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 - Electrical and Electronics Engineering

Course Code	Course Name	% of Change
17CYBO2	Applied Electrochemistry	30
17CSP02	Python Programming Laboratory	50
17EEP01	Electric Circuit Laboratory	30
17MYB10	Probability, Statistics & Numerical Methods	40
17EEC08	Linear Integrated Circuits	25
17EEC11	Measurements and Instrumentation	40
17EEC12	Control Systems	20
17EEP07	Power Electronics Laboratory	40
17EEC16	Microprocessor and Microcontroller	25
17EEC17	Electric Drives and Control	60
	Average	**36.00 %**

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REGULATIONS – 2017 CHOICE BASED CREDIT SYSTEM

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

CURRICULUM: I-VIII SEMESTERS SYLLABUS: 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.	17PYB01	Physics for Engineers	BS	-	3	3	0	0	3
4.	17CYBO2	Applied Electrochemistry	BS	-	3	3	0	0	3
5.	17MEC01	Engineering Graphics	ES	-	4	2	2	0	3
6.	17CSC02	Python Programming	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	32	16	4	12	23

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.	17PYB05	Physics of Solids	BS	17PYB01	3	3	0	0	3
4.	17CYB03	Environmental Science	HS	-	3	3	0	0	3
5.	17GYC01	Basics of Civil and Mechanical Engineering	ES	-	3	3	0	0	3
6.	17EEC02	Electric Circuit Theory	PC	-	5	3	2	0	4
PRACTICAL									
7.	17GYP01	Physics and Chemistry Laboratory	BS	-	4	0	0	4	2
8.	17EEP01	Electric Circuit Laboratory	PC	-	4	0	0	4	2
9.	17GEP02	Inter personal Values	HS	17GEP01	2	0	0	2	0
				TOTAL	33	17	4	12	24

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SEMESTER: III									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17MYB05	Transforms and Partial Differential Equations	BS	17MYB02	5	2	2	0	3
2.	17EEC03	Electronic Devices and Circuits	PC	-	3	3	0	0	3
3.	17EEC04	Electrical Machines-I	PC	17EEC02	5	2	2	0	3
4.	17EEC05	Field Theory	PC	-	3	3	0	0	3
5.	17EEC06	Power Plant Engineering	ES	-	3	3	0	0	3
6.	17ITC03	Data Structures and algorithms	ES	-	5	2	0	2	3
PRACTICAL									
7.	17EEP02	Electronic Devices and Circuits Laboratory	PC	-	4	0	0	4	2
8.	17EEP03	Electrical Machines-I Laboratory	PC	-	4	0	0	4	2
9.	17GED02	Soft Skills- Reading and Writing	EEC	17GED01	2	0	0	2	0
				TOTAL	34	15	4	12	22

SEMESTER: IV									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17MYB10	Probability, Statistics & Numerical Methods	BS	17MYB05	5	2	2	0	3
2.	17EEC07	Electrical Machines-II	PC	17EEC04	5	2	2	0	3
3.	17EEC08	Linear Integrated Circuits	PC	17EEC03	3	3	0	0	3
4.	17EEC09	Digital Logic Circuits	PC	17EEC03	3	3	0	0	3
5.	17EEC10	Transmission and Distribution	ES	17EEC02 & 17EEC04	3	3	0	0	3
6.	E1	Elective I (PSE)	PSE	-	3	3	0	0	3
PRACTICAL									
7.	17EEP04	Electrical Machines-II	PC	17EEP03	4	0	0	4	2
8.	17EEP05	Linear and Digital Integrated Circuits	PC	17EEP02	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	-	2	0	0	1	0
				TOTAL	32	16	4	11	22

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SEMESTER:V									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17GEA02	Principles of Management	HS	-	3	3	0	0	3
2.	17EEC11	Measurements and Instrumentation	PC	17EEC08	3	3	0	0	3
3.	17EEC12	Control Systems	PC	17EEC04 & 17EEC07	5	3	2	0	4
4.	17EEC13	Power Electronics	PC	17EEC03	3	3	0	0	3
5.	17EEC14	Communication Engineering	ES	17EEC09	3	3	0	0	3
6.	E2	Elective II (PSE)	PSE	-	3	3	0	0	3
PRACTICAL									
7.	17EEP06	Control and Instrumentation Laboratory	PC	17EEP03 & 17EEP04	4	0	0	4	2
8.	17EEP07	Power Electronics Laboratory	PC	17EEP02	4	0	0	4	2
9.	17GED08	Essence of Indian traditional knowledge	EEC	-	2	2	0	0	0
				TOTAL	30	20	2	8	23

SEMESTER:VI									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17EEC15	Power System Analysis	PC	17EEC10	5	3	2	0	4
2.	17EEC16	Microprocessor and Microcontroller	PC	17EEC09	3	3	0	0	3
3.	E3	Elective III (PSE)	PSE	-	3	3	0	0	3
4.	E4	Elective IV (PSE)	PSE	-	3	3	0	0	3
5.	E5	Elective V (PSE)	PSE	-	3	3	0	0	3
6.	E6	Elective VI (PSE/OE)	PSE/OE	-	3	3	0	0	3
PRACTICAL									
7.	17EEP08	Microprocessor and Microcontroller Laboratory	PC	17EEP05	4	0	0	4	2
8.	17GED06	Comprehension	EEC	-	2	0	0	2	0
9.	17GED07	Constitution of India	EEC	-	2	2	0	0	0
				TOTAL	28	20	2	6	21

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
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SEMESTER: VII									
SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRERQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1.	17EEC17	Electric Drives and Control	PC	17EEC04, 17EEC07 & 17EEC13	3	3	0	0	3
2.	17EEC18	Power System Protection and Switch Gear	PC	17EEC04, 17EEC07 & 17EEC10	3	3	0	0	3
3.	17EEC19	Principles of Embedded Systems	ES	17EEC16	3	3	0	0	3
4.	17EEC20	Power System Operation and Control	PC	17EEC10, 17EEC15	3	3	0	0	3
5.	E7	Elective VII (PSE/OE)	PSE/OE	-	3	3	0	0	3
PRACTICAL									
6.	17EEP09	Power System Simulation Laboratory	PC	-	2	0	0	4	2
7.	17EED01	Project Work I	EEC	-	8	0	0	8	4
				TOTAL	25	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.	17EED02	Project Work II	EEC	17EED01	16	0	0	16	8
				TOTAL	22	6	0	16	14

TOTAL NO. OF CREDITS: 170

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

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B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

(A) HS,BS, and ES Courses

(a) Humanities and Social Sciences (HS)	Credit Distribution:12-17	AICTE Norm:5 to 10%

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17EYA01	Professional English- I	HS	-	4	2	0	2	3
2.	17GEP01	Personal Values	HS	-	2	0	0	2	0
3.	17EYA02	Professional English – II	HS	17EYA01	4	2	0	2	3
4.	17GEP02	Inter personal Values	HS	17GEP01	2	0	0	2	0
5.	17CYB03	Environmental Science	HS	-	3	3	0	0	3
6.	17GEA02	Principles of Management	HS	-	3	3	0	0	3
7.	17GEA03	Total Quality Management	HS	-	3	3	0	0	3
8.	17GEA04	Professional ethics and Human Values	HS	-	3	3	0	0	3

(b) Basic Sciences (BS)	Credit Distribution:17-21	AICTE Norm:17 to 20%

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17MYB01	Calculus and Solid Geometry	BS	-	5	3	2	0	4
2.	17PYB01	Physics for Engineers	BS	-	3	3	0	0	3
3.	17CYB01	Applied Electrochemistry	BS	-	3	3	0	0	3
4.	17GYP01	Physics and Chemistry Laboratory	BS	-	4	0	0	4	2
5.	17MYB02	Complex Analysis and Laplace Transforms	BS	17MYB01	5	3	2	0	4
6.	17PYB05	Physics of Solids	BS	17PYB01	3	3	0	0	3
7.	17MYB05	Transforms and Partial Differential Equations	BS	17MYB02	5	2	2	0	3
8.	17MYB10	Probability, Statistics and Numerical Methods	BS	17MYB05	5	2	2	0	3

(c) Engineering Sciences (ES)	Credit Distribution:17-21	AICTE Norm:17 to 20%

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17MEC01	Engineering Graphics	ES	-	4	2	2	0	3
2.	17CSC02	Python Programming	ES	-	3	3	0	0	3
3.	17CSP02	Python Programming Laboratory	ES	-	4	0	0	4	2
4.	17GYP02	Engineering Practices Laboratory	ES	-	4	0	0	4	2

Dr.N.Rengaraj, B.Sc., B.Tech., M.E., Ph.D.,
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5.	17GYC01	Basics of Civil and Mechanical Engineering	ES	-	3	3	0	0	3
6.	17EEC06	Power Plant Engineering	ES	-	3	3	0	0	3
7.	17ITC03	Data Structures and Algorithms	ES	17CSC02	3	2	0	2	3
8.	17EEC10	Transmission and Distribution	ES	17EEC02 & 17EEC04	3	3	0	0	3
9.	17EEC14	Communication Engineering	ES	17EEC09	3	3	0	0	3
10.	17EEC19	Principles of Embedded Systems	ES	17EEC16	3	3	0	0	3

(B) Programme Core Courses (PC)			Credit Distribution:63-72		AICTE Norm:30 to 40%				
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17EEC02	Electric Circuit Theory	PC	-	5	3	2	0	4
2.	17EEP01	Electric Circuits Laboratory	PC	-	4	0	0	4	2
3.	17EEC03	Electronic Devices and Circuits	PC	-	3	3	0	0	3
4.	17EEC04	Electrical Machines-I	PC	17EEC02	5	2	2	0	3
5.	17EEC05	Field Theory	PC	-	3	3	0	0	3
6.	17EEP02	Electronic Devices and Circuits Laboratory	PC	-	4	0	0	4	2
7.	17EEP03	Electrical Machines-I Laboratory	PC	-	4	0	0	4	2
8.	17EEC07	Electrical Machines-II	PC	17EEC04	5	2	2	0	3
9.	17EEC08	Linear Integrated Circuits	PC	17EEC03	3	3	0	0	3
10.	17EEC09	Digital Logic Circuits	PC	17EEC03	3	3	0	0	3
11.	17EEP04	Electrical Machines-II Laboratory	PC	17EEP03	4	0	0	4	2
12.	17EEP05	Linear and Digital Integrated Circuits Laboratory	PC	17EEP02	4	0	0	4	2
13.	17EEC11	Measurements and Instrumentation	PC	17EEC08	3	3	0	0	3
14.	17EEC12	Control Systems	PC	17EEC04 & 17EEC07	3	3	0	0	3
15.	17EEC13	Power Electronics	PC	17EEC03	3	3	0	0	3
16.	17EEP06	Control and Instrumentation Laboratory	PC	17EEP03 & 17EEP04	4	0	0	4	2
17.	17EEP07	Power Electronics Laboratory	PC	17EEP02	4	0	0	4	2
18.	17EEC15	Power System Analysis	PC	17EEC10	5	3	2	0	4
19.	17EEC16	Microprocessor and Microcontroller	PC	17EEC09	3	3	0	0	3
20.	17EEC17	Electric Drives and Control	PC	17EEC04, 17EEC07 & 17EEC13	3	3	0	0	3
21.	17EEP08	Microprocessor and Microcontroller Laboratory	PC	17EEP05	4	0	0	4	2
22.	17EEC18	Power System Protection and Switch Gear	PC	17EEC04, 17EEC07 & 17EEC10	3	3	0	0	3
23.	17EEC19	Principles of Embedded Systems	PC	17EEC16	3	3	0	0	3

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24.	17EEC20	Power System Operation and Control	PC	17EEC10, 17EEC15	3	3	0	0	3
25	17EEP09	Power System Simulation Laboratory	PC	-	4	0	0	4	2

(C) Elective Courses

(a) Program Specific Electives(PSE)			Credit Distribution:18-21		AICTE Norm:10 to 17%				
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17EEX01	Fundamentals of Fiber Optics and Laser Instrumentation	PSE	-	3	3	0	0	3
2.	17EEX02	Energy Studies	PSE	-	3	3	0	0	3
3.	17EEX03	Semiconducting Materials and Devices	PSE	17EEC03	3	3	0	0	3
4.	17ITC08	Fundamentals of JAVA Programming	PSE	-	3	2	0	2	3
5.	17EEX04	Network Theory	PSE	17EEC02	3	3	0	0	3
6.	17EEX05	Computer Architecture and Organization	PSE	17EEC09	3	3	0	0	3
7.	17ITC12	Database Systems Concepts	PSE	-	3	3	0	0	3
8.	17EEX06	Discrete Time Systems and Signal Processing	PSE	17EEC09 & 17EEC12	3	3	0	0	3
9.	17EEX07	Design of Electrical Machines	PSE	17EEC02, 17EEC04 & 17EEC07	3	3	0	0	3
10.	17EEX08	Energy Management and Auditing	PSE	-	3	3	0	0	3
11.	17EEX09	Computer Networks and protocols	PSE	-	3	3	0	0	3
12.	17EEX10	Special Electrical Machines	PSE	17EEC04 & 17EEC07	3	3	0	0	3
13.	17EEX11	Bio Medical Instrumentation and its Applications	PSE	-	3	3	0	0	3
14.	17EEX12	Wind and Solar Electrical System	PSE	17EEC13	3	3	0	0	3
15.	17EEX13	Power Electronics for Renewable Energy Systems	PSE	17EEC13	3	3	0	0	3
16.	17EEX14	Computer Aided Design of Electrical Apparatus	PSE	17EEC04 & 17EEC07	3	3	0	0	3
17.	17EEX16	High Voltage Engineering	PSE	17EEC02	3	3	0	0	3
18.	17EEX17	Power Semiconductor Devices and Applications	PSE	17EEC13	3	3	0	0	3
19.	17EEX18	Power Quality	PSE	17EEC13	3	3	0	0	3
20.	17ECX16	Internet of Things and its applications	PSE	-	3	3	0	0	3
21.	17GEA03	Total Quality Management	PSE	-	3	3	0	0	3

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22.	17EEX19	PLC and Automation	PSE	17EEC03,04,07	3	3	0	0	3
23.	17EEX20	Flexible AC Transmission Systems	PSE	17EEC10 & 17EEC15	3	3	0	0	3
24.	17GEA04	Professional Ethics and Human Values	PSE	-	3	3	0	0	3
25.	17EEX21	Power System Dynamics	PSE	17EEC10 & 17EEC15	3	3	0	0	3
26.	17EEX22	Fundamentals of Electric Power Utilization	PSE	17EEC04, 17EEC07 &17EEC17	3	3	0	0	3
27.	17EEX23	Engineering Automotive Electronic Systems	PSE	17EEC03, 17EEC16	3	3	0	0	3
28.	17EEX24	Thermodynamics	PSE	-	3	3	0	0	3
29.	17ITX26	Problem Solving and Algorithmic Skills	PSE	-	3	3	0	0	3
30.	17CSX31	Problem Solving and Programming	PSE	-	3	3	0	0	3
31.	17EEX25	Electric and Hybrid Vehicles	PSE	17EEC04, 17EEC07, 17EEC17	3	3	0	0	3

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

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15.	17CSZ03	Software Engineering	OE	-	3	3	0	0	3
16.	17CSZ04	Unified Functional Testing	OE	-	3	3	0	0	3
17.	17CSZ05	C Programming	OE	-	3	3	0	4	3
18.	17CSZ06	Data Structures	OE	-	3	3	0	0	3
19.	17ECZ01	Modern wireless communication system	OE	-	3	3	0	4	3
20.	17ECZ02	Consumer Electronics	OE	-	3	3	0	0	3
21.	17ECZ03	Automotive Electronics	OE	-	3	3	0	0	3
22.	17ECZ04	Electronic Testing	OE	-	3	3	0	0	3
23.	17EEZ01	Renewable Energy Technology	OE	-	3	3	0	0	3
24.	17EEZ02	Smart Grid	OE	-	3	3	0	0	3
25.	17EEZ03	Energy Auditing, Conservation and Management	OE	-	3	3	0	0	3
26.	17EEZ04	Electrical Machines	OE	-	3	3	0	0	3
27.	17EIZ01	Autotronix	OE	-	3	3	0	0	3
28.	17EIZ02	Industrial Automation	OE	-	3	3	0	0	3
29.	17EIZ03	Fiber Optic Sensors	OE	-	3	3	0	0	3
30.	17EIZ04	Ultrasonic Instrumentation	OE	-	3	3	0	0	3
31.	17ITZ01	Software Testing Tool	OE	-	3	3	0	0	3
32.	17ITZ02	User Experience	OE	-	3	3	0	0	3
33.	17ITZ03	Developing Mobile Apps	OE	-	3	3	0	0	3
34.	17ITZ04	Software Project Management	OE	-	3	3	0	0	3
35.	17ITZ05	Java Programming	OE	-	3	3	0	0	3
36.	17MEZ01	Engineering Ergonomics	OE	-	3	3	0	0	3
37.	17MEZ02	Energy Audit and Resource Management	OE	-	3	3	0	0	3
38.	17MEZ03	Electric Vehicle Technology	OE	-	3	3	0	0	3
39.	17MEZ04	Value Engineering	OE	-	3	3	0	0	3
40.	17MEZ05	Smart Mobility	OE	-	3	3	0	0	3
41.	17MYZ01	Mathematical Structures	OE	-	3	3	0	0	3

42.	17MYZ02	Optimization Techniques	OE	-	3	3	0	0	3
43.	17MYZ03	Statics for Engineers	OE	-	3	3	0	0	3
44.	17MYZ04	Statistics for Engineers	OE	-	3	3	0	0	3
45.	17PYZ01	Nanomaterials	OE	-	3	3	0	0	3
46.	17PYZ02	Nuclear physics and Reactors	OE	-	3	3	0	0	3
47.	17PYZ03	Space science and technology	OE	-	3	3	0	0	3
48.	17CYZ01	Chemistry for Every Day Life	OE	-	3	3	0	0	3
49.	17CYZ02	E - Waste Management	OE	-	3	3	0	0	3
50.	17CYZ03	Industrial Chemistry	OE	-	3	3	0	0	3
51.	17EYZ01	Communicative Hindi	OE	-	3	3	0	0	3
52.	17EYZ02	Fundamentals of German	OE	-	3	3	0	0	3
53.	17EYZ03	Basics of Japanese	OE	-	3	3	0	0	3
54.	17EYZ04	Employability Enhancement and Analytical Skills	OE	-	3	3	0	0	3
55.	17EYX01	Effective Communication	OE	-	3	3	0	0	3
56.	17GYZ01	Biology for Engineers	OE	-	3	3	0	0	3

(D) Project			Credit Distribution:12		AICTE Norm:7 to 12%				
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17EED01	Project Work I	EEC	-	8	0	0	8	4
2.	17EED02	Project Work II	EEC	17EED01	16	0	0	16	8

(E) Skill/Proficiency based courses(Not to be included in CGPA)			Credit Distribution: Non-Credit		AICTE Norm:3%				
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PREREQUISITE	CONTACT PERIODS	L	T	P	C
1.	17GED02	Soft Skills- Reading and Writing	EEC	17GED01	2	0	0	2	0
2.	17GED01	Soft Skills- Listening and Speaking	EEC	-	2	0	0	2	0
3.	17GED03	Personality and Character Development	EEC	-	2	0	0	1	0
4.	17GED08	Essence of Indian Traditional Knowledge	EEC	-	2	2	0	0	0
5.	17GED06	Comprehension	EEC	-	2	0	0	2	0
6.	17GED07	Constitution of India	EEC	-	2	2	0	0	0

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

SUMMARY									
S. No.	SUBJECT	CREDITS AS PER SEMESTER							CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
1.	HS	3	6	0	0	3	0	0	0	12
2.	BS	10	9	3	3	0	0	0	0	25
3.	ES	10	3	6	3	3	0	3	0	28
4.	PC	0	6	13	13	14	9	11	0	66
5.	PSE	0	0	0	3	3	12	0	3	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	24	22	22	23	21	21	14	170

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

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17CYB02 – APPIED 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	The students will be able to apply knowledge of fundamental principles of chemistry	a, f
2.0	To introduce the basic concepts of electrode potential and batteries	2.1	The students will be able to 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	The students will be able to 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	The students will be able to 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	The students will be able to 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.

Dr.N.Rengarajan, B.Sc., B.Tech., M.E., Ph.D.,
PRINCIPAL
NANDHA ENGINEERING COLLEGE
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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 = 45 PERIODS

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.

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,c,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,k
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,i,k
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,i,k
5.0	To learn about exception handling	5.1	The students will be able to develop simple programs with exception handling	a,b,e,i

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 – 3 Nos.

Software:

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

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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17EEP01 - ELECTRIC CIRCUIT LABORATORY
(Common to EEE & EIE Branches)

L	T	P	C
0	0	4	2

PREREQUISITE : NIL

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To provide fundamentals concepts of electric circuits.	1.1	The students will be able to analyze the electrical circuits using various circuit laws	a,b,f,i,k
2.0	To understand and analyze the basic theorems of Circuit theory	2.1	The students will be able to examine the network theorems and operation of typical electrical circuits.	a,c,f,j
3.0	To understand the concept of resonance in series circuit.	3.1	The students will be able to design an electric circuits under resonance to meet desired needs within realistic constraints	a,d,i,k
4.0	To get an insight into solution of three phase power measurements.	4.1	The students will be able to find power and power factor in three phase circuits using two wattmeter method.	a,b,f,k
5.0	To understand the concept of basic theorems using digital simulation.	5.1	The students will be able to design and find the accurate values for basic theorem using MATLAB.	

LIST OF EXPERIMENTS:

1. Experimental verification of Ohm's law & Kirchhoff's voltage and current laws
2. Experimental verification of Superposition theorem
3. Experimental verification of Thevenin's theorem
4. Experimental verification of Norton's theorem
5. Experimental verification of Maximum power transfer theorem
6. Experimental verification of Reciprocity theorem
7. Verification of KVL and KCL by using digital simulation
8. Verification of Superposition theorem & Thevenin's theorem by using digital simulation
9. Verification of Reciprocity theorem & Maximum power transfer theorem by using digital simulation
10. RLC series resonance circuits by using digital simulation

ADDITIONAL EXPERIMENTS:

11. Study of CRO and measurement of sinusoidal voltage, frequency and power factor
12. Experimental determination of power in three phase circuits by two-watt meter method

TOTAL (P:60) = 60 PERIODS

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

17MYB10- PROBABILITY, STATISTICS AND NUMERICAL METHODS
(Common to EEE and E&I Branches)

L	T	P	C
2	2	0	3

PREREQUISITE : 17MYB05 | **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 have a fundamental knowledge of the basic probability concepts.	a,b,k,l
2.0	Identify unethical behavior in terms of hypothesis testing.	2.1	The students will be able to select a hypothesis testing method for the given numerical set of data to analyze the significance.	a,e,l
3.0	Find numerical approximations to the roots of an equation by Newton method, numerical solution to a system of linear equations by Gaussian Elimination and Gauss-Seidel.	3.1	The students will be able to acquainted with the basic concepts in numerical methods and their uses.	a,c,d,l
4.0	Find the Lagrange Interpolation Polynomial for any given set of points.	4.1	When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.	a,e,l
5.0	Apply several methods of numerical differentiation and integration, including Romberg integration.	5.1	The students will be able to explain the consequences of finite precision and the inherent limits of the numerical methods considered.	a,b,l

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 - TESTING OF HYPOTHESIS	**(6+6)**
Sampling Distributions-Testing of hypothesis for mean - t - distribution, F – distribution- Chi-square - Test for independence of attributes and Goodness of fit.	
UNIT III - SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	**(6+6)**
Solution of equation – Method of criteria for convergence - Iteration method : x = g(x)method – Newton Raphson method – Solution of linear system by Gaussian elimination and Gauss – Jordon method – Iterative methods: Gauss-Seidel method – Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method for symmetric matrix.	
UNIT IV - INTERPOLATION AND APPROXIMATION	**(6+6)**
Divided differences in unequal intervals - Interpolating with a cubic spline – Lagrangian Polynomials — Newton's forward and backward difference formulas for equal intervals.	

UNITV - NUMERICAL DIFFERENTIATION AND INTEGRATION	(6+6)
Numerical Differentiation using interpolation formulae –Numerical integration by Trapezoidal and Simpson's 1/3 rule and 3/8 rule – Romberg's method – Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpson's rules.	
	TOTAL (L: 30+T:30) = 60 PERIODS

TEXT BOOKS:

1. T. Veerarajan. and T. Ramachandran, "Numerical Methods with programming in C" 2nd ed., Tata McGraw-Hill, 2006 , First reprint 2007.
2. Veerarajan.T, "Probability, Statistics and Random Processes with Queuing Theory and Queuing Networks", Fourth Edition ,Tata McGraw-Hill, New Delhi 2016.

REFERENCES:

1. E. Balagurusamy, "Numerical Methods", Tata McGraw-Hill, New Delhi, 1999, 25th reprint 2008.
2. M.K Venkatraman, "Numerical Methods" National Publication, New Delhi, 2000, Reprint 2005.
3. B.S.Grewal, "Numerical Methods in Engineering & Science" ,Khanna publishers ,New Delhi,2012.
4. P. Kandasamy, K.Thilagavathy and K. Gunavathy, "Numerical Methods – Vol: IV", S.Chand& Co. Ltd. New Delhi, 2003, reprint 2007.

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

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17EEC08-LINEAR INTEGRATED CIRCUITS

L	T	P	C
3	0	0	3

PREREQUISITE : 17EEC03	QUESTION PATTERN : TYPE – 3

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the function and fabrication process of ICs	1.1	The students will be able to Know about IC fabrication procedure	a,b,d,e,i
2.0	To provide in-depth instructions on the characteristics of operational amplifiers	2.1	The students will be able to impart knowledge on characteristics of OP-AMP	a,c,d,e,i
3.0	To understand the applications of operational amplifiers	3.1	The students will be able to get adequate knowledge on OP-AMP application	a,b,c,e,g
4.0	To make the student to understand about unique IC and applications of ICs	4.1	The students will be able to analyze and construct various application circuits using 555 timer.	a,b,d,k
5.0	Develop a strong basis of oscillator	5.1	The students will be able to recognize about the Oscillators and types	a,b,c,d,j,l

UNIT I - IC FABRICATION	(9)
IC classification -Fundamental of monolithic IC technology: epitaxial growth, masking and etching, diffusion of impurities - Realization of monolithic ICs and packaging -Fabrication of diodes, capacitance, resistance.	
UNIT II – CHARACTERISTICS OF OPAMP	**(9)**
Ideal OP -AMP characteristics: DC characteristics, AC characteristics -Differential amplifier - Basic applications of op-amp –Inverting and Non-inverting Amplifiers -V/I & I/V converters –Summer -Differentiator and integrator.	
UNIT III – APPLICATIONS OF OPAMP	**(9)**
Instrumentation amplifier -Comparators – Multivibrators - Clippers – Clampers - D/A converter (R-2R ladder and weighted resistor types) - A/D converters using op amps.	
UNIT IV - UNIQUE ICs AND APPLICATIONS OF ICs	**(9)**
Functional block, characteristics & application circuits with 555 Timer –IC 566 voltage controlled oscillator - IC 565 phase lock loop - 723 Variable voltage regulators - LM 380 power amplifier.	
UNIT V -OSCILLATORS	**(9)**
Oscillators – Barkhausen criterion for oscillation – Hartley & Colpitt's oscillators – phase shift, Wien bridge and crystal oscillators - Clapp oscillator.	
	TOTAL = 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 BOOKS:

1. D. Roy Choudhury, Shail B. Jain, "Linear Integrated Circuits" , Fourth Edition New Age International,4th ed., 2011.
2. Gayakwad R.A., 'Op-amps & Linear Integrated Circuits', Prentice Hall of India, New Delhi, 4 th Edition, 2009.

REFERENCE:

1. Jacob Millman, Christos C.Halkias, "Integrated Electronics - Analog and Digital Circuits System",McGraw Hill Education, 2nd ed., 2011.

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

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17EEC11-MEASUREMENTS AND INSTRUMENTATION

L	T	P	C
3	0	0	3

PREREQUISITE : 17EEC08	QUESTION PATTERN : TYPE - 3

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To introduce the basic functional elements of instrumentation	1.1	The students will be able to apply the basic laws governing the operation of the instruments	a,b,f,i,k
2.0	To introduce various electrical measuring instruments	2.1	The students will be able to calibrate measuring instruments.	a,c,f,j
3.0	To educate on the comparison between various measurement techniques	3.1	The students will be able to apply analog and digital techniques to measure electrical quantities.	a,d,i,k
4.0	To introduce the fundamentals of electrical and electronic instruments	4.1	The students will be able to demonstrate about storage & display devices.	a,b,f,k
5.0	To introduce various transducers and the data acquisition systems	5.1	The students will be able to use various transducers and data acquisition system.	a,b,c,i,l

UNIT I - INTRODUCTION	**(9)**
Functional elements of an instrument – Static and dynamic characteristics – Errors in measurement – Statistical evaluation of measurement data – Standards and calibration- Principle and types of digital voltmeters, ammeters.	
UNIT II - ELECTRICAL AND ELECTRONIC INSTRUMENTS	**(9)**
Principle and types of multi meters – Single phase watt meters and energy meters – Magnetic measurements – Determination of B-H curve and measurements of iron loss – Instrument transformers – Instruments for measurement of frequency.	
UNIT III - COMPARATIVE METHODS OF MEASUREMENTS	**(9)**
D.C Bridges: Wheatstone Bridge, Kelvin's double bridge- A.C bridges: Maxwell bridge, Anderson bridge, Schering bridge.	
UNIT IV - STORAGE AND DISPLAY DEVICES	**(9)**
Magnetic disk and tape – Recorders, digital plotters and printers, digital CRO, LED, & Dot matrix display – Data Loggers. – Smart Meters.	
UNIT V - TRANSDUCERS AND DATA ACQUISITION SYSTEMS	**(9)**
Classification of transducers – Selection of transducers – Resistive (Thermistors & Thermocouples), capacitive & inductive Transducers (LVDT) – Piezoelectric and Hall effect transducer – Elements of data acquisition system.	
TOTAL = 45 PERIODS	

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

TEXT BOOKS:

1. Sawhney A K, "A Course in Electrical and Electronic Measurement and Instrumentation", Dhanpat Rai & Sons, New Delhi, 18th Edition, 2012.
2. Gupta J.B., "A Course in Electronic and Electrical Measurements", S. K. Kataria & Sons, Delhi, 2009.

REFERENCES:

1. Kalsi H.S, "Electronic Instrumentation", McGraw Hill Education India, 3rd Edition, 2010.
2. Prithwiraj Purkait, Budhaditya Biswas, Chiranjib Koley "Electrical and Electronics Measurements and Instrumentation", McGraw Hill Education India, First Edition, 2013.
3. Patranabi.D, "Sensors And Transducers", PHI Learning Pvt. Ltd., 2003.

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

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17EEC12-CONTROL SYSTEMS

L	T	P	C
3	2	0	4

PREREQUISITE : 17EEC04 AND 17EEC07 | **QUESTION PATTERN :TYPE-3**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To introduce the basic concepts of physical systems and modeling.	1.1	The students will be able to understand the use of transfer function models for analysis physical systems and introduce the control system	a,b,c,e,i,k
2.0	To impart in-depth analysis of system dynamics in time-domain using classical techniques.	2.1	The students will be able to provide adequate knowledge in the time response of systems and steady state error analysis.	a,b,e,i
3.0	To impart in-depth analysis of system dynamics in frequency domain using classical techniques.	3.1	The students will be able to accord basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.	a,b,c,f,i
4.0	To learn about the basic idea of stability analysis	4.1	The students will be able to introduce stability analysis and design of compensators.	a,c,e,f,i
5.0	To acquire knowledge on in-depth analysis of physical system dynamics using state-space models	5.1	The students will be able to introduce state variable representation of physical systems and study the effect of state feedback	b,c,e,l,k

UNIT I -SYSTEMS AND THEIR REPRESENTATIONS	**(12)**
Basic elements of control systems – Classification of control systems-Open loop and closed loop control systems-Transfer functions of mechanical, electrical and Electromechanical systems – Block diagram s –Signal flow graphs – Mason's gain formula-Control System Components	
UNIT II - TIME DOMAIN ANALYSIS	**(12)**
Typical test signals- Time domain specifications – Characteristic equation-Transient response of second order systems – Steady state response-Steady state errors-Static and dynamic error coefficient – Root locus.	
UNIT III - FREQUENCY DOMAIN ANALYSIS AND DESIGN	**(12)**
Frequency domain specifications –Bode plot – Polar plot – Nyquist stability criterion. Correlation between frequency domain and time domain specifications.	
UNIT IV- STABILITY AND COMPENSATOR DESIGN	**(12)**
Stability of linear control systems – Stability and location of the roots of the Characteristic equation – Routh Hurwitz criterion - Design of lag, lead, lag-lead series networks Lag/Lead compensator design using bode plots construction –Introduction to P, PI, PID controllers-Effects of P, PI, PID modes of feedback control.	

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

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UNIT V -STATE SPACE ANALYSIS	(12)
Introduction-Concepts of state, state variables and state model-Physical ,phase and canonical variables-State equation – Solutions – Realization – Controllability – Observability – State space to transfer function conversion – Pole placement.	
	TOTAL = 60 PERIODS

TEXT BOOKS:

1. Gopal M, "Control Systems – Principles and Design" 4 th ed,Tata McGraw-Hill, New Delhi, 2012.
2. Nagrath I J and Gopal M, "Control System Engineering", 6th ed ,New Age International, New Delhi, 2017.

REFERENCES:

1. Norman S Nise, "Control System Engineering ", John Wiley & Sons, 6th ed, New Delhi, 2012.
2. Farid Golnaraghi and Benjamin C Kuo, "Automatic Control Systems", 10th ed, McGraw-Hill, New Delhi ,2017.
3. Ogata K, "Modern Control Engineering", Prentice Hall of India, New Delhi, 2012.

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

17EEP07-POWER ELECTRONICS LABORATORY

L	T	P	C
0	0	4	2

PREREQUISITE : 17EEP02

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To understand the various characteristics of SCR, TRIAC, MOSFET and IGBT	1.1	The students will be able to examine the working and characteristics of transistor & thyristor.	a,c,d,l
2.0	To analyze the switching characteristics of SCR and MOSFET	2.1	The students will be able to know the working operation of single phase converter.	a,b,c,d,l
3.0	To design and generate the gate pulses for converter circuits	3.1	The students will be able to observe the working operation of Three phase AC voltage controller.	a,c,d,h
4.0	To verify the step up and step down operation of DC –DC chopper	4.1	The students will be able to examine the working of Chopper.	a,b,c
5.0	To simulate the various electronics circuits using power electronics devices	5.1	The students will be able to identify the operation of single phase Cyclo-converter.	a,c,d,l

LIST OF EXPERIMENTS:

1. Experimental verification of static characteristics of SCR.
2. Experimental verification of VI characteristics of TRIAC.
3. Experimental verification of dynamic characteristics of SCR and MOSFET.
4. Experimental verification of Single-phase half and fully controlled Rectifiers with R and RL load.
5. Formation of buck and boost converter circuit using power MOSFET.
6. Formation of single phase IGBT based PWM Inverter.
7. Design and implementation of single-phase AC voltage controller.
8. Design and implementation of single-phase cycloconverter.
9. Simulation of Single-phase half and fully controlled rectifier using R, RL and RLE load.
10. Simulation of three phase inverter with R load.

ADDITIONAL EXPERIMENTS:

1. SCR Based Voltage and Current Commutated Chopper
2. Pulse Generation using bread board connection

TOTAL = 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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17EEC16-MICROPROCESSOR AND MICROCONTROLLER

L	T	P	C
3	0	0	3

PREREQUISITE : 17EEC09 | **QUESTION PATTERN : TYPE - 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To impart knowledge on basic functional blocks of 8085 microprocessor	1.1	The students will be able to understand the internal operations of 8085 processor	a,e,f,i
2.0	To motivate the students to acquire knowledge on addressing modes and instruction sets of 8085 processor	2.1	The students will be able to develop skills in writing assembly language program	a,b,c,e,f
3.0	To make the student to understand the interfacing of application devices	3.1	The students will be able to recognize the knowledge on interfacing the external devices to the processor according to the user requirements	a,c,e,g
4.0	To impart knowledge on basic functional blocks and operations of 8051 microcontroller	4.1	The students will be able to understand the internal structure and instruction set of 8051 controller	a,e,f,i
5.0	To convey the skills to know about PIC microcontroller	5.1	The students will be able to develop PWM outputs using PIC microcontroller.	b,c,f,k,l

UNIT I - 8085 PROCESSOR	**(9)**
Functional Building Blocks – Signals – I/O & data transfer concepts – Timing Diagram – Interrupts.	
UNIT II - PROGRAMMING OF 8085 PROCESSOR	**(9)**
Instruction format – Addressing modes – Instruction set – Need for assembly language – Development of assembly language programs – Introduction to ARM processor.	
UNIT III - PERIPHERAL INTERFACING	**(9)**
Architecture and interfacing: 8255, 8259, 8253, 8251- A/D and D/A converters – Interfacing with 8085.	
UNIT IV - 8051 MICRO CONTROLLER	**(9)**
Architecture – Memory Organization – I/O ports – Addressing modes – Instruction set – Interrupt structure - Simple programming exercises - Stepper motor control - Washing Machine Control.	
UNIT V - PIC MICROCONTROLLER – PERIPHERALS	**(9)**
PIC Microcontroller - Peripherals Timer 0 – Timer 1 - Compare and Capture mode — Timer 2 – PWM outputs – I^2C operation – ADC – UART	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:

1. Krishna Kant, "Microprocessors and Microcontrollers: Architecture, Programming and System Design 8085, 8086, 8051, 8096", 2nd ed., Prentice Hall of India, 2014.
2. Soumitra Kumar Mandal, Microprocessor & Microcontroller Architecture, Programming & Interfacing using 8085, 8086, 8051, McGraw Hill Education, 2013.

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

REFERENCES:

1. Muhammad Ali Mazidi,J.G.Mazidi,R.D.Mckinlay, "The 8051 Microcontroller and Embedded Systems", 2nd ed.,Prentice Hall, 2007.
2. R.S. Gaonkar, „Microprocessor Architecture Programming and Applications with the 8085", 5th ed., Wiley Eastern Ltd., New Delhi, 2013.

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

17EEC17 - ELECTRIC DRIVES AND CONTROL

L	T	P	C
3	0	0	3

PREREQUISITE : 17EEC04,17EEC07 & 17EEC13 | **QUESTION PATTERN: TYPE – 1**

COURSE OBJECTIVES AND OUTCOMES:

	Course Objectives		Course Outcomes	Related Program outcomes
1.0	To provide knowledge on the process of learning fundamental concept of electrical drive systems and drive motor characteristics.	1.1	The students will be able to know the fundamental concept electrical drive, the selection process involved in drives and drive motor characteristics.	a,b,c,e,i,k
2.0	To know the fundamental of DC motor drives	2.1	The students will be able to understand the operation of the converter, chopper fed dc drive and solve simple problems	a,b,c,f,i
3.0	To give exposure to understand and analyze the various speed control of induction motor drives.	3.1	The students will be able to study and analyze the speed control of induction motor drive.	a,b,c,f,i
4.0	To acquire knowledge on digital control techniques used for speed control of dives	4.1	The students will be able to use recent microcontroller for motor control and PLC based control of drives.	b,c,e,f,i,k,l
5.0	To learn about the design of different controllers for drives	5.1	The students will be able analyze and design various controllers for drives	a,b,c,e,i

UNIT I – INTRODUCTION	**(9)**
Basic elements – Types of Electric Drives – Factors influencing the choice of electrical drives –Multi quadrant operation- heating and cooling curves – Loading conditions and classes of duty – Selection of power rating for drive motors –Drive motor characteristics - Braking of electrical motors	
UNIT II - CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF DC DRIVES	**(9)**
Speed control of DC series and shunt motors – Armature and field control- Ward-Leonard control system: Intermittent load application – Steady state analysis of the single and three phase converter fed separately excited DC motor drive –4 quadrant operations of converter / chopper fed drive.	
UNIT III - CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF AC DRIVES	**(9)**
Speed control of three phase induction motor – Voltage control- voltage / frequency control – Constant airgap flux – Field weakening mode –AC voltage Regulator- Voltage / current fed inverter – Rotor control – Rotor resistance control and slip power recovery schemes- principle of vector control.	
UNIT IV - DIGITAL CONTROL TECHNIQUES FOR SPEED CONTROL OF DRIVES	**(9)**
Digital techniques in speed control - Advantages and limitations– Microprocessor based control of drives- Microcontroller based control of drives -PLC Based drives.	
UNIT V - DESIGN OF CONTROLLERS FOR DRIVES	**(9)**
Introduction-Transfer function for DC motor / load and converter – Closed loop control with Current and speed feedback–Armature voltage control and field weakening mode – Design of controllers; current controller and speed controller- Converter selection and characteristics.	
TOTAL = 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. Dubey G.K., "Fundamentals of Electrical Drives", Narosa Publishing House, New Delhi, 2015.
2. Bose, B.K., —Modern Power Electronics and AC Drives", Pearson Education (Singapore) Pvt.. Ltd, New Delhi, 2010

REFERENCES:

1. Vedam Subramanyam, – Electric Drives: Concepts and Applicationsll, Tata McGraw hill Pvt. Ltd, New Delhi, 2011.
2. Krishnan R, – Electric Motor Drives: Modeling, Analysis and Controlll, Prentice Hall of India, Pvt. Ltd, New Delhi,2010
3. S.K.Pillai, "A First Course on Electrical Drives", II Edition, New Age International Publishers, 2010.

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