NANDHA ENGINEERING COLLEGE
(Autonomous)
Affiliated to Anna University Chennai ✦ Approved by AICTE ✦ Accredited by NBA-NewDelhi
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1.1.2 Details of Courses where syllabus revision was carried out in

B. Tech - Information Technology

Course Code	Course Name	% of Change
17MYB01	Calculus and Solid Geometry	30
17CYB04	Chemistry for Computer Engineers	40
17CSC03	Structured Programming	20
17CSC02	Python Programming	50
17CSP02	Python Programming Laboratory	30
17CSP03	Structured Programming Laboratory	35
17MYB02	Complex Analysis and Laplace Transforms	40
17CSC04	Data Structures using Python	25
17MYB04	Probability and Statistics	40
17ITC01	OOPS using Java	20
17ITP01	OOPS using Java Laboratory	30
17ITC04	Design and Analysis of Algorithm	50
17ITC07	Software Engineering	45
17ECC12	Digital Signal Processing	45
17ITC10	Object Oriented Analysis and Design	25
17ITC11	Computer Graphics and Multimedia	70
17ITP04	Case Tools Laboratory	60
17ITC14	Cryptography and Network Security	25
17CSP09	Internet of Things Laboratory	30
17ITX01	Data Science and Big Data Analytics	30
17ITX05	PHP Programming	40
17ITX06	Programming with JAVA 2 Enterprise Edition	85
17ITX04	Datamining and warehousing	60
17ITX10	Mobile Communication	80
17ITX11	Principles of Cloud Computing	20
17ITX12	Ethical Hacking	20
17ITX18	Business Intelligence	80
17ITX20	Finite Automata	80
	Average	**43.83 %**

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NANDHA ENGINEERING COLLEGE (AUTONOMOUS), ERODE – 638 052

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

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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

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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	-	4	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	27	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	CATEG ORY	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			

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.	17ITX01	Data Science and Big Data Analytics	PSE	17MYB04 17CSC07	4	2	0	2	3
2.	17ITX02	Advanced Database Management System	PSE	17CSC07	3	3	0	0	3
3.	17ITX03	Object Oriented Database Management System	PSE	17ITC01 17CSC07	3	3	0	0	3
4.	17ITX04	Data mining and warehousing	PSE	17CSC07	3	3	0	0	3
5.	17ITX05	PHP Programming	PSE	17ITC09	3	3	0	0	3
6.	17ITX06	Programming with JAVA 2 Enterprise Edition	PSE	17ITC01	3	3	0	0	3
7.	17ITX07	Advanced Web Programming	PSE	17ITC09	3	3	0	0	3
8.	17ITX08	C# and .Net	PSE	17ITC01	3	3	0	0	3
9.	17ITX09	Ruby Programming	PSE	-	3	3	0	0	3

10.	17ITX10	Mobile Communication	PSE	17ITC05	3	3	0	0	3
11.	17ITX11	Principles of Cloud computing	PSE	-	3	3	0	0	3
12.	17ITX12	Ethical Hacking	PSE	17ITC13	3	3	0	0	3
13.	17ITX13	Social media network analysis	PSE	17ITC05	3	3	0	0	3
14.	17ITX14	Software Testing	PSE	-	3	3	0	0	3
15.	17CSX19	Software Agents	PSE	-	3	3	0	0	3
16.	17ITX15	Information Storage Management	PSE	17CSC07	3	3	0	0	3
17.	17CSX11	Human Computer Interaction	PSE	17ITC05	3	3	0	0	3
18.	17ITX16	Composing Mobile Apps	PSE	-	3	3	0	0	3
19.	17ITX17	Building Enterprise Applications	PSE	17ITX06	3	3	0	0	3
20.	17ITX18	Business Intelligence	PSE	-	3	3	0	0	3
21.	17ITX19	Information Security Management	PSE	-	3	3	0	0	3
22.	17ITX20	Finite Automata	PSE	17ITC13	3	3	0	0	3
23.	17CSX20	Software Quality Assurance	PSE	-	3	3	0	0	3
24.	17ITX21	Knowledge Management Techniques	PSE	-	3	3	0	0	3
25.	17ITX22	Enterprise Resource Planning	PSE	-	3	3	0	0	3
26.	17CSX22	Natural Language Processing	PSE	-	3	3	0	0	3
27.	17ITX23	Text Mining Techniques	PSE	-	3	3	0	0	3
28.	17ITX24	Distributed Systems Concepts and Design	PSE	-	3	3	0	0	3
29.	17ITX25	Video Processing And Analytics	PSE	-	3	3	0	0	3
30.	17MYB12	Basic Statistics and Numerical Analysis	PSE	-	3	3	0	0	3
31.	17ITX26	Problem Solving and Algorithmic Skills	PSE	-	3	3	0	0	3
32.	17CSX31	Problem Solving And Programming	PSE	-	3	3	0	0	3
33.	17ECX16	Internet of Things and its Applications	PSE	-	3	3	0	0	3
34.	17CSX29	Internet of Things	PSE	17ITC05	3	3	0	0	3
35.	17ITX27	Data Science Techniques	PSE	-	3	3	0	0	3
36.	17ITX28	Agile Software Development	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	VII/VII I
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.	17ECZ01	Modern wireless communication system	OE	-	3	3	0	0	3	VII
21.	17ECZ02	Consumer Electronics	OE	-	3	3	0	0	3	VII
22.	17ECZ03	Automotive Electronics	OE	-	3	3	0	0	3	VIII
23.	17ECZ04	Electronic Testing	OE	-	3	3	0	0	3	VIII
24.	17EEZ01	Renewable Energy Technology	OE	-	3	3	0	0	3	VII
25.	17EEZ02	Smart Grid	OE	-	3	3	0	0	3	VII
26.	17EEZ03	Energy Auditing, Conservation and Management	OE	-	3	3	0	0	3	VIII
27	17EEZ04	Electrical Machines	OE	-	3	3	0	0	3	VIII
28	17EIZ01	Autotronix	OE	-	3	3	0	0	3	VII
29	17EIZ02	Industrial Automation	OE	-	3	3	0	0	3	VII
30	17EIZ03	Fiber Optic Sensors	OE	-	3	3	0	0	3	VIII

31.	17EIZ04	Ultrasonic Instrumentation	OE	-	3	3	0	0	3	VIII
32.	17ITZ01	Software Testing Tool	OE	-	3	3	0	0	3	VII
33.	17ITZ02	User Experience	OE	-	3	3	0	0	3	VII
34.	17ITZ03	Developing Mobile Apps	OE	-	3	3	0	0	3	VIII
35.	17ITZ04	Software Project Management	OE	-	3	3	0	0	3	VIII
36.	17ITZ05	Java Programming	OE	-	3	3	0	0	3	
37.	17MEZ01	Engineering Ergonomics	OE	-	3	3	0	0	3	VII / VIII
38.	17MEZ02	Energy Audit and Resource Management	OE	-	3	3	0	0	3	VII / VIII
39.	17MEZ03	Electric Vehicle Technology	OE	-	3	3	0	0	3	VII / VIII
40.	17MEZ04	Value Engineering	OE	-	3	3	0	0	3	VII / VIII
41.	17MEZ05	Smart Mobility	OE	-	3	3	0	0	3	VII / VIII
42.	17MEZ06	Smart Sensor Systems	OE	-	3	3	0	0	3	VII / VIII
43.	17MYZ01	Mathematical Structures	OE	-	3	3	0	0	3	VII
44.	17MYZ02	Optimization Techniques	OE	-	3	3	0	0	3	VII
45.	17MYZ03	Statics for Engineers	OE	-	3	3	0	0	3	VII
46.	17MYZ04	Statistics for Engineers	OE	-	3	3	0	0	3	VII
47.	17PYZ01	Nanomaterials	OE	-	3	3	0	0	3	VII
48.	17PYZ02	Nuclear physics and Reactors	OE	-	3	3	0	0	3	VII
49.	17PYZ03	Space science and technology	OE	-	3	3	0	0	3	VII
50..	17CYZ01	Chemistry for Every Day Life	OE	-	3	3	0	0	3	VII
51	17CYZ02	E - Waste Management	OE	-	3	3	0	0	3	VII
52	17CYZ03	Industrial Chemistry	OE	-	3	3	0	0	3	VII
53	17EYZ01	Communicative Hindi	OE	-	3	3	0	0	3	VII
54	17EYZ02	Fundamentals of German	OE	-	3	3	0	0	3	VII
55	17EYZ03	Basics of Japanese	OE	-	3	3	0	0	3	VII
56	17EYZ04	Employability Enhancement and Analytical Skills	OE	-	3	3	0	0	3	VII
57	17EYX01	Effective Communication	OE	-	3	3	0	0	3	VII
58	17GYZ01	Biology for Engineers	OE	-	3	3	0	0	3	VII
59.	17BMZ01	Health care technology	OE	-	3	3	0	0	3	VII
60.	17BMZ02	Telemedicine	OE	-	3	3	0	0	3	VII
61.	17BMZ03	Epidemiology and Pandemic Management	OE	-	3	3	0	0	3	VII
62.	17BMZ04	Medical Ethics	OE	-	3	3	0	0	3	VII

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

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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).

Approved by Eighth Academic Council

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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.

STRUCTURED PROGRAMMING

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.

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.

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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

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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

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).

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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: 1. 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.

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.

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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.

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.

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

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.

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.

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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, 4th 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.

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

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.

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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

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.

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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.

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

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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.

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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.

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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 to take 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.

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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	Tounderstand the fundamentals of Business intelligence.	1.1	The students will be able to explainthe 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 explainthe 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 – Qlik 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 toBI Integration with softwares - 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.

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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.

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

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

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.