-to-service APIs: API Keys , OAuth2, Securing Microservice APIs: Service Mesh, Locking Down Network Connections, Securing Incoming Requests

UNIT IV VULNERABILITY ASSESSMENT AND PENETRATION TESTING **(9)**

Vulnerability Assessment Lifecycle, Vulnerability Assessment Tools: Cloud-based vulnerability scanners, Host-based vulnerability scanners, Network-based vulnerability scanners, Database based vulnerability scanners, Types of Penetration Tests: External Testing, Web Application Testing, Internal Penetration Testing, SSID or Wireless Testing, Mobile Application Testing.

UNIT V HACKING TECHNIQUES AND TOOLS **(9)**

Social Engineering, Injection, Cross-Site Scripting(XSS), Broken Authentication and Session Management, Cross-Site Request Forgery, Security Misconfiguration, Insecure Cryptographic Storage, Failure to Restrict URL Access, Tools: Comodo, OpenVAS, Nexpose, Nikto, Burp Suite, etc.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Andrew Hoffman, Web Application Security: Exploitation and Countermeasures for Modern Web Applications, First Edition, 2020, O'Reilly Media, Inc.
2. Bryan Sullivan, Vincent Liu, Web Application Security: A Beginners Guide, 2012, The McGraw-Hill Companies.
3. Neil Madden, API Security in Action, 2020, Manning Publications Co., NY, USA.

REFERENCES:

1. Michael Cross, Developer's Guide to Web Application Security, 2007, Syngress Publishing, Inc.
2. Ravi Das and Greg Johnson, Testing and Securing Web Applications, 2021, Taylor & Francis Group, LLC.
3. Prabath Siriwardena, Advanced API Security, 2020, Apress Media LLC, USA.
4. Malcom McDonald, Web Security for Developers, 2020, No Starch Press, Inc.
5. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, Gideon Lenkey, and Terron Williams Grey Hat Hacking: The Ethical Hacker's Handbook, Third Edition, 2011, The McGraw-Hill Companies.

17ITX37 PROBLEM SOLVING USING JAVA					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**		**Related Program outcome**	
1.0	To understand the basics of Java Programming Language	**1.1**	The Students will be able to solve simple problems using Java.	**a,b,c,d,e, h,j,k,l**	
2.0	To understand fundamentals of programming such as conditional and iterative execution	**2.1**	The students will be able to write programs using branching and looping statements	**a,b,c,d,e, h,i,j,k,l**	
3.0	To understand the concepts of Java arrays and Strings.	**3.1**	The students will be able to Be able to develop confidently with Strings and implement arrays.	**a,b,c,d,e, h,i,j,k,l**	
4.0	To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods.	**4.1**	The students will be able to understand basic oops concepts and develop applications using inheritance and interfaces.	**a,b,c,d,e, h,i,j,k,l**	
5.0	To understand threads and collection concepts	**5.1**	The students will be able to build applications using threads and collection framework.	**a,b,c,d,e, h,i,j,k,l**	

UNIT I - INTRODUCTION TO JAVA	(9)
History of java-Features-Glimpse of java-Data types and Variables-Local variable-Instance variable-static variable-Keywords: this, super, final- Type conversion & casting- Importance of Scanner class-Getting started with Eclipse IDE and VSCode.	
UNIT II-OPERATORS AND DECISION MAKING STATEMENTS	(9)
Operators- Arithmetic Operator, Bitwise Operator, Conditional Operator, Unary Operator-Relational and Logical operators-Conditional statements: If else, If else if, Nested if -Looping Statements: For Loop, while Loop, do while loop-switch-break-continue- auto boxing and unboxing.	
UNIT III-ARRAYS AND STRINGS	(9)
Arrays: One Dimensional Array-Two Dimensional Array-Inbuilt functions in arrays. Strings-String array-Inbuilt functions in Strings-String Buffer class-String Builder class-String Tokenizer class	
UNIT IV-OBJECT-ORIENTED PROGRAMMING PARADIGM	(9)
Class-objects-Encapsulation-Inheritance and its types-Polymorphism: Static binding and dynamic binding-Methods –Constructors and its types-Abstract class-Interface.	
UNIT V- MULTITHREADING AND COLLECTIONS	(9)
Throwable classes-Exception types-Exception keywords-Collection classes: List, Set-Thread-Ways of thread creation-methods-thread priorities-Synchronization-multithreading-Lambda Expression.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Herbert Schildt, “Java:The Complete Reference”,McGraw Hill Education, Twelfth edition,2021.

REFERENCE:

1. Cay.S.Horstmann,GaryCornell, “Core Java-JAVA Fundamentals”, Prentice Hall,Eleventh edition, 2020.

17ITX38 PRODUCT LIFE CYCLE MANAGEMENT					
		L	T	P	C
		2	0	2	3
PREREQUISITE : NIL					
COURSE OBJECTIVES AND OUTCOMES:					
Course Objectives		**Course Outcomes**			**Related Program Outcome**
1.0	To understand history, concepts and terminology of PLM.	**1.1**	The students will be able to understand history, concepts and terminology of PLM		**a,b**
2.0	To understand the changes that effects the business	**2.1**	The students will be able to Understand different changes that effects the business		**a,b,c**
3.0	To Interpret the technology forecasting and product innovation and development in business processes.	**3.1**	The students will be able to understand benefits of PLM in Business.		**a,b,d,j,k**
4.0	To understand PLM in service industry	**4.1**	The students will be able to understand the role of PLM in service industry.		**a,b,e,f,i**
5.0	To Familiarize with various strategies of PLM	**5.1**	The students will be able to familiar with various strategies of PLM		**a,b,d,l**

Unit I – INTRODUCTION TO PRODUCT LIFECYCLE MANAGEMENT	**(9)**
Introduction to PLM, Fundamentals of PLM- Objective of PLM - Activities of PLM - Joined-up and Holistic Approach - Generic Product Lifecycle Phases, PLM Grid, Components of PLM Grid, Why PLM, How PLM.	
Unit II - COMPLEX AND CHANGING ENVIRONMENT	**(9)**
Changes and Interconnections, Macroeconomic and Geopolitical Changes, Environmental and Social Changes, Corporate Changes, Technological Changes, Product Changes, The Result and the Requirements	
UNIT III - PLM DEPLOYMENT AND BUSINESS BENEFITS	**(9)**
Deployment Stages of PLM, PLM maturity model, Realization stage of the project, Accomplishing change, Business benefits of a PLM system - Factors leading to PLM, Benefits of the PLM system, Improving the productivity of labour, Costs of quality, PLM and data warehousing as a tool to support decision-making	
UNIT IV – SERVICE INDUSTRY AND PLM	**(9)**
Introduction to service, Further productization, Making a service, PLM in service business - PLM challenges in service business, Services modularized, Making items out of product functions, IT specifically variable product	

UNIT V - PRODUCT AND PRODUCT MANAGEMENT STRATEGY AS A PART OF BUSINESS STRATEGY	(9)
Product lifecycle management as a business strategy tool, From changes in the business environment to product strategy, Making a product strategy, Product management strategy, Time to market, Time to react, Time to volume, Time to service, Electronic business and PLM	
TOTAL (L:45) : 45 PERIODS	

TEXT BOOKS:

1. John Stark, "Product Lifecycle Management: 21st Century Paradigm for Product Realisation", Springer Publisher, 2011 (2nd Edition).
2. Antti Saaksvuori and Anselmi Immonen, "Product Lifecycle Management", Springer Publisher, 2008 (3rd Edition).

REFERENCES:

1. International Journal of Product Lifecycle Management, Inderscience Publishers
2. Ivica Crnkovic, Ulf Asklund and Annita Persson Dahlqvist, "Implementing and Integrating ProductData Management and Software Configuration Management", Art ech House Publishers, 2003.