NANDHA ENGINEERING COLLEGE
(Autonomous)

Affiliated to Anna University Chennai ❖ Approved by AICTE ❖ Accredited by NBA-NewDelhi

Pitchandampalayam, (P.O), Vaikkalmedu, Erode - Perundurai Road, Erode - 638 052

Phone : 04294-225585, 223711, 223722, 226393 Mobile : 73737 23722 Fax : 04294 - 224787

Website : www.nandhaengg.org E.mail : info@nandhaengg.org

1.1.2 Details of Courses where syllabus revision was carried out in

B.E - Electronics and Communication Engineering

Course Code	Course Name	% of Change
17CYB02	Applied Electro Chemistry	45
17ECC03	Circuit Theory	20
17ECC07	Signals and Systems	35
17ECP03	Digital Logic Design Laboratory	40
17MYB09	Probability and Random Processes	30
17ECC14	Data Communication and Networks	20
17ECC15	Transmission Lines and Waveguides	20
17ECP08	Microprocessor and Microcontroller Interfacing Laboratory	50
17ECC17	VLSI Design	25
17ECX03	Radar and Navigational Aids	50
17ECX09	Wireless Communication	30
17ITC08	Fundamentals of Java Programming	20
17GEA03	Total Quality Management	20
	Average	**31.15 %**

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REGULATIONS – 2017 CHOICE BASED CREDIT SYSTEM

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULAM: I – VIII SEMESTERS SYLLABUS: 1 to 8 SEMESTERS

SEMESTER: I									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	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.	17PYB01	Physics for Engineers	BS	-	3	3	0	0	3
4.	17CYB02	Applied Electrochemistry	BS	-	3	3	0	0	3
5.	17CSC02	Python Programming	ES	-	3	3	0	0	3
6.	17ECC01	Electronic Devices	ES	-	3	3	0	0	3
PRACTICAL									
7.	17CSP02	Python Programming Laboratory	ES	-	4	0	0	4	2
8.	17GYP02	Engineering Practices Laboratory	ES	-	4	0	0	4	2
9.	17GEP01	Personal Values	HS	-	2	0	0	2	0
				TOTAL	31	17	2	12	23

SEMESTER: II									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	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.	17PYB05	Physics of Solids	BS	17PYB01	3	3	0	0	3
4.	17CYB03	Environmental Science	BS	-	3	3	0	0	3
5.	17MEC01	Engineering Graphics	ES	-	4	2	2	0	3
6.	17ECC03	Circuit Theory	ES	-	3	3	0	0	3
PRACTICAL									
7.	17GYP01	Physics and Chemistry Laboratory	BS	-	4	0	0	4	2
8.	17ECP01	Circuits and Devices Laboratory	ES	17ECC01	4	0	0	4	2
9.	17GEP02	Inter Personal Values	HS	17GEP01	2	0	0	2	0
				TOTAL	32	16	4	12	23

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SEMESTER: III									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17MYB05	Transforms and Partial Differential Equations	BS	17MYB02	4	2	2	0	3
2.	17ITC03	Data Structures and Algorithms	ES	-	4	2	0	2	3
3.	17ECC05	Electrical Machines and instruments	ES	-	3	3	0	0	3
4.	17ECC06	Digital Logic Design	PC	17ECC01	3	3	0	0	3
5.	17ECC07	Signals and Systems	PC	17MYB02	4	2	2	0	3
6.	17ECC08	Analog Electronics	PC	17ECC01	3	3	0	0	3
PRACTICAL									
7.	17ECP03	Digital Logic Design Laboratory	PC	17ECP01	4	0	0	4	2
8.	17ECP04	Analog Electronics Laboratory	PC	17ECP01	4	0	0	4	2
9.	17GED02	Soft Skills-Reading and Writing	EEC	-	2	0	0	2	0
				TOTAL	31	15	4	12	22

SEMESTER: IV									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17MYB09	Probability and Random Processes	BS	17MYB02	4	2	2	0	3
2.	17ITC08	Fundamentals of Java Programming	ES	-	4	2	0	2	3
3.	17ECC10	Electromagnetic Fields	ES	17PYB01	4	2	2	0	3
4.	17ECC11	Analog Circuit Design	PC	17ECC01	3	3	0	0	3
5.	17ECC12	Digital Signal Processing	PC	-	4	2	2	0	3
6.	E1	Elective I (PSE)	PSE	-	3	3	0	0	3
PRACTICAL									
7.	17ECP06	Analog Circuit Design Laboratory	PC	17ECP01	4	0	0	4	2
8.	17ECP07	Digital Signal Processing Laboratory	PC	17ECC07	4	0	0	4	2
9.	17GED01	Soft Skills-Listening and Speaking	EEC	-	2	0	0	2	0
10.	17GED03	Personality and Character Development	EEC	-	1	0	0	1	0
				TOTAL	33	14	6	13	22

SEMESTER: V									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17GEA02	Principles of Management	HS	-	3	3	0	0	3
2.	17ECC13	Microprocessors and Microcontrollers Interfacing	PC	17ECC06	3	3	0	0	3
3.	17ECC14	Data Communication and Networks	PC	17ECC06	3	3	0	0	3
4.	17ECC15	Transmission Lines and Waveguides	PC	17ECC10	4	2	2	0	3
5.	E2	Elective II (PSE)	PSE	-	3	3	0	0	3
6.	E3	Elective III (PSE)	PSE	-	3	3	0	0	3
PRACTICAL									
7.	17ECP08	Microprocessors and Microcontrollers Interfacing Laboratory	PC	17ECP03	4	0	0	4	2
8.	17ECP09	Data Communication and Networks Laboratory	PC	17ECP03	4	0	0	4	2
9.	17GED08	Essence of Indian Traditional Knowledge	EEC	-	2	0	0	2	0
				TOTAL	29	17	2	10	22

SEMESTER: VI									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17ECC16	Analog and Digital Communication	PC	17ECC06	3	3	0	0	3
2.	17ECC17	VLSI Design	PC	17ECC13	3	3	0	0	3
3.	E4	Elective IV (PSE)	PSE	-	3	3	0	0	3
4.	E5	Elective V (PSE)	PSE	-	3	3	0	0	3
5.	E6	Elective VI (PSE)	PSE	-	3	3	0	0	3
6.	E 7	Elective VII	PSE/OE	-	3	3	0	0	3
PRACTICAL									
7.	17ECP10	Analog and Digital Communication Laboratory	PC	17ECP03	4	0	0	4	2
8.	17ECP11	VLSI Design Laboratory	PC	17ECP08	4	0	0	4	2
9.	17GED06	Comprehension	EEC	ALL CORE SUBJECT	2	0	0	2	0
10.	17GED07	Constitution of India	EEC	-	2	0	0	2	0
				TOTAL	31	17	0	14	22

SEMESTER: VII									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17ECC19	Microwave Engineering	PC	17ECC18	3	3	0	0	3
2.	17ECC20	Optical Communication	PC	17ECC16	3	3	0	0	3
3.	17ECC21	Embedded and Real Time Systems	PC	17ECC13	3	3	0	0	3
4.	17ECC18	Antenna and Wave Propagation	PC	17ECC15	4	2	0	2	3
5.	E 8	Elective VIII	PSE/OE	-	3	3	0	0	3
PRACTICAL									
6.	17ECP12	Microwave and Optical Laboratory	PC	17ECP10	4	0	0	4	2
7.	17ECP13	Embedded Systems Laboratory	PC	17ECP08	4	0	0	4	2
8.	17ECD01	Project work-I	EEC	-	8	0	0	8	4
				TOTAL	31	15	0	16	23

SEMESTER: VIII									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	E 9	Elective IX (OE)	OE	-	3	3	0	0	3
PRACTICAL									
2.	17ECD02	Project work-II	EEC	17ECD01	16	0	0	16	8
				TOTAL	19	3	0	16	11

TOTAL NO. OF CREDITS: 168

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS – 2017 **CHOICE BASED CREDIT SYSTEM**

(A) HS,BS, and ES Courses

(a) Humanities and Social Sciences (HS)			AICTE Credit Distribution Norm:12							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17EYA01	Professional English-I	HS	-	4	2	0	2	3	I
2.	17GEP01	Personal Values	HS	-	2	0	0	2	0	I
3.	17EYA02	Professional English-II	HS	17EYA01	4	2	0	2	3	II
4.	17GEP02	Inter Personal Values	HS	17GEP01	2	0	0	2	0	II
5.	17GEA02	Principles of Management	HS		3	3	0	0	3	V

(b) Basic Sciences (BS)			AICTE Credit Distribution Norm:25							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17MYB01	Calculus and Solid Geometry	BS	-	5	3	2	0	4	I
2.	17PYB01	Physics for Engineers	BS	-	3	3	0	0	3	I
3.	17CYB02	Applied Electrochemistry	BS	-	3	3	0	0	3	I
4.	17MYB02	Complex Analysis and Laplace Transforms	BS	17MYB01	5	3	2	0	4	II
5.	17PYB05	Physics of Solids	BS	17PYB01	3	3	0	0	3	II
6.	17CYB03	Environmental Science	BS	-	3	3	0	0	3	II
7.	17GYP01	Physics and Chemistry Laboratory	BS	-	4	0	0	4	2	II
8.	17MYB05	Transforms and Partial Differential Equations	BS	17MYB02	4	2	2	0	3	III
9.	17MYB09	Probability and Random Processes	BS	17MYB02	4	2	2	0	3	IV

(c) Engineering Sciences (ES)			AICTE Credit Distribution Norm:24							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17CSC02	Python Programming	ES	-	3	3	0	0	3	I
2.	17ECC01	Electronic Devices	ES	-	3	3	0	0	3	I
3.	17CSP02	Python Programming Laboratory	ES	-	4	0	0	4	2	I
4.	17GYP02	Engineering Practices Laboratory	ES	-	4	0	0	4	2	I
5.	17MEC01	Engineering Graphics	ES	-	4	2	2	0	3	II
6.	17ECC03	Circuit Theory	ES	-	3	3	0	0	3	II
7.	17ECP01	Circuits and Devices	ES	17ECC01	4	0	0	4	2	II

		Laboratory								
8.	17ECC05	Electrical Machines and instruments	ES	-	3	3	0	0	3	III
9.	17ITC03	Data Structures and Algorithms	ES	-	3	3	0	0	3	III
10.	17ECC10	Electromagnetic Fields	ES	17PYB01	3	3	0	0	3	IV
11.	17ITC08	Fundamentals of Java Programming	ES	-	3	2	0	2	3	IV

(B) Programme Core Courses (PC)			AICTE Credit Distribution Norm:48							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17ECC06	Digital Logic Design	PC	17ECC01	3	3	0	0	3	III
2.	17ECP03	Digital Logic Design Laboratory	PC	17ECP01	4	0	0	4	2	III
3.	17ECC07	Signals and Systems	PC	17MYB02	3	3	0	0	3	III
4.	17ECC08	Analog Electronics	PC	17ECC01	3	3	0	0	3	III
5.	17ECP04	Analog Electronics Laboratory	PC	17ECP01	4	0	0	4	2	III
6.	17ECC11	Analog Circuit Design	PC	17ECC01	3	3	0	0	3	IV
7.	17ECP06	Analog Circuit Design Laboratory	PC	17ECP01	4	0	0	4	2	IV
8.	17ECC12	Digital Signal Processing	PC	-	3	3	0	0	3	IV
9.	17ECP07	Digital Signal Processing Laboratory	PC	17ECC07	4	0	0	4	2	IV
10.	17ECC13	Microprocessor and Microcontroller Interfacing	PC	17ECC06	3	3	0	0	3	V
11.	17ECP08	Microprocessors and Microcontrollers Interfacing Laboratory	PC	17ECP03	4	0	0	4	2	V
12.	17ECC14	Data Communication and Networks	PC	17ECC06	3	3	0	0	3	V
13.	17ECP09	Data Communication and Networks Laboratory	PC	17ECP03	3	3	0	0	3	V
14.	17ECC14	Transmission Lines and Waveguides	PC	17ECC10	3	3	0	0	3	V
15.	17ECC16	Analog and Digital Communication	PC	17ECC06	3	3	0	0	3	VI
16.	17ECP10	Analog and Digital Communication Laboratory	PC	17ECC06	3	3	0	0	3	VI
17.	17ECC17	VLSI Design	PC	17ECC13	3	3	0	0	3	VI
18.	17ECP11	VLSI Design Laboratory	PC	17ECP08	4	0	0	4	2	VI
19.	17ECC18	Antenna and Wave Propagation	PC	17ECC15	3	3	0	0	3	VI
20.	17ECC19	Microwave Engineering	PC	17ECC18	3	3	0	0	3	VII
21.	17ECC20	Optical Communication	PC	17ECC16	3	3	0	0	3	VII
22.	17ECC21	Embedded and Real Time Systems	PC	17ECC13	3	3	0	0	3	VII
23.	17ECP12	Microwave and Optical	PC	17ECP10,	4	0	0	4	2	VII

		Laboratory		17ECC18							
24.	17ECP13	Embedded Systems Laboratory	PC	17ECP13	4	3	0	4	2	VII

(C) Elective Courses										
(a)Program Specific Electives(PSE)			AICTE Credit Distribution Norm:18							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17ECX01	Medical Electronics	PSE	-	3	3	0	0	3	IV
2.	17ECX02	Nano Electronics	PSE	-	3	3	0	0	3	IV
3.	17ECX03	Radar and Navigational Aids	PSE	-	3	3	0	0	3	V
4.	17ECX04	Sensor and its Applications	PSE	-	3	3	0	0	3	V
5.	17ECX05	MEMS and its Application	PSE	-	3	3	0	0	3	VI
6.	17ECX06	Computer Hardware Interfacing	PSE	-	3	3	0	0	3	VI
7.	17ECX07	Control Systems Engineering	PSE	-	3	3	0	0	3	VI
8.	17ECX08	Digital Image Processing	PSE	-	3	3	0	0	3	VI
9.	17ECX09	Wireless Communication	PSE	-	3	3	0	0	3	VII
10.	17ECX10	High Speed Networks	PSE	-	3	3	0	0	3	VII
11.	17ECX11	Modern Microprocessors and Microcontrollers	PSE	-	3	3	0	0	3	VII
12.	17ECX12	Protocols and Architectures for Wireless Sensor Networks	PSE	-	3	3	0	0	3	VII
13.	17ECX13	Telecommunication Switching and Networks	PSE	-	3	3	0	0	3	VII
14.	17ECX14	Multimedia Compression Techniques	PSE	-	3	3	0	0	3	VIII
15.	17ECX15	Satellite Communication	PSE	-	3	3	0	0	3	VIII
16.	17ECX16	Internet of Things and its applications	PSE	-	3	3	0	0	3	VII
17.	17ECX17	Speech Processing	PSE	-	3	3	0	0	3	VII
18.	17ECX18	Opto Electronic Devices	PSE	-	3	3	0	0	3	VII
19.	17ECX19	Cryptography and Network Security	PSE	-	3	3	0	0	3	VI
20.	17ECX20	Statistical Theory of Communication	PSE	-	3	3	0	0	3	VII
21.	17ECX21	Cognitive Radio	PSE	-	3	3	0	0	3	VI
22.	17CSX01	Data Science	PSE	-	3	3	0	0	3	VIII
23.	17CSX26	HADOOP Distributed Environment	PSE	-	3	3	0	0	3	VIII
24.	17CSX31	Problem Solving And Programming	PSE	-	3	3	0	0	3	III
25.	17ITC12	Database Systems Concepts	PSE	-	3	3	0	0	3	VIII
26.	17ITX26	Problem Solving And Algorithmic Skills	PSE	-	3	3	0	0	3	VI
27.	17GEA03	Total Quality Management	PSE	-	3	3	0	0	3	VIII

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28.	17GEA04	Professional Ethics and Human Values	PSE	-	3	3	0	0	3	VI
29.	17MYB12	Basic Statistics and Numerical Analysis	PSE	-	3	3	0	0	3	VI

(b)Open Electives			AICTE Credit Distribution Norm:18							
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/ VIII
14.	17CSZ01	Design Thinking	OE	-	3	3	0	0	3	VII
15.	17CSZ02	Digital Marketing	OE	-	3	3	0	0	3	VII
16.	17CSZ03	Software Engineering	OE	-	3	3	0	0	3	VIII
17.	17CSZ04	Unified Functional Testing	OE	-	3	3	0	0	3	VIII
18	17CSZ05	C Programming	OE	-	3	3	0	0	3	VI
19.	17CSZ06	Data Structures	OE	-	3	3	0	0	3	VI
20.	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

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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	VII
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

(D) Employability Enhancement Courses			AICTE Credit Distribution Norm:15							
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C	P.S
1.	17GED03	Personality and Character Development	EEC	-	1	0	0	1	0	VI
2.	17GED06	Comprehension	EEC	ALL CORE SUBJECS	2	0	0	2	0	VII
3.	17ECD01	Project Work-I	EEC	-	8	0	0	8	4	VII
4.	17ECD02	Project Work-II	EEC	17ECD01	16	0	0	16	8	VIII
5.	17GED07	Constitution of India	EEC	-	2	2	0	0	0	VI
6.	17GED08	Essence of Indian traditional knowledge	EEC	-	2	2	0	0	0	V

SUMMARY

S. No.	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
1.	HS	3	3	0	0	3	0	0	0	9
2.	BS	10	12	3	3	0	0	0	0	28
3.	ES	10	8	6	6	0	0	0	0	30
4.	PC	0	0	13	10	13	13	13	0	62
5.	PSE	0	0	0	3	6	9	3	0	21
6.	OE	0	0	0	0	0	0	3	3	6
7.	EEC	0	0	0	0	0	0	4	8	12
CREDITS TOTAL		23	23	22	22	22	22	23	11	168

17CYB02 – APPLIED ELECTRO CHEMISTRY
(Common to ECE,EEE, EIE & BME Branches)

L	T	P	C
3	0	0	3

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

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the principles of water characterization and treatment methods.	1.1	Apply knowledge of fundamental principles of chemistry.	a, f
2.0	To introduce the basic concepts of electrode potential and batteries.	2.1	Define and solve engineering problems, including the utilization of creative and innovative skills .	a, g
3.0	To understand the principles and applications of corrosion.	3.1	Gain practical experience with chemical process equipment as well as to analyze and interpret data.	a, c
4.0	To provide the knowledge polymer chemistry and nanomaterials.	4.1	Understand the impact of engineering solutions in a global, economic, environmental and societal content.	a, c, f
5.0	To study about the alloys and phase rule.	5.1	Understand the management of electronic waste	a, f

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– POLYMERS AND NANOMATERIALS (9)

Polymers - classification, addition, condensation and co polymerization - Plastics - thermoplastics and thermosetting plastics - Engineering plastics - preparation , properties and uses of PVC, teflon, PET and nylon - Polymer processing - compression and injection moulding techniques - Nanomaterials - carbon nanotubes - synthesis and their applications.

UNIT V – PHASE RULE AND ALLOYS (9)

Phase rule: Introduction, definition of terms with examples, one component system – water system – reduced phase rule – thermal analysis and cooling curves – two component systems – lead silver system – Pattinson process.
Alloys : Introduction – Definition – importance and purpose of making of alloys – Ferrous alloys – Nichrome and AlNiCo – heat treatment of steel.

TOTAL (L:45) = 45 PERIODS

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

TEXT BOOKS:

1. Dr.Ravikrishnan.A, "Engineering chemistry I & Engineering Chemistry II, Sri Krishna Hitech Publishing chem Co. Pvt Ltd., 13th ed., Chennai, 2014.
2. P.C. Jain.and Monica Jain, "Engineering Chemistry",Vol I & II, Dhanpat Rai Pub,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.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECC03- CIRCUIT THEORY *(Common to ECE & BME Branches)*			
L	T	P	C
3	0	0	3

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

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To make students to learn and understand the basics of Electrical circuits.	1.1	The Students can apply the Ohm's law and Kirchhoff's law and investigates the behavior of electric circuits by analytical techniques.	a,b,f,i,k
2.0	To enable the student to Evaluate the voltage, current of electric circuit using Graph theory techniques	2.1	The Students will be able to Evaluate the voltage, current of electric circuit using Graph theory techniques	a,c,f,j
3.0	To enable the student to Design simple network for the complex network by exploring circuit theorems.	3.1	The Students will be able to Design simple network for the complex network by exploring circuit theorems.	a,d,i,k
4.0	To motivate the students to implement the project using transient response of DC circuits.	4.1	The students will be able to Design and test the dc and ac transient circuits using test signals.	a,b,f,k
5.0	To make the students to design the resonance circuit and coupled circuits.	5.1	Design and test circuit for a desired cut off frequency using resonant and coupled circuits.	a,b,c,i,l

UNIT I - BASICS OF CIRCUIT ANALYSIS	**(9)**
Basic components and electric circuits, voltage and current laws, Resistors and Capacitors – series and parallel circuits, Basic mesh and nodal analysis, source transformation techniques-Star delta transformation techniques.	
UNIT II -NETWORK THEOREMS FOR DC CIRCUITS	**(9)**
Network Reduction: Voltage and Current Division, - Thevenin's theorem - Norton's theorem- Super position theorem- Maximum power transfer theorem- Reciprocity theorem.	
UNIT III- NETWORK THEOREMS FOR AC CIRCUITS	**(9)**
Impedance and Admittance for R, L and C elements, Thevenin's theorem - Norton's theorem- Super position theorem- Maximum power transfer theorem- Reciprocity theorem.	
UNIT IV -TRANSIENTS	**(9)**
Differential equations / Laplace Transform - Steady state and transient response: DC response of RL, RC and RLC circuit - Sinusoidal response of RL, RC and RLC circuits.	
UNIT V-RESONANCE AND COUPLED CIRCUITS	**(9)**
Resonance: Natural frequency and Damping Ratio - Series Resonance - Parallel Resonance-Quality Factor. Coupled Circuits: Self-inductance- Mutual inductance, Dot conversion-Coupling Coefficient. Tuned Circuits-Single Tuned circuits.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis," 8th edition., Tata McGraw Hill publishers, New Delhi, 2013.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

REFERENCES :

1. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis," Tata McGraw Hill, 2007.
2. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.
3. Nageswara Rao.T, "Circuit Theory", A.R. Publications, Chennai, 2014.
4. Joseph Edminister and MahmoodNahri, Theory and Problems of Electric Circuits Tata McGraw- Hill, 2008.

17ECC07 - SIGNALS AND SYSYTEMS

L	T	P	C
2	2	0	3

PREREQUISITE : 17MYB02 | **QUESTION PATTERN : TYPE - 3**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the basic properties of signal & systems and its various methods of classification	1.1	The students will be able to Understand the operation of continuous time & Discrete time signals	a,b,d,l
2.0	To learn Laplace Transform &Fourier transform and their properties	2.1	The students will be able to Analyze the properties of signals & systems	a,d,e
3.0	To know Z transform and their properties	3.1	The students will be able to Apply Laplace transform, Fourier transform, Z transform in signal analysis	a,f,k
4.0	To motivate the students to implement the discrete time system using impulse response and inputs.	4.1	The students will be able to Implementation of continuous time LTI systems using Fourier and Laplace Transforms.	b,f,j,k
5.0	To characterize LTI systems in the Time domain and various Transform domains	5.1	The students will be able to Designing of discrete time LTI systems using Z transform	b,f,j,l

UNIT I - CLASSIFICATION OF SIGNALS AND SYSTEMS	**(6+6)**
Standard Signals: Unit impulse, unit step, unit ramp, exponential, and sinusoidal signals, Classification of Continuous and discrete time signals, Types of signals: power, energy, periodic, even and odd, Basic Operations on Signals, Basic System Properties: Linearity, Time Invariant, causality, stability and invertibility, LTI.	
UNIT II - TIME DOMAIN CHARACTERISATION OF CONTINUOUS TIME LTI SYSTEM	**(6+6)**
Convolution Integral, Properties of continuous time LTI system-Causality, stability, Causal continuous time LTI system described by differential equations.	
UNIT III- FREQUENCY DOMAIN REPRESENTATION IN CT SIGNALS	**(6+6)**
Fourier series representation of continuous time periodic signals, properties of continuous time Fourier series, Fourier transform of continuous time aperiodic signals and periodic signals, properties of continuous time Fourier transform, Laplace transform, Region of Covergence, Inverse Laplace transform.	
UNIT IV – TIME DOMAIN CHARACTERISATION OF DISCRETE TIME LTI SYSTEM	**(6+6)**
Sampling theorem (Low Pass) – Reconstruction of a Signal from its samples, aliasing, Convolution sum, properties of discrete time LTI system, Causal discrete time LTI system described by difference equations.	
UNIT V- FREQUENCY DOMAIN REPRESENTATION IN DT SIGNALS	**(6+6)**
Z Transform, Inverse Z transform – Long division – partial fraction, ROC, Properties of Z Transform: Linearity, time shifting, change of scale, Z-domain differentiation, differencing, accumulation, convolution in discrete time, initial and final value theorems.	

Dr.N.Rengaraian, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

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

TEXT BOOK:

1. Alan V.Oppenheim, Alan S.Wilsky and S.Hamid Nawab, "Signals and Systems,"2nd Edition. Prentice-Hall of India.2012.

REFERENCES:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.
4. Signals and Systems with MATLAB Applications, Second Edition, Steven T. Karris, Orchard Publications,2006

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECP03 - DIGITAL LOGIC DESIGN LABORATORY

L	T	P	C
0	0	4	2

PREREQUISITE : 17ECP01 | **QUESTION PATTERN : TYPE -NIL**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To make students to learn and practice the basics of logic gates	1.1	The Students can be able to analyze the characteristics of diodes and transistors.	a,b,e,k
2.0	To enable the student to design the combinational logic circuits.	2.1	The Students will be able to design the combinational circuits like adder, subtractor, code convertors, encoder & decoders.	a,b,f,k
3.0	To make the students to learn and practice with design of sequential logic circuits.	3.1	The Students will be able to design the sequential circuits like counters and shift registers.	a,j,l
4.0	To enable the students to learn about Verilog code for combinational and sequential circuits.	4.1	The students will be able to Implement combinational and sequential circuits using Verilog codes.	b,d
5.0	To motivate the students to implement the project using basic digital logics.	5.1	The Students will be able to design own projects based on digital logic.	c,g

LIST OF EXPERIMENTS:

Hardware Experiments:

1. Verification of Boolean expressions.
2. Construct a Half Adder, Full Adder using Multiplexer.
3. Construct a Code Converter circuit.(Binary to gray and BCD to XS-3)
4. Implementation of Magnitude Comparator circuit using logic gates.
5. Construct a Priority Encoder using logic gates.
6. Design adder circuit using decoders.
7. Construct a Multiplexer and De-Multiplexer circuit using logic gates.
8. Verification of SR, JK, D and T Flip Flops.
9. Design of Synchronous Counter using flip-flops.
10. Design of Shift Registers using flip-flops.

Software Experiments(Using Model Sim) :

11. Modeling and Simulation of Half adder, Full adder using Verilog.
12. Modeling and Simulation of Synchronous Counters using Verilog.

TOTAL (P: 60) = 60 PERIODS

Dr.N.Rangarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 52.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17MYB09 - PROBABILITY AND RANDOM PROCESSES
(For ECE and BME Branches)

L	T	P	C
2	2	0	3

PREREQUISITE : 17MYB02 | **QUESTION PATTERN : TYPE -4**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	Enable students to understand the concepts of probability, conditional probability and independence.	1.1	The students will be able to understand the fundamental knowledge of the basic probability concepts.	a,b
2.0	Be able to obtain the distributions of functions of random variables.	2.1	Have a well-founded knowledge of standard distributions which can describe real life phenomena.	a,b,c
3.0	Understand the classifications of random processes.	3.1	Acquire skills in handling situations involving more than one random variable and functions of random variables.	b,g
4.0	Understand the concepts of as strict stationary, wide-sense stationary and Ergodic.	4.1	Understand and characterize phenomena which evolve with respect to time in probabilistic manner.	a,c,g
5.0	Understand the concepts of correlation functions and power spectral density.	5.1	Apply concept and properties of spectral density function and cross correlation functions.	a,b,g

UNIT I - PROBABILITY AND RANDOM VARIABLES	**(6+6)**
Random variable-Probability mass function – Probability density functions – Properties - Moments –Moment generating functions and their properties.	
UNIT II - STANDARD DISTRIBUTIONS	**(6+6)**
Discrete distributions: Binomial, Poisson-Continuous distributions: Uniform, Normal distributions and their properties.	
UNIT III - TWO DIMENSIONAL RANDOM VARIABLES	**(6+6)**
Joint distributions-Marginal and conditional distributions-Covariance-Correlation and Regression-Transformation of random variables-Central limit theorem (Excluding proof).	
UNIT IV - RANDOM PROCESSES	**(6+6)**
Definition and examples-first order, second order, strictly stationary, wide-sense stationary and Ergodic process-Markov process-Binomial, Poisson processes.	
UNIT V - CORRELATION AND SPECTRAL DENSITIES	**(6+6)**
Auto correlation-Cross correlation-properties-Power spectral density-Cross spectral density-properties-Wiener-Khintchine relation (Statement Only)-Relationship between cross power spectrum and cross correlation function.	
TOTAL (L: 30+T:30) = 60 PERIODS	

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

TEXT BOOKS:

1. Veerarajan. T, "Probability, Statistics and Random Processes," 3rd ed., New Delhi, Tata McGraw-Hill, 2008.
2. Venkatarama Krishnan, "Probability and random Process",2nd Edition, John Wiley &Sons, New Jersey,2016.

REFERENCES:

1. Scott L. Miller and Donald Childers, "Probability and Random Processes with applications to Signal Processing and communications," Elsevier, 2012.
2. Gubner A.John, "Probability and Random Processes for Electrical and Computer Engineers", Cambridge University press, Newyork, 2006.
3. Charles W.Therrien, Murali Tummala, "Probability and random process for electrical and computer Engineers", CRC Press, Newyork, 2012.
4. Singaravelu.A, Sivasubramanian, Ramaa, "Probability, Statistics and Random Processes," 2nd ed., Meenakshi Publication, Chennai, 2003.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECC14 - DATA COMMUNICATION AND NETWORKS

L	T	P	C
3	0	0	3

PREREQUISITE : 17ECC06 | **QUESTION PATTERN : TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To provide in-depth understanding of the underlying concepts of computer networks.	1.1	The students will be able to Comprehend Processes To Communicate With Each Other Across A Computer Networks.	a,c,g,k
2.0	To extend the students' knowledge in the areas of multiple access techniques, network protocols.	2.1	The students will be able to Analyze The Services, Roles And Features Of The Data Link Layers Of Data Networks.	a,c,d,i
3.0	To analysis the upper layers of the OSI model.	3.1	The students will be able to Identify solution for each routing/switching functionality at network layer.	b,c,g,k,l
4.0	To treat certain key related areas such as performance of internetworking.	4.1	The students will be able to Trace the flow of information from one node to another node in the network.	a,i,k,l
5.0	To familiar with emerging trends in networking technologies.	5.1	The students will be able to Choose the required functionality at each layer for given application.	a,c,d,h,k

UNIT I – INTRODUCTION TO COMMUNICATION NETWORKS (9)

Data communications – Networks – Network types - Networking devices : hubs , switches, gateways, repeaters, Bridges and routers - Modem and its types – Internet history – standards and administration- TCP/IP protocol suite- ISO / OSI Reference Model - Transmission Media : Guided Media and Unguided Media, Switching: Circuit switched networks, Packet switched networks.

UNIT II - DATA LINK LAYER (9)

Introduction –Link layer Addressing - Error Detection & Correction – Block coding – cyclic codes – checksum – Forward Error Correction –DLC services - DLL Protocol – Media access Control – Wired LAN's: Ethernet – ATM - Wireless LAN : IEEE 802.11 – Bluetooth,WiMAX.

UNIT III - NETWORK LAYER (9)

Network Layer services – Packet Switching –Network Layer performance - IPv4 Addresses- Forwarding of IP Packets- Internet Protocol-ICMPv4-Routing Algorithms - Unicast Routing Protocols - IGMP –Multicast Routing – IPv6 addressing.

UNIT IV - TRANSPORT LAYER (9)

Introduction - User Datagram Protocol - Transmission Control Protocol – SCTP -- Quality of service – Data flow characteristics – Flow control to improve QoS: Token Bucket and Leaky Bucket.

UNIT V - APPLICATION LAYER (9)

World wide web and HTTP – FTP- Email – Telnet – SSH- Domain Name System- Cryptography and Network security: Introduction –Confidentiality – Other aspects of Security – Transport layer security: SSL Architecture.

TOTAL :(L: 45) = 45 PERIODS

TEXT BOOK:

1. Behrouz A. Forouzan, "Data Communication and Networking", 5th Edition, Tata McGraw-Hill, 2013.

REFERENCES:

1. Tanenbaum, Andrew S and David Wetherall, —Computer Networks, 5th Edition, PHI Learning, New Delhi, 2010.
2. Kurose, James F. and Ross, Keith W., —Computer Networking: A Top-Down Approach Featuring the Internet, 6th Edition, Pearson Education, New Delhi, 2012.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECC15 - TRANSMISSION LINES AND WAVEGUIDES

L	T	P	C
2	2	0	3

PREREQUISITE : 17ECC10 | **QUESTION PATTERN : TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To introduce various types of transmission lines and analyze the lumped circuit model of a transmission line and their characteristics	1.1	The student will be able to Interpret the lumped circuit model of a transmission line with circuit theory and determine characteristic impedance, propagation constant and reflection coefficient.	a,b,c,d,e,h,l,k,l
2.0	To illustrate the concept of planar transmission lines.	2.1	The students will be able to realize E and H field distribution in Microstrip, Strip lines and Coplanar lines and Calculate losses and Q-factor of Microstrip line	a,b,g,i,l
3.0	To find SWR, Reflection Coefficient, Return loss and impedance matching.	3.1	The students will be able to Compute the SWR, reflection coefficient parameters using smith chart and design single stub matching and double stub matching	a,b,c,d,e,h,i,k,l
4.0	To investigate the propagation of electromagnetic waves in Parallel plane waveguides	4.1	The students will be able to Deduce the field configuration of parallel plate waveguide.	a,b,c,g,i,k,l
5.0	To investigate the propagation of electromagnetic waves in Rectangular waveguides	5.1	The students will be able to Deduce the field configuration of rectangular waveguide and resonant cavities	a,b,c,g,i,k,l

UNIT I - FILTERS (6+6)

The neper - the decibel -Characteristic impedance of Symmetrical Networks – current and voltage ratios - Propagation constant - Properties of Symmetrical Networks - Filter fundamentals - Pass and Stop bands. Behaviour of the Characteristic impedance. Constant K Filters Low pass, High pass band, pass band elimination filters - m - derived sections –Filter circuit design – Filter performance – Crystal Filters-Two port networks.

UNIT II - TRANSMISSION LINE THEORY (6+6)

Line Parameters, The transmission line – general solution, Physical significance of the equation, Wavelength and velocity of wave propagation, Waveform distortion, The distortion less line, the telephone cable, Reflection of line not terminated in Z_0- Reflection coefficient, Open circuit and short circuit line, reflection factor and reflection loss, insertion loss.

UNIT III - IMPEDANCE MATCHING AND TUNING (6+6)

Standing waves – nodes – standing wave ratio, Impedance matching- Half wavelength and Quarter wave transformer, single stub matching. Smith chart - Measurement of VSWR, impedance, single stub and double stub matching problems.

UNIT IV - GUIDED WAVES BETWEEN PARALLEL PLANES (6+6)

Application of the restrictions to Maxwell's equations – Types of propagation - Transmission of TM waves between Parallel planes – Transmission of TE waves between Parallel planes. Transmission of TEM waves between Parallel planes –Velocities of the waves. Characteristic impedance of plane.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

UNIT V - GUIDED WAVES BETWEEN RECTANGULAR PLANES	(6+6)
Applications of Maxwell's equations to the rectangular waveguide. TM waves in rectangular waveguide. TE waves in rectangular waveguide – Dominant mode in rectangular waveguide-The TEM wave coaxial lines. Excitation modes. Guide termination and resonant cavities. Introduction to circular waveguides	
	TOTAL (L: 30+T:30) = 60 PERIODS

TEXT BOOKS:

1. John D. Ryder, "Network lines and Fields", PHI, Second Edition reprint 2013.
2. F. Olyslager, "Electromagnetic Waveguides and Transmission Lines" Clarandon Press. Oxford reprint 2003

REFERENCES:

1. E.C.Jordan, K.G. Balmain: "E.M.waves & Radiating systems", Pearson education, 2006.
2. Simon Ramo, John R. Whinnery"Fields And Waves In Communication Electronics", Wiley student Edition publications third edition 2008
3. G.S.N. Raju, Electromagnetic Field Theory & Transmission Lines, Pearson Education, 2006
4. Dr.P.Dhananjayan, "Transmission lines and waveguides", Laxmi publication Fifth Edition June 2012.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECP08 - MICROPROCESSOR AND MICROCONTROLLER INTERFACING LABORATORY			
L	T	P	C
0	0	4	2

PREREQUISITE : 17ECP03	QUESTION PATTERN : TYPE -NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To make students to learn and practice the basics of 8085 programming concepts	1.1	The students will be able to develop applications using 8085 processor program.	a,b,i
2.0	To enable the student to analyze the various arithmetic & Logical operations in 8085 processor.	2.1	The students will be able to evaluate various arithmetic & Logical operations using 8085 processor.	b,c,d,k
3.0	To provide the student with practice in the 8051 microcontroller.	3.1	The students will be able to verify the various arithmetic & Logical operations using 8051 controller.	b,c,d,k
4.0	To make the students to learn and practice with 8051 peripherals	4.1	The Students will be able to verify the basic peripherals in 8051 using HLP.	c,d,e,k
5.0	To motivate the students to learn the I/O interfacing concepts in 8051.	5.1	The Students will be able to implement the interfacing concepts for various real world applications.	d,e,f,k

LIST OF EXPERIMENTS:

Assembly Language Programming:

1. Study of 8085 microprocessor (Addressing modes & Instruction set).
2. Assembly language programming for 8/16 bit Arithmetic operators Using 8085.
3. Assembly language programming with control instructions Using 8085 (Increment / Decrement, Ascending / Descending order, Maximum / Minimum of numbers.
4. Assembly language programming for arithmetic and logical operations using 8051.
5. Interfacing and Programming of DC Motor Speed control using 8051.
6. Interfacing and Programming of Stepper Motor control using 8051.

High Level Language Programming

The following programs have to be tested on 8051 Development board/equivalenting Embedded C Language on KEIL IDE or Equivalent.

1. Program to toggle all the bits of Port P1 continuously with delay.
2. Program to toggle P1.5 continuously with delay. Use Timer in mode 0, mode 1, mode 2 and mode 3 to create delay using 8051.
3. Program to interface 7 segment display to display a message on it using 8051.
4. Program to interface keypad. Whenever a key is pressed, it should be displayed on LCD using 8051.
5. Program to get analog input from Temperature sensor and display the temperature Value on LCD using ADC with 8051 Microcontroller.
6. Program to handle interrupts with 8051 Microcontroller.

TOTAL (P: 60) = 60 PERIODS

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

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17ECC17 - VLSI DESIGN
(Common to ECE and E&I Branches)

L	T	P	C
3	0	0	3

PREREQUISITE : 17ECC13 | **QUESTION PATTERN : TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To make students to learn CMOS devices and its manufacturing technology	1.1	The students will be able to create models of moderately sized CMOS circuits that realize specified digital functions.	a,b,c,l,l
2.0	To enable the student to evaluate the Basic electrical properties of MOS and BICMOS Circuits	2.1	The students will be able to identify the interactions between process parameters, device structures, circuit performance, and system design	a,b,c,e,j
3.0	To enable the student to design Sub System Design and Layout	3.1	The students will be able to apply CMOS technology-specific layout rules in the placement and routing of transistors and Interconnect.	a,b,d,i,k
4.0	To motivate the students to implement the Subsystem design and Layout.	4.1	The students will be able to complete a significant VLSI design project having a set of objective criteria and design Constraints.	a,b,c,d,j
5.0	To make the students to analyze the Ultra fast circuits and systems.	5.1	The students will be able to analyze the physical design process of ultra fast circuits and systems	a,b,c,d,l

UNIT I - MOS TECHNOLOGY AND DESIGN PROCESS (9)

Basic MOS Transistors – Enhancement and Depletion Mode Transistor Action – nMOS Fabrication – CMOS Fabrication: n-well – p-well – twin tub – Bi CMOS Technology – Transient Response – Rise Time – Fall Time – Stick Diagrams: n MOS Design Style – CMOS Design Style – Design Rules and Layout.

UNIT II - BASIC ELECTRICAL PROPERTIES OF MOS AND CMOS CIRCUITS (9)

Drain to Source Current Vs Voltage Relationships – MOS Transistor Characteristics – MOS Transistor Transconductance gm and Output Conductance gds – Pass Transistor and The nMOS Inverter – Determination of Pullup to Pull-down Ratio – Alternative forms of Pull-up – The CMOS inverter – Latch up in CMOS Circuits. Types of Power Dissipation- Static and Dynamic Power Dissipation.

UNIT III- CMOS LOGIC STRUCTURES (9)

Switch Logic – Pass Transistors and Transmission Gates – Gate Logic: The Inverter – Two-input nMOS, CMOS and BICMOS Nand Gates – Two-input nMOS, CMOS and BICMOS Nor Gates – Pseudo nMOS Logic – Dynamic CMOS Logic – Clocked CMOS Logic: CMOS domino Logic – n-p CMOS Logic.

UNIT IV - CMOS MEMORIES AND CLOCKING (9)

The Dynamic Shift Register stage- A Three transistor Dynamic RAM Cell- A One transistor Dynamic Memory Cell – A Pseudo –static RAM/Register Cell-Four transistor Dynamic and Six-transistor Static CMOS Memory Cells- JK Flip-flop Circuit – D Flip-flop circuit- Forming Arrays of Memory Cells-Building up the Floor plan for a 4 x 4-bit register array-Selection and Control of the 4 x 4-bit register array – Random Access Memory(RAM) Arrays – Two Phase clocking – Charge storage- Dynamic Register Element- A Dynamic shift Register.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

UNIT V- CMOS SUB SYSTEM DESIGN	(9)
Overview of Verilog HDL-Modeling Concepts- Adders: Carry look ahead – Carry Select– Design of multipliers: The Serial - Parallel Multiplier – Braun array – Baugh-Woolley – Pipelined Multiplier Array – Wallace Tree Multiplier.	
	TOTAL (L: 45) = 45 PERIODS

TEXT BOOKS:

1. Neil H.E. Weste , David Harris, "CMOS VLSI Design : A circuits and systems perspective " Pearson Education, 4th Edition, 2015..
2. Douglas A. Pucknell, "Basic VLSI Systems and Circuits", Prentice Hall of India, Third Edition, Reprint 2008.

REFERENCES :

1. John P.Uyemera, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Reprint 2009.
2. John n Rabaey, Anantha Chandrekasan, Borivoje Nikolic " Digital integrated circuits a design perspective" PHI New Delhi , second Edition
3. Wayne Wolf," Modern VLSI Design – System On Chip", PHI New Delhi Third Edition, 2006.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECX03 - RADAR AND NAVIGATIONAL AIDS

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 understand and gain complete knowledge about radar	1.1	The students will be able to gain knowledge radar.	a,d
2.0	To enhance the basic knowledge about pulse Doppler radar.	2.1	The students will be able to understand the pulse Doppler radar operations.	c,e
3.0	To provide the basic concepts of radar navigation.	3.1	The students will be able to Understand the principles of navigation in addition to approach and landing aids.	c,d,e
4.0	To develop an ability to understand the basics of clutter.	4.1	The students will be able to learn about clutter.	c,d,f
5.0	To apply the concept of radar in military applications.	5.1	The students will be able to apply the concept of radar in various fields.	f,i

UNIT I – INTRODUCTION TO RADAR	**(9)**
Basic Radar –The simple form of the Radar Equation– Radar Block Diagram – Radar Frequencies – Applications of Radar– The origins of Radar–Radar Equations: Integration of radar pulses– Radar cross section of targets– Radar cross section fluctuations.	
UNIT II – MTI AND PULSE DOPPLER RADAR	**(9)**
Introduction to Doppler and MTI Radar–Delay Lines Cancellers– Staggered Pulse Repetition Frequencies –Doppler Filter Banks–Digital MTI Processing – Moving Target Detector – MTI from a Moving Platform (AMIT) – Pulse Doppler Radar .	
UNIT III – TRACKING RADAR	**(9)**
Tracking with Radar – Monopulse Tracking– Conical Scan And Sequential Lobing– Limitations To Tracking Accuracy–Low Angle Tracking –Tracking In Range – Other Tracking Radar Topics– ADT	
UNIT IV – RADAR CLUTTER	**(9)**
Introduction to radar clutter –surface clutter radar equation –land clutter–sea clutter– statistical models for surface clutter–weather clutter– detection of targets in clutter.	
UNIT V – RADAR TRANSMITTERS AND RECEIVERS	**(9)**
Radar Transmitters : Introduction - Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources - Other aspects of Radar Transmitter. Radar Receivers - The Radar Receiver - Receiver noise Figure - Superheterodyne Receiver.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOK:

1. Merrill I. Skolnik ," Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2008.

REFERENCES:

1. Peyton Z. Peebles: "Radar Principles", Johnwiley, 2007.
2. J.C Toomay, "Principles of Radar", 2nd Edition – prentice hall, 2004.
3. N.S.Nagaraja, Elements of Electronic Navigation Systems, 2nd Edition, Tata McGraw-Hill, 2006.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ECX09- WIRELESS COMMUNICATION

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 deal with the fundamental cellular radio concepts and the technical challenges	1.1	The student will be able to Interpret the fundamental cellular radio concepts, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems	a,b,e
2.0	To present different ways to radio propagation models and predict the large – scale and small scale effects of radio propagation in many operating environment.	2.1	The students will be able to understand radio propagation models and predict the large scale and small scale effects	a,c,f,l
3.0	To provide idea about analog and digital modulation techniques used in wireless communication.	3.1	The students will be able to Compute deduce Modulation and demodulation technique	a,b,c,e,f,l
4.0	To deal with the different types of equalization techniques and diversity concepts.	4.1	The students will be able signal processing in wireless system.	a,c,e,f
5.0	It deals with advanced transceiver schemes.	5.1	The students will be able to figure out the different Spread Spectrum Systems	a,e,f,l

UNIT I - WIRELESS SERVICES AND TECHNICAL CHALLENGES (9)

Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

UNIT II - WIRELESS PROPAGATION CHANNELS (9)

Propagation Mechanisms – Reflection, Diffraction, reflection. Link calculations, Statistical description of the wireless channel- Time variant and Invariant Two path model, Rayleigh distribution. Small scale fading with a dominant component, Large scale fading. Narrowband and Wideband models.

UNIT III - WIRELESS TRANSCEIVERS (9)

Structure of a wireless communication link, Important Modulation formats – Binary Phase shift keying, Quadrature Phase Shift Keying, p/4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error probability in flat fading channel.

UNIT IV - SIGNAL PROCESSING IN WIRELESS SYSTEMS (9)

Principle of Diversity, Macrodiversity, Microdiversity, Combination of signals, Transmit diversity, Channel coding – Block coding, convolution coding and trellis codes.

UNIT V - ADVANCED TRANSCEIVER SCHEMES (9)

Spread Spectrum Systems- Frequency hopping multiple access, Code division multiple access, Cellular Code Division Multiple Access Systems- Principle, Power control, Orthogonal Frequency Division Multiplexing – Principle, Frequency selective channel, Inter carrier interference. Implementation of Second Generation (GSM, IS–95) and 3G and 4G - VoLTE Wireless Networks and Standards.

TOTAL (L: 45) = 45 PERIODS

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

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TEXT BOOK:

1. Andreas.F. Molisch, "Wireless Communications", John Wiley – India, Second Edition 2006.

REFERENCES:

1. Rappaport. T.S., "Wireless communications", Pearson Education, 2003.
2. Gordon L. Stuber, "Principles of Mobile Communication", Springer International Ltd., 2001.
3. Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2007.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17ITC08 - FUNDAMENTALS OF JAVA PROGRAMMING
(Common To ECE,EEE,BME and E&I Branches)

L	T	P	C
2	0	2	3

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

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To learn the fundamental concepts of Java.	1.1	The students will be able to learn fundamental concepts of Java.	a,b,e
2.0	To apply inheritance concepts using class.	2.1	The students will be able to design concepts with inheritance.	a,b
3.0	To implement exception handling and Files.	3.1	The students will be able to implement exception handling and Files.	a,b,e
4.0	To create threads and interfaces in Java classes.	4.1	The students will be able to create threads and interfaces in Java classes.	a,b
5.0	To learn GUI and generics concepts	5.1	The students will be able to implementGUI and generics concepts.	a,b,e

UNIT I INTRODUCTION (6+6)

Introduction of Java - Features Of Java – Application of Java – Data Types –Statements – Operators – Control statements - Basics of Oops Concepts: Class – Objects – Methods –Constructor – finalizer –Access Control.

UNIT II INHERITANCE AND KEYWORDS (6+6)

Inheritance: Types Of Inheritance – Polymorphism – Method Overloading – Method Overriding- super – final with inheritance – Abstract Class - Keywords : static –final - this - String – String Buffer - Arrays

UNIT III PACKAGE, EXCEPTION HANDLING AND FILES (6+6)

Packages – Package Hierarchy –Basics of Exception Handling – Input / Output Basics – Streams – Byte streams and Character streams – Reading and WritingConsole – Reading and Writing Files

UNIT IV INTERFACES AND THREADS (6+6)

Interfaces – Interface Design – Threads – Thread Synchronization - Multi-Thread Programming.

UNIT V GENERICS AND GUI (6+6)

Generic Programming – Generic classes – generic methods - Introduction to Swing – layout management - Swing Components – TextFields , Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes.Applet programming - Basics of event handling - event handlers - adapter classes - actions - mouse events.

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

List of Experiments:

1. Program to implement Operators, Flow Controls
2. Program to implement Classes, Constructors, Overloading
3. Program using Static and Final
4. Program using File Streams and IO Streams
5. Program to implement Strings, String Buffer
6. Program using Interfaces, Abstract Classes
7. Program to implement Exception Concepts and Threads
8. Program to implement Swing Application

TEXT BOOK:

1. Herbert Schildt, "The Complete Reference (Fully updated for jdk7)", Oracle press Ninth Edition,2014.

REFERENCE:

1. Deitel&Deitel, "Java How to Program", Prentice Hall, 10th Edition, 2016.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

17GEA03 - TOTAL QUALITY MANAGEMENT

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 acquire various concepts of quality management.	1.1	Students can acquire various concepts of quality management.	b,c,f
2.0	To implement various principles of quality management.	2.1	Students can implement various principles of quality management.	b,c,f
3.0	To impart quality using statistical process.	3.1	Students will be able to impart quality using statistical process.	b,c,e
4.0	To use the various tools to maintain quality.	4.1	Students can learn to use the various tools to maintain quality.	b,c,e
5.0	To implement the quality system for ISO certification.	5.1	Students can implement the quality system for ISO certification.	b,c,f,h

UNIT I – INTRODUCTION (9)

Definitions-Basic approach –Gurus of TQM- TQM Framework -Defining Quality- Dimensions of quality- Benefits of TQM – Leadership: Leadership Concepts – The Deming philosophy - Quality council - Quality statements- Strategic planning- Customer satisfaction: Customer perception of quality- Using customer complaints- service quality- Customer retention.

UNIT II - TQM PRINCIPLES (9)

Employee involvement: Motivation- Empowerment- Teams- Recognition and Reward- Performance appraisal – Continuous process improvement: The Juran Trilogy – PDSA cycle- Kaizen – Six sigma - Supplier Partnership: Partnering, Supplier selection - Supplier Rating.

UNIT III- TQM TOOLS AND TECHNIQUES- I (9)

Bench marking - Reason to bench mark, process – Quality Function Development (QFD)- Failure mode and effect analysis – Stages of FMEA- Other types of FMEA-Management tools: Tree diagram- Matrix diagram- Process decision program chart-Activity network diagram.

UNIT IV - TQM TOOLS AND TECHNIQUES- II (9)

Statistical process control: Pareto diagram –Process flow diagram- Cause and effect diagram- Histogram-Charts – Variable control chart-Control chart for attributes-Scatter diagrams -Process Capability – Total productive maintenance: Learning the new philosophy-Training-Improvement needs.

UNIT V- QUALITY MANAGEMENT SYSTEMS (9)

Benefits of ISO registration-ISO 9000 series of standards–ISO 9001 Requirements- implementation, Documentation, Internal Audits – Environmental Management system- ISO 14000 series standards- Concepts of ISO 14001- Requirements of ISO 14001- Benefits of EMS.

TOTAL (L: 45) = 45 PERIODS

TEXT BOOK:

1. Dale H. Besterfiled, et at., "Total quality Management", Pearson Education Asia, Third Edition, Indian Reprint, 2011.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52

REFERENCES :

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th ed., First Indian Edition, Cengage Learning, 2012.
2. Subburaj Ramasamy , "Total Quality Management", Tata McGrawHill, First reprint 2009.
3. Suganthi. L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
4. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

Dr.N.Rengaraian, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
(Autonomous)
ERODE - 638 052.

NANDHA ENGINEERING COLLEGE (AUTONOMOUS) ERODE-52