Curriculum and Syllabi

B.E. Electronics and Communication Engineering

Semesters I to IV

Regulations 2019

Department of Electronics and Communication Engineering

Vision

To strive for excellence in Electronics and Communication Engineering education, research and technological services imparting quality training to students, to make them competent and motivated engineers.

Mission

- Impart quality engineering education in the areas of Electronics, Signal Processing, Embedded Systems and Communication Networks.
- Equip the students with professionalism and technical expertise to provide appropriate solutions to societal and industrial needs.
- Provide stimulating environment for continuously updated facilities to pursue research through creative thinking and team work.

OBE Coordinator   Programme Coordinator   Head of the Department

Head - OBE

Programme: B.E. Electronics and Communication Engineering

Programme Educational Objectives (PEOs) – Regulations 2019

B.E. Electronics and Communication Engineering graduates will:

PEO1. Actively apply knowledge and technical skills in engineering practices towards the progress of the organization in competitive and dynamic environment.

PEO2. Own their professional and personal development by continuous learning and apply the learning at work to create new knowledge.

PEO3. Conduct themselves in a responsible and ethical manner supporting sustainable economic development which enhances the quality of life.

Programme Outcomes (POs) - Regulations 2019

On successful completion of B.E. Electronics and Communication Engineering programme, graduating students/graduates will be able to:

PO1.Engineering knowledge: Apply the knowledge of Mathematics, Science and engineering to solve problems in the field of Electronics and Communication Engineering

PO2.Problem analysis: Identify, formulate/model, analyze and solve complex problems in the field of Electronics and Communication Engineering

PO3.Design and development: Design an electronic system/component, or process to meet specific purpose with due consideration for economic, environmental, social, political, ethical, health and safety issues

PO4.Conduct investigations: Design and conduct experiment, analyze and interpret data to provide valid conclusions in the field of Electronics and Communication Engineering

PO5.Modern tool usage: Apply appropriate techniques and modern software tools for design and analysis of Electronic systems with specified constraints

OBE Coordinator   Programme Coordinator   Head of the Department

Head - OBE

PO6.Engineer and society: Apply contextual knowledge to provide engineering solutions with societal, professional and environmental responsibilities

PO7.Environment and sustainability: Provide sustainable solutions within societal and environmental contexts for problems related to Electronics and Communication Engineering

PO8.Ethics: Comply with code of conduct and professional ethics in engineering practices

PO9.Individual and team work: Perform effectively as a member/leader in multidisciplinary teams

PO10.Communication: Communicate effectively to engineering community and society with proper aids and documents

PO11.Project management & finance: Demonstrate knowledge and understanding of the engineering and management principles to manage projects in multidisciplinary environment

PO12.Lifelong learning: Recognize the need for, and have the ability to engage in independent and lifelong learning

Programme Specific Outcomes (PSOs) - Regulations 2019

On successful completion of B.E. Electronics and Communication Engineering programme, graduating students/graduates will be able to:

PSO1: Technology deployment: Apply technologies of electronics, embedded systems, signal processing, communication and networking in the field of Industrial Automotive, Consumer, Medical and Defense Electronics industries

PSO2: IC design: Apply the design flow of Very Large Scale Integrated circuits to design and test Integrated Circuits in semiconductor industries

OBE Coordinator	Programme Coordinator	Head of the Department

Head - OBE

Dr. MAHALINGAM
COLLEGE OF ENGINEERING AND TECHNOLOGY
Affiliated to Anna University, Chennai; Approved by AICTE ; Accredited by NAAC with Grade 'A++'
Accredited by NBA - Tier1 (Mech, Auto, Civil, EEE, ECE, E&I and CSE)
Udumalai Road, Pollachi - 642 003, Tel: 04259-236030/40/50 Fax: 04259-236070 www.mcet.in

Programme: B.E Electronics and Communication Engineering
2019 Regulations
Curriculum for Semesters I to II

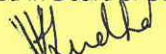| Course Code	Course Title	Duration	Credits	Marks
19SHMG6101	Induction Program	3 Weeks	-	100

Semester I (2019 Batch)

Course Code	Course Title	Hours/Week L	T	P	Credits	Marks	Common to Programmes
19MABC1101	Matrices and Calculus	3	1	0	4	100	AU,ME,MC,PR CE,EC,EE&EI
19ENHG2101	Communication Skills – I	2	0	2	3	100	All
19CHBC2001	Chemistry for Electrical Sciences	3	0	2	4	100	EC, EE&EI
19ECSN2101	Fundamentals of Electrical and Electronics Engineering	3	0	2	4	100	---
19MESC2001	Introduction to Engineering	2	0	2	3	100	AU,ME,MC,PR EC,EE&EI
19PSHG3002	Personal Effectiveness	0	0	2	1	100	All
Total		**13**	**1**	**10**	**19**	**600**	

Semester II (2019 Batch)

Course Code	Course Title	Hours/Week L	T	P	Credits	Marks	Common to Programmes
19MABC1201	Ordinary Differential Equations and Complex Variables	3	1	0	4	100	AU,ME,MC,PR CE,EC,EE&EI
19ENHG2201	Communication Skills – II	2	0	2	3	100	All
19PHBC2001	Physics for Electrical Sciences	3	0	2	4	100	EC,EE & EI
19ECSN2201	Electric Circuits and Electron devices	3	0	2	4	100	---
19CSSC2001	C Programming	3	0	2	4	100	AU,ME,MC,PR CE,EC,EE&EI
19MESC4001	Engineering Drawing	1	0	3	2.5	100	EC,EI,CS&IT
19PSHG3001	Wellness for Students	0	0	2	1	100	All
19CHMG6201	Environmental Sciences	1	0	0	0	100	All
Total		**16**	**1**	**13**	**22.5**	**800**	

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. MAHALINGAM
COLLEGE OF ENGINEERING AND TECHNOLOGY

MCET
College of Engineering and Technology
An Autonomous Institution
(Since 2011)

Affiliated to Anna University, Chennai, Approved by AICTE ; Accredited by NAAC with Grade 'A++'
Accredited by NBA - Tier1 (Mech, Auto, Civil, EEE, ECE, E&I and CSE)
Udumalai Road, Pollachi - 642 003. Tel: 04259-236030/40/50 Fax: 04259-236070 www.mcet.in

Programme: B.E Electronics and Communication Engineering
2019 Regulations
Curriculum for Semesters I to IV

Course Code	Course Title	Duration	Credits	Marks
19SHMG6101	Induction Program	3 Weeks	-	100

Semester I (2020 Batch)

Course Code	Course Title	Hours/Week L	T	P	Credits	Marks	Common to Programmes
19MABC1101	Matrices and Calculus	3	1	0	4	100	AU,ME,MC,PR CE,EC,EE&EI
19ENHG2101	Communication Skills – I	2	0	2	3	100	All
19CHBC2001	Chemistry for Electrical Sciences	3	0	2	4	100	EC, EE&EI
19ECSN2101	Fundamentals of Electrical and Electronics Engineering	3	0	2	4	100	---
19MESC2001	Introduction to Engineering	2	0	2	3	100	AU,ME,MC,PR EC,EE&EI
19PSHG6001	Wellness for Students*	0	0	2	-	-	All
Total		**13**	**1**	**10**	**18**	**500**	

Semester II (2020 Batch)

Course Code	Course Title	Hours/Week L	T	P	Credits	Marks	Common to Programmes
19MABC1201	Ordinary Differential Equations and Complex Variables	3	1	0	4	100	AU,ME,MC,PR CE,EC,EE&EI
19ENHG2201	Communication Skills – II	2	0	2	3	100	All
19PHBC2001	Physics for Electrical Sciences	3	0	2	4	100	EC,EE & EI
19ECSN2201	Electric Circuits and Electron devices	3	0	2	4	100	---
19CSSC2001	C Programming	3	0	2	4	100	AU,ME,MC,PR CE,EC,EE&EI
19MESC4001	Engineering Drawing	1	0	3	2.5	100	EC,EI,CS&IT
19PSHG6001	Wellness for Students*	0	0	2	1	100	All
19CHMG6201	Environmental Sciences	1	0	0	0	100	All
Total		**16**	**1**	**13**	**22.5**	**800**	

* Annual Pattern

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Semester III

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1302	Numerical Methods and Linear Algebra	3	1	0	4	100	EC,EE,EI &MC
19ECCN1301	Analog Circuits- I	3	0	0	3	100	-
19ITSN2302	Data Structures and Algorithms - I	3	0	2	4	100	-
19ECCN2301	Transmission Lines and Waveguides	3	0	2	4	100	-
19ECCN1302	Digital Principles and System Design	3	1	0	4	100	-
19ECCN3301	Analog Circuits- I Laboratory	0	0	3	1.5	100	-
19ECCN3302	Digital Principles and System Design Laboratory	0	0	3	1.5	100	-
XXXXXXXXX	One Credit Course (OCC).	0	0	2	1	100	-
Total		**15**	**2**	**12**	**23**	**800**	

Semester IV

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABG1401	Probability and Statistics	3	1	0	4	100	All
19ECCN1401	Analog Circuits - II	3	1	0	4	100	-
19ITSN2401	Data Structures and Algorithms - II	3	0	2	4	100	-
19ECCN1402	Signals and Systems	3	1	0	4	100	-
19ECCN3401	Analog Circuits - II Laboratory	0	0	3	1.5	100	-
19ECPN6401	Mini- Project	0	0	4	2	100	-
XXXXXXXXX	One Credit Course (OCC)	0	0	2	1	100	-
19PSHG6002	Universal Human Values 2 :Understanding Harmony	2	1	0	3	100	All
Total		**14**	**4**	**11**	**23.5**	**800**	

Course Code	Course Title	Duration	Credits	Marks
19ECPN6001	Internship or Skill Development*	2 Weeks	1	100

*Refer to clause:4.8 in UG academic regulations 2019

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Tentative Curriculum for Semesters V to VIII
Semester V

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
	Digital Signal Processing	3	0	2	4	100	-
	Control Systems	3	1	0	4	100	-
	Analog and Digital Communication	3	1	0	4	100	-
	Professional Elective-I	3	0	0	3	100	-
	Online course	3	0	0	3	100	-
	Open Elective-I	3	0	0	3	100	-
	Data Science laboratory	0	0	3	1.5	100	
	Communication laboratory	0	0	3	1.5	100	-
	Employability Skills-I	0	0	2	1	100	ALL
Total		**18**	**2**	**10**	**25**	**900**	

*Refer to clause: 4.8 in UG academic regulations 2019

Semester VI

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
	CMOS Design	3	1	0	4	100	-
	Microcontroller& its interfacing techniques	3	0	2	4	100	-
	Internet of Things(IoT)	3	0	0	3	100	-
	Professional Elective -II	3	0	0	3	100	-
	Online course	3	0	0	3	100	-
	Open Elective-II	3	0	0	3	100	-
	Innovative and Creative Project	0	0	4	2	100	-
	Employability Skills-II	0	0	2	1	100	ALL
Total		**18**	**1**	**8**	**23**	**800**	

Course Code	Course Title	Duration	Credits	Marks
	Internship or Skill Development*	2 -4 Weeks	1	100

*Refer to clause: 4.8 in UG academic regulations 2019

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Semester VII

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
	RF and Microwave Engineering	3	0	0	3	100	-
	Machine Learning	3	0	0	3	100	-
	Professional Elective -III	3	0	0	3	100	-
	Professional Elective -IV	3	0	0	3	100	-
	Open Elective-III	3	0	0	3	100	
	RF and Microwave Laboratory	0	0	3	1.5	100	-
	CMOS Design Laboratory	0	0	3	1.5	100	
Total		**15**	**0**	**6**	**18**	**700**	

Semester VIII

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
	Project	0	0	16	8	200	
Total					**8**	**200**	

Course Code	Course Title	Duration	Credits	Marks
	Internship or Skill Development*	8 -16 weeks	4	100

*Refer to clause: 4.8 in UG academic regulations 2019

Total Credits (2019 Batch only):168

Total Credits (2020 Batch onwards): 167
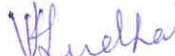
Passed in Board of Studies meeting

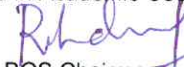Approved in Academic Council meeting

BOS Convener

BOS Chairman

PROFESSIONAL ELECTIVES

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
Communication and Networking							
	Computer Communication Networks	3	0	0	3	100	-
	Wireless Communication	3	0	0	3	100	-
	Fiber Optic Communication	3	0	0	3	100	-
	Antenna and wave Propagation	3	0	0	3	100	-
	High Speed Networks	3	0	0	3	100	-
	Electromagnetic Interference and Compatibility	3	0	0	3	100	-
	Blue Tooth Technology	3	0	0	3	100	-
	Multimedia Communication	3	0	0	3	100	-
	Satellite Communication	3	0	0	3	100	-
	Cognitive Networks	3	0	0	3	100	-
	OFDM and MIMO Concepts	3	0	0	3	100	-
	Telecommunication and Digital Switching Techniques	3	0	0	3	100	-
	Advanced Wireless Communication	3	0	0	3	100	-
	Advanced Networking Technologies	3	0	0	3	100	-
	Wireless sensor Networks	3	0	0	3	100	-
	Mobile Communication and Networks	3	0	0	3	100	-
	Cryptography and Network Security	3	0	0	3	100	-
	Television and Video Systems	3	0	0	3	100	-
	Information Theory and Coding	3	0	0	3	100	-
	High Speed Electronics	3	0	0	3	100	-
	Error Correcting Codes	3	0	0	3	100	-

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Design Engineering

	Wavelets	3	0	0	3	100	-
	Digital Image and Video Processing	3	0	0	3	100	-
	Speech and Audio Processing	3	0	0	3	100	-
	Adaptive Signal Processing	3	0	0	3	100	-
	Testing of VLSI Circuits	3	0	0	3	100	-
	ASIC Design	3	0	0	3	100	-
	Computer Architecture	3	0	0	3	100	-
	CMOS Analog IC Design	3	0	0	3	100	-
	Bio- Medical Electronics	3	0	0	3	100	-
	Advanced Microcontrollers	3	0	0	3	100	-
	Low Power VLSI Design	3	0	0	3	100	-
	Digital System Design and Verification	3	0	0	3	100	-
	Introduction to MEMS	3	0	0	3	100	-
	Nano electronics	3	0	0	3	100	-

Control and Automation

	Automotive Electronics	3	0	0	3	100	-
	Virtual Instrumentation	3	0	0	3	100	-
	Industrial Automation	3	0	0	3	100	-
	Power Electronics	3	0	0	3	100	-

Software Engineering

	Data Base Management Systems	3	0	0	3	100	-
	Data Mining and Analytics	3	0	0	3	100	-
	Java Programming	3	0	0	3	100	-
	Scientific Computing with Python	3	0	0	3	100	-
	Software Testing	3	0	0	3	100	-
	Scientific computing	3	0	0	3	100	-

Management

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting
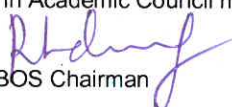
BOS Chairman

	Principles of Management	3	0	0	3	100	-
	Engineering Economics and Cost Analysis	3	0	0	3	100	-
	Disaster Management	3	0	0	3	100	-
Basic Sciences							
	Calculus of Variations and Integral Equations	3	0	0	3	100	-
	Operations Research	3	0	0	3	100	-

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

OPEN ELECTIVES

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
	Automotive Infotronics	3	0	0	3	100
	Electronics in Automobiles	3	0	0	3	100
	Automotive Sensors	3	0	0	3	100
	Environmental Impact Assessment	3	0	0	3	100
	Safety Engineering	3	0	0	3	100
	Geographical Information System	3	0	0	3	100
	Data Science Using Hadoop	3	0	0	3	100
	Artificial Intelligence	3	0	0	3	100
	Soft Computing	3	0	0	3	100
	Electric and Hybrid vehicles	3	0	0	3	100
	Solar Energy System	3	0	0	3	100
	Energy Auditing and Conservation	3	0	0	3	100
	Applied Design Thinking	3	0	0	3	100
	Industrial Internet of Things	3	0	0	3	100
	Smart Sensor Technology	3	0	0	3	100
	Virtual Instrumentation	3	0	0	3	100
	Open Source Technologies	3	0	0	3	100
	Multimedia Systems and Applications	3	0	0	3	100
	Cyber Law and Information Security	3	0	0	3	100
	E-Commerce	3	0	0	3	100
	User Interface Design	3	0	0	3	100
	Disaster Management	3	0	0	3	100
	Software Modeling-Principles and Practices	3	0	0	3	100
	Automation Systems	3	0	0	3	100
	Total Quality Management	3	0	0	3	100

Passed in Board of Studies meeting

BOS Convener
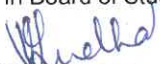
Approved in Academic Council meeting

BOS Chairman

Dr. MAHALINGAM COLLEGE OF TECHNOLOGY, POLLACHI
2019 REGULATION -COURSE CODE GENERATION PROCEDURE FOR UG COURSES

1	2	3	4	5	6	7	8	9	10
1	9	A	U						

REGULATION

BOARD /DEPARTMENTS
CHARACTER TYPE-ALPHABET

AU	AUTO
CE	CIVIL
CS	CSE
EC	ECE
EE	EEE
EI	EIE
IT	IT
ME	MECH
MC	MECHATRONICS
PR	PRODUCTION
CH	CHEMISTRY
EN	ENGLISH
MA	MATHS
PH	PHYSICS
PS	PROFESSIONALSKILLS

SEMESTER NUMBER
CHARACTER TYPE-NUMBER

1to8	SEMESTER
0	FLOATINGSEMESTER

MODE OF ASSESSMENT
CHARACTER TYPE-NUMBER

1	THEORY
2	THEORYWITH PRACTICALCOMPONENT
3	PRACTICAL
4	PRACTICALWITHTHEORY COMPONENT
5	THEORY WITH SELFSTUDY COMPONENT
6	CUSTOMIZED

COURSE TYPE
CHARACTER TYPE – ALPHABET

B	BASIC SCIENCE
S	ENGINEERING SCIENCE
H	HUMANITIES
C	PROFESSIONAL CORE
E	PROFESSIONAL ELECTIVE
O	OPENELECTIVE
I	INDUSTRY OFFERED COURSE
R	MINOR REVISION IN SYLLABUS
V	OCC
P	PROJECT/ SKILLDEVELOPMENT/INTERNSHIP
M	MANDATORY NON – CREDIT COURSE

COMMON TOANY BOARD/DEPARTMENTS
CHARACTERTYPE-ALPHABET

G	GENERIC (COMMON TOALL BRANCHES–ex. COMMUNICATION SKILLS)
N	NON COMMON COURSE(INDIVIDUAL)
C	COMMON COURSE(ex COMMON TO EC, EE, EI)

SEQUENCE NUMBER
CHARACTERTYPE-NUMBER

01,02,03….99

Regulations 2019

Detailed Syllabi for

Semesters I to IV

Course Code: 19SHMG6101	Course Title: Induction Program
	(common to all B.E/B.Tech programmes)
Course Category: Mandatory Non-Credit Course	Course Level: Introductory
Duration: 3 Weeks	Max. Marks:100

Pre-requisites

> ➢ Nil

Course Objectives

The course is intended to:

1. Explain various sources available to meet the needs of self, such as personal items and learning resources
2. Explain various career opportunities, opportunity for growth of self and avenues available in the campus
3. Explain the opportunity available for professional development
4. Build universal human values and bonding amongst all the inmates of the campus and society
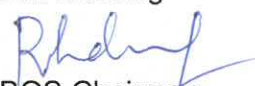
List of Activities:

1. History of Institution and Management: Overview on NIA Education Institutions-Growth of MCET – Examination Process-OBE Practices – Code of Conduct – Centre of Excellence
2. Lectures by Eminent People, Motivational Talk – Alumni, Employer
3. Familiarization to Dept./Branch: HoD Interaction – Senior Interaction – Department Association
4. Universal Human Value Modules: Module 1, Module 2, Module 3 and Module 4
5. Orientation on Professional Skill Courses
6. Proficiency Modules – Mathematics, English, Physics and Chemistry
7. Introduction to various Chapters, Cell, Clubs and its events

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

8. Creative Arts: Painting, Music and Dance

9. Physical Activity: Games and Sports, Yoga and Gardening

10. Group Visits: Visit to Local areas and Campus Tour

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explain various sources available to meet the needs of self, such as personal items and learning resources through visit to local areas and campus	Understand
CO2: Explain various career opportunities and avenues available in the campus through orientation sessions	Understand
CO3: Explain the opportunity available for professional development through professional skills, curricular, co-curricular and extracurricular activities	Understand
CO4: Build universal human values and bonding amongst all the inmates of the campus and society for having a better life	Apply

Course Articulation Matrix
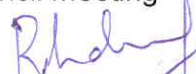
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	2	1	2	-	-	-	-
CO2	1	-	-	-	-	-	-	2	1	2	-	-	-	-
CO3	1	-	-	-	-	-	-	2	1	2	-	-	-	-
CO4	2	-	-	-	-	-	-	2	1	2	-	-	-	-

High-3; Medium-2;Low-1

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment Pattern

Component	Marks	Details
Attendance	10	Minimum 80% and 1 mark for every 2% observed
Knowledge Test	40	Objective type questions
Work plan for future	50	Career plan developed consulting mentor
Total	**100**	

Non-letter Grades

Marks Scored	Performance Level
70 & above	Good
30 – 69	Average
< 30	Fair

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19MABC1101	Course Title: Matrices and Calculus		
	(Common to AU,ME,MC,PR CE,EC,EE&EI)		
Course Category: Basic Science	Course Level: Introductory		
L:T:P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max Marks:100

Pre-requisites

➤ NIL

Course Objectives

The course is intended to:

1. Determine the canonical form of a Quadratic form using Orthogonal transformation
2. Use different testing methods to check the convergence of infinite series
3. Apply differential and integral calculus to determine the evoluteof a curve and improper integrals
4. Apply partial derivatives to find extreme values of functions of two variables
5. Apply multiple integrals to find area of plane curves and volume of solids

Unit I	**Matrices**	9+3 Hours

Rank of a matrix - System of linear equations – Symmetric - Skew symmetric and orthogonal matrices-(Definitions and examples only) - Eigenvalues and Eigenvectors - Diagonalization of symmetric matrices through orthogonal transformation – Cayley-Hamilton Theorem - Transformation of quadratic forms to canonical forms through orthogonal transformation.

Unit II	**Sequences And Series**	9+3 Hours

Sequences - Definition and Examples - Series- Tests for convergence- Power series - series for exponential, trigonometric and logarithm functions - Comparison Test – Integral Test - Cauchy's root test - D Alembert's ratio test - Alternating series- Leibnitz's test.

Unit III	**Differential and Integral Calculus**	9+3 Hours

Curvature – Radius of curvature - Evolutes and Involutes - Evaluation of definite and improper integrals - Beta and Gamma functions and their properties.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Multivariable Differentiation   9+3 Hours

Limit – continuity - Mean value theorems and partial derivatives- Taylor's series and Maclaurin's series – Jacobian – Maxima, Minima and saddle points - Method of Lagrange's multipliers.

Unit V   Multivariable Integration   9+3 Hours

Multiple Integration: Double integrals - Change of order of integration in double integrals - Change of variables (cartesian to polar, cartesian to spherical and cartesian to cylindrical) - Triple integrals - Applications: areas and volumes.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1:Determine the canonical form of a Quadratic form using Orthogonal transformation	Apply
CO2: Use different testing methods to check the convergence of infinite series	Apply
CO3:Determine the evolute of a curve and evaluate improper integrals using beta gamma functions	Apply
CO4:Apply partial derivatives to find extreme values of functions of two variables	Apply
CO5:Apply multiple integrals to find area of plane curves and volume of solids	Apply

Text Book(s):

T1.Erwinkreyzig, Advanced Engineering Mathematics, 9th edition, John Wiley& Sons, 2006.

T2.Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, NewDelhi,

2008.

T3.Ramana B.V., higher Engineering Mathematics, Tata McGraw-Hill, New Delhi, 11th

Reprint, 2010.

Reference Book(s):

R1. G.B.Thomas and R.L Finney, Calculus and Analytic Geometry, 9th edition, Pearson,

Reprint, 2002.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

R2.N.P.Bali and Manish Goyel, A text book of Engineering Mathematics, Laxmi Publication,

Reprint, 2008.

R3.B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Web References:

1. https://onlinecourses.nptel.ac.in/noc16_ma05
2. https://nptel.ac.in/courses/122101003/2
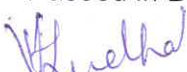3. https://nptel.ac.in/syllabus/111104092/

Course Articulation Matrix

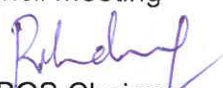| CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	2	3	-	2	-	-
CO2	3	-	-	-	-	-	-	2	2	3	-	2	-	-
CO3	3	-	-	-	-	-	-	2	2	3	-	2	.	-
CO4	3	-	-	-	-	-	-	2	2	3	-	2	-	-
CO5	3	-	-	-	-	-	-	2	2	3	-	2	-	-

High-3; Medium-2;Low-1

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	30
	CCET II	3,4	50	
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19ENHG2101	Course Title: Communication Skills – I (Common to all B.E/B.Tech Programmes)		
Course Category: Humanities	Course Level: Introductory		
L:T:P(Hours/Week)2: 0: 2	Credits:3	Total Contact Hours:60	Max Marks:100

Pre-requisites

➢ The student should have undergone English as his/her first or second language in school.

Course Objectives

The course is intended to:

1. Listen and understand monologues and dialogues of a native speaker on par with B1 of CEFR level
2. Speak in simple sentences to convey their opinions and ideas on par with B1 of CEFR level.
3. Read and infer a given text on par with B1 of CEFR level
4. Draft basic formal written communication on par with B1 of CEFR level

Unit I   Listening   **15 Hours**

Importance of active listening –Physical condition needed for active listening-Identifying relevant points while taking notes.- Framing questions at different linguistic contexts - Listening for specific details of concrete monologues and dialogues – Listening to organize ideas - Developing ideas – Listening to compose paragraphs – Paraphrasing the aural input.

Unit II   Speaking   **15 Hours**

Importance of note making to practice speaking - Traditional note making, developing Mind map - Collecting points from various sources - Identifying relevant ideas needed for the speech -Using mind-map to organize thought processing - Prioritizing the ideas - Types of sentences - Frequently used words (Institution, home and leisure) - Mother Tongue Influence - Expressing the thoughts in simple sentences - Tenses & Voices (Active & Passive) - Postures, gestures and eye contact - Intonation and Sentence stress - Express one's thoughts coherently.

Unit III   Reading   **15 Hours**

Reading strategies - Skimming -Scanning - Interpretation of visual data - Factual texts on subjects of relevance - Inferring texts – Reading to write a review – Checking the accuracy of reading while presenting the interpreted data – Reading to comprehend

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Writing   15 Hours

WritingSimple and short sentences - Writing E-mail, Memo, Note and Message - Letter Writing - Importance of punctuations -- Identifying the main points - Organising the main ideas - Writing a draft.

List of Tasks

1. BEC Preliminary Listening Test-I & Speaking Test-1.
2. BEC Preliminary Listening Test-2 & Speaking Test-2.
3. BEC Preliminary Listening Test-3 & Speaking Test-3.
4. BEC Preliminary Listening Test-4 & Speaking Test-4.
5. BEC Preliminary Listening Test-5 & Speaking Test-5.
6. BEC Preliminary Listening Test-6 & Speaking Test-6.

Course Outcomes At the end of this course, students will be able to:	Cognitive Level
CO1: Listen actively and paraphrase simple messages and specific details of concrete monologues and dialogues	Apply
CO2: Express one's views coherently in a simple manner	Apply
CO3: Read and comprehend factual texts on subjects of relevance	Understand
CO4: Write texts bearing direct meanings for different contexts maintaining an appropriate style	Apply

Text Book(s):

T1. Whitby Norman, Business Benchmark Pre-intermediate to Intermediate Students' Book CUP Publications, 2nd Edition, 2014

T2. Wood Ian, Williams Anne, Cowper Anna, Pass Cambridge BEC Preliminary, Cengage Learning,2nd edition, 2015.

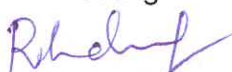T3. Learners Book prepared by the Faculty members of Department of English

Reference Book(s):

R1. BEC-Preliminary - Cambridge Handbook for Language Teachers, 2nd Edition, CUP 2000

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

R2. Hewings Martin - Advanced Grammar in use - Upper-intermediate Proficiency, CUP, 3rd Edition, 2013.

Web References:

1. http://www.grammarinenglish.com -Jan 23,2018
2. https://www.northshore.edu/support_centre /pdf/listen-notes.pdf
3. http://www.examenglish.com/BEC/BEC_Vantage.html- Jan 23, 2018

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	2	3	-	-	-	-
CO2	2	-	-	-	-	-	-	1	2	3	-	-	-	-
CO3	1	-	-	-	-	-	-	1	-	3	-	-	-	-
CO4	2	-	-	-	-	-	-	1	-	3	-	-	-	-

High-3; Medium-2; Low-1

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	2,3,4	50	20
	CCET II	2,3,4	50	
	CCET III	2,3,4	50	
	Continuous Assessment – Practical	1,2	75	10
	Final Assessment – Practical	1,2	50	10
End Semester Examination	ESE	2,3,4	100	60
			Total	100

Passed in BOS meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19CHBC2001	Course Title: Chemistry for Electrical Sciences (Common to EC,EE &EI)		
Course Category: Basic Science	Course Level: Introductory		
L:T:P(Hours/Week)3: 0: 2	Credits:4	Total Contact Hours:75	Max Marks:100

Pre-requisites

➤ Higher Secondary Chemistry I and II

Course Objectives

The course is intended to:

1. Explain the principles of electrochemistry and batteries
2. Explain the mechanism of corrosion and corrosion control
3. Explain the concepts of spectroscopic techniques
4. Describe the basics of biofuels and fuel cells
5. Describe synthesis, properties and applications of nano materials

Unit I   Electrochemistry and Batteries   **9 Hours**

Cells – Types of cells– galvanic and electrolytic cells – emf and its measurement – Nernst equation –Batteries – types and Characteristics, Construction, working and applications - Alkaline battery, Lead –Acid battery, Nickel-Cadmium battery, Lithium ion battery

Unit II   Corrosion and its Control   **9 Hours**

Corrosion – dry and wet corrosion – mechanism of electrochemical corrosion – galvanic corrosion and concentration cell corrosion, Factors influencing corrosion. Corrosion Control methods – Cathodic protection methods, Metallic coating – Galvanizing, Tinning – Chrome plating and Electroless plating of Nickel

Unit III   Spectroscopic Techniques   **9 Hours**

Spectroscopy- Electromagnetic spectrum, Absorption and Emission spectroscopy – Relationship between absorbance and concentration – Derivation of Beer-Lambert's law (problems). UV – Visible Spectroscopy, Atomic Absorption Spectroscopy, Flame photometry – Principle, Instrumentation and applications.

Unit IV   Biofuels and Fuel Cells   **9 Hours**

Biomass – Biogas – Constituents, manufacture and uses. General outline of fermentation process – manufacture of ethyl alcohol by fermentation process. Combustion – Calorific values – Gross and bet calorific value – problems based on calorific value. Fuel cells – Construction working and applications of Hydrogen Oxygen fuel cells, methanol oxygen fuel cells, solid oxide fuel cells

      Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit V   Synthesis and Applications ofNano Materials   9 Hours

Introduction – Difference between bulk and Nano materials – size dependent properties. Nano scale materials –particles, clusters, rods and tubes. Synthesis of Nanomaterials: Sol-gel process, Electro deposition, Hydrothermal methods. Applications of Nano materials in Electronics, Energy science and medicines. Risk and future perspectives of nano materials.

List of Experiments   30 Hours

1. Estimation of iron in water by spectrophotometry
2. Estimation of Fe^{2+} by potentiometric titration
3. Determination of corrosion rate by weight loss method
4. Measurement of emf of electrochemical cell – Poggendorff's method
5. Determination strength of acid by pHmetry
6. Conduct metric titration of strong acid against strong base

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explain batteries based on their characteristics, construction, working principle and applications	Understand
CO2: Explain the mechanism of corrosion and its control techniques	Understand
CO3: Use Beer- Lambert's law and other spectroscopic methods for chemical analysis	Apply
CO4: Calculate energy potential of fuel cells and calorific value of biofuels	Apply
CO5: Describe synthesis, properties and applications of nano materials	Understand

Text Book(s):

T1.P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Pub, Co., New Delhi 2018.

T2.Wiley Engineering Chemistry, 2nd Edition, Wiley India Pvt. Ltd. New Delhi, 2011.

Reference Book(s):

R1.Larry Brown and Tom Holme, Chemistry for Engineering Students, 3rd Edition, Cengage Learning, 2010.

R2.S. S. Dara, S. S. Umare "A text book of Engineering Chemistry" 12th edition S. Chand & Co. Ltd., New Delhi, 2014.

R3.Charles P. Poole, Jr., Frank J. Owens "Introduction to Nanotechnology" Wiley India Pvt. Ltd. New Delhi, 2003.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Web References:

1. http://nptel.ac.in/courses/122101001/downloads/lec.23.pdf
2. https://nptel.ac.in/courses/104106075/Week1/MODULE%201.pdf
3. https://nptel.ac.in/courses/103102015/

Course Articulation Matrix
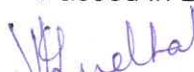
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	1	2	3	-	-	-	-
CO2	1	-	-	-	-	-	-	1	2	3	-	-	-	-
CO3	2	-	-	-	-	-	-	1	2	3	-	-	-	-
CO4	2	-	-	-	-	-	-	1	-	1	-	-	-	-
CO5	1	-	-	-	-	-	-	1	-	1	-	-	-	-

High-3; Medium-2;Low-1
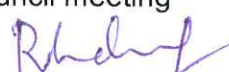
Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III		50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19ECSN2101	Course Title: Fundamentals of Electrical and Electronics Engineering		
Course Category: Engineering Science	Course Level: Introductory		
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max Marks:100

Pre-requisites

> Nil

Course Objectives

The course is intended to:

1. Analyze the electric circuits.
2. Explain the construction and operation of DC and AC Electrical machines
3. Explain the operation of basic measuring instruments and transducers
4. Design simple Electronic circuits
5. Explain the construction, operation and applications of special semiconductor devices

Unit I   **Introduction to DC Circuits**   **9 Hours**

Circuit Laws: ohms law - Kirchhoff's current law and voltage law - series and parallel circuit analysis - voltage and current division rule - source transformation - star delta transformation

Unit II   **Electrical Machines**   **9 Hours**

Constructional details of DC machine - operation of DC motor- torque equation - constructional details and operation of 1-phase and 3-phase induction motor, stepper motor and brushless DC motor –1-phase Transformer constructional details and principle of operation.
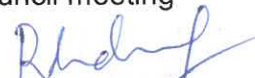
Unit III   **Basic Measuring Instruments**   **9 Hours**

Units and standards– Types of error - Transducers - classification of transducers - Static and dynamic characteristics– Moving coil and Moving iron meters –Oscilloscopes: DSO - LVDT – Strain gauge - RTD – Capacitive transducer.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Introduction to Semiconductor Devices   9 Hours

PN junction Diode – characteristics-half wave rectifiers - full wave rectifiers - clippers and clampers- Zener diode characteristics – Zener diode as voltage regulator- Construction and operation of BJT and FET - Parameters of JFET.

Unit V   Special Semiconductor Devices   9 Hours

Construction, operation and applications of Varactor Diode, Tunnel Diode, PIN diode, UJT,SCR, Photodiode and Phototransistor.

List of Experiments   30 Hours

1. Verification of Kirchhoff's Voltage and Current laws
2. Voltage and frequency measurement using CRO
3. Half wave and full wave rectifiers
4. Clippers and Clampers
5. Voltage regulator using Zener diode
6. Characteristics of UJT

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Analyze the electric circuits using circuit laws	Apply
CO2: Explain the construction and operation of DC and AC Electrical machines	Understand
CO3: Explain the operation of basic measuring instruments and transducers for Electrical and Electronic circuits.	Understand
CO4: Design simple Electronic circuits using semiconductor devices	Apply
CO5: Explain the construction, operation and applications of special semiconductor devices	Understand

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
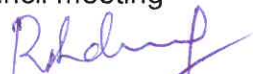POLLACHI - 642 003

Text Books:

T1. M.Arumugham and N.Premkumar, "Electric Circuit Theory", Khanna publishers, 2010.

T2. Kalsi .H.S, "Electronics Instrumentation", 3rd Edition (copyright 2010, Second Reprint 2011) Tata McGraw Hill, New Delhi, 2010.

T3. Millman J, Halkias .C and Satyabratajit, "Electronic Devices and Circuits", 2nd Edition, Tata McGraw-Hill, New Delhi, 2007.

Reference Books:

R1. Theraja.B.L, "Electrical Technology Volume-II AC/DC Machines", S.Chand and Company Ltd., New Delhi (India),2008.

R2. Anil K.Maini, Varsha Agarwal, "Electronic Devices and Circuits", Wiley India Private Ltd, New Delhi, 1st Edition. 2015.

R3. A Sudhakar, S Shyam mohan and Pillai, "Circuits and Network (Analysis and synthesis)", Tata McGraw-Hill, 2004

R4. Sawhney .A.K, "A Course in Electrical and Electronic Measurement and Instrumentation", Dhanpat Rai& Sons, New Delhi, 18^{th}Edition, 2001.

Web References:

1. http://nptel.ac.in/video.php?subjectId=117103063
2. http://nptel.ac.in/video.php?subjectId=122106025
3. http://nptel.ac.in/courses/108108076/

Course Articulation Matrix
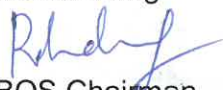
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	2	3	-	-	-	-
CO2	1	-	-	-	-	-	-	1	-	1	-	-	-	-
CO3	1	-	-	-	-	-	-	1	2	3	-	-	-	-
CO4	2	-	-	-	-	-	-	1	2	3	-	-	-	-
CO5	1	-	-	-	-	-	-	1	2	3	-	-	-	-

High-3; Medium-2;Low-1

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman
Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Course Code:19MESC2001	Course Title: Introduction to Engineering (Common to AU,ME,PR,MC,EC,EE&EI)		
Course Category: Engineering Science	Course Level: Introductory		
L:T:P(Hours/Week)2: 0: 2	Credits:3	Total Contact Hours:60	Max Marks:100

Pre-requisites

> Nil

Course Objectives

The course is intended to:

1. Explain the career opportunities in engineering

2. Explain how to acquire engineering competencies

3. Explain how to remain, relevant and versatile as an engineer

4. Observe engineering products and processes

5. Take ownership for learning and development

6. Identify and rectify unsafe conditions and acts

Unit I	Career Opportunities in Engineering	5 Hours
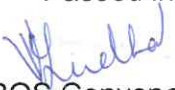
Technicians, engineers and scientists, history of engineering. 17 sustainable development goals set by UNO, concept of small e to big E. career choices for an engineer, types of industries, academia and research as career choices, entrepreneurship as a career choice, various departments in engineering industries, roles available in engineering industries. innate skills, learnt skills (competencies), graduate attributes, roles of engineers and the corresponding competencies, career opportunities in engineering in terms of roles & competencies

Unit II	Developing Specific Skills and Competencies	5 Hours

OBE Model, PEOs and POs, technical POs, professional POs, mapping with Graduate attributes, Classification of courses, resources available in the campus and e-resources, resources and facilities available to acquire specific competencies, on-campus and off-campus activities, the methods by which students can systematically involve in activities, significance of professional skill courses, plan for utilizing the resources and facilities to

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

develop specific competencies.

| Unit III | Staying Relevant through Continuous Improvement / Environmental Versatility | 7 Hours |

Rate of change, technology life cycle (TLC), features of a dynamic and complex environment in which students operate or will operate, impact of globalization & technical advancements, importance of remaining, relevant and versatile in a dynamic and complex environment with the help of technology life cycle, activities/process to remain relevant and versatile, environmental scanning, Life- long learning.

| Unit IV | Observe Every Product and Process with an Engineering Perspective And Inquisitiveness | 4 Hours |

Product -Need, purpose - primary and secondary function, various stages of manufacturing and its processes. Product - assembly of several simple engineering devices/systems. Product-Parts, principles and laws (mechanical, electrical and electronics), functional relationship between the parts, role of programming in engineering products. Significance of materials and their advancements in improvements in product.

| Unit V | Learning and Development Leveraging the Resources and Infrastructure | 6 Hours |

Process Of Learning, Situated Learning with Examples, Own Learning (Not Copying), Differences between Real Life and Simulated Environment, the Sprit Of Experimentation, Various Learning Enablers, Measure the performance against the plan.
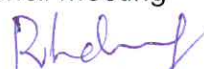
| Unit VI | Unsafe Conditions and Acts and Following Environment Friendly Practices | 3 Hours |

Safety-definition, importance of personal safety. Statistics of road accidents. Unsafe condition and unsafe act- definition, cause and effects, identification of the unsafe conditions and acts in home/hostel, labs, class rooms, public places. Importance of environment friendly practices.

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Outcomes At the end of this course, students will be able to:	Cognitive Level
CO1: Explain the career opportunities in engineering in terms of roles & competencies	Understand
CO2: Explain how a student can acquire the competencies	Understand
CO3: Explain how to remain, relevant and versatile in a dynamic and complex environment	Understand
CO4: Observe every product and processes with an engineering perspective and inquisitiveness	Apply
CO5: Choose to take ownership for his/her learning and development leveraging the resources and infrastructure	Understand
CO6: Identify and rectify unsafe conditions and acts and follow environment friendly practices	Understand

Text Book(s):

T1. Worksheets and Handouts prepared by MCET team.
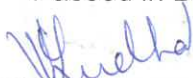
Reference Book(s):

R1. L. A Bloomfield, "How things work: The physics of everyday life", Wiley, 5th Edition, 2013.

R2. C. Mason, "How things work," Usborne Publishing Ltd 2009.

R3. D.K. Publishing, "How things work encyclopedia", 2010.

R4. J. E. Gordon, "The New Science of Strong Materials or Why You Don't Fall through the Floor" Princeton University Press; With a New introduction by Philip Ball,2018.

R5. R.P. Feynman," Six Easy Pieces: Essentials of Physics Explained by Its Most Brilliant Teacher", Basic Books; 4th Edition 2011.
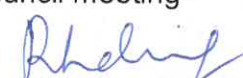
Web References:

1. https://en.wikibooks.org/General_Engineering_Introduction/Engineering_Science

2. https://science.howstuffworks.com/engineering-channel.html

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

List of Ria Lab Exercises   **30 Hours**

1. Career opportunities with roles and responsibilities

2. Observe every product and processes with an engineering perspective and inquisitiveness

a) Primary and Secondary functions of products and their equivalents

b) Primary and Secondary functions of parts of the products, their manufacturing processes and materials

c) Structural and functional relations of the product

3. Safe and unsafe acts and conditions in day-to-day life and professional practices.

4. Skills for Hobby project (At least TWO)

a) Soldering and de-soldering practices

b) Circuit and component testing using multi-meter & CRO

c) Battery operated circuit connections and testing

d) Simple switching circuits using relays and transistors

e) Adhesives used in part assembly

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	1	1	2	-	2	-	-
CO2	2	-	-	-	-	-	-	1	-	1	-	1	-	-
CO3	2	-	-	-	-	-	-	1	-	1	-	1	-	-
CO4	3	-	-	-	-	-	-	3	3	3	2	3	-	-
CO5	2	-	-	-	-	-	-	1	-	1	-	1	-	-
CO6	2	-	-	-	-	-	-	1	1	2	-	2	-	-

High-3; Medium-2; Low-1

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment Pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,4	50	20
	CCET II	2,3	50	
	CCET III	5,6	50	
	Continuous Assessment – Practical	1,2,3,4,5,6	75	10
	Final Assessment – Practical	2,4	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19PSHG3002	Course Title: Personal Effectiveness (Common to all B.E/B.Tech Programmes) (2019 Batch Only)		
Course Category: Humanities	Course Level: Introductory		
L:T:P(Hours/Week)0: 0: 2	Credits: 1	Total Contact Hours: 30	Max Marks:100

Pre-requisites

  ➢ NIL

Course Objectives

The course is intended to:

1. Set SMART goals for academic, career and life
2. Identify strength, weaknesses and opportunities
3. Plan for achieving the goals
4. Apply time management techniques
5. Create time and pursue activities of self interest

Unit I   The Importance of Envisioning

Importance of positive self-perception – Principle of dual creation (Everything gets created twice – Envisioning) - Understanding Vision and mission statements - Writing personal mission statements – 'Focus' as a way of life of most successful people – Importance of goal setting – Importance of planning and working to time.

Unit II   Fundamental Principles of Goal Setting and Working to Time

Clarifying personal values, interests and orientations – Awareness of opportunities ahead – Personal SWOT analysis - Principles driving goal setting: Principle of response and stimuli, Circle of influence and circle of concern, What you see depends on the role you assume

Unit III   Goal Setting and Action Orientation

Potential obstacles to setting and reaching your goals - Five steps to goals setting: SMART goals, Inclusive goals, Positive stretch, Pain vs gain, Gun-point commitment – Importance of action orientation - Converting goals to actionable tasks – Establishing road map – Using Gantt chart for planning and progress

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Time Management - Tools and Techniques

Pareto 80-20 principle of prioritization – Time quadrants as a way to prioritize weekly tasks – The glass jar principle - Handling time wasters – Assertiveness, the art of saying 'NO' – Managing procrastination

Unit V   Putting into Practice

Practicals: Using the weekly journal – Executing and achieving short term goals – Periodic reviews.

Course Outcomes
At the end of this course, students will be able to:
CO1.Identify the strengths, weaknesses and opportunities
CO2.Set well-articulated goals for academics, career, and personal aspirations
CO3. Establish the road map to realize the goals
CO4. Apply time management techniques to complete planned tasks on time
CO5. Create time and pursue activities of self-interest that add value

Text Book(s):

T1. Reading material, workbook and journal prepared by PS team of the college.

Reference Book(s):

R1.Stephen R Covey, "First things first", Simon & Schuster Uk, Aug 1997.

R2.Sean Covey, "Seven habits of highly effective teenagers", Simon & Schuster Uk, 2004.

Course offering:

Orientation Programme (2 days)	CO1 and CO2
Student practice (weekly review classes)	CO3
Student journal writing (interim reviews)	CO4 and CO5

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Assessment Pattern

	Assessment Component	CO.No.	Marks	Total
Continuous Assessment	**Yoga:**	1,2,3,4,5		75
	Physical Exercises, KayaKalpa		15	
	Meditation		15	
	Assessment of student's workbook		10	
	Sports:			
	Physical Exercises, KayaKalpa		20	
	Assessment of student's workbook		15	
End Semester Examination (combined for yoga and sports)	Written test (MCQ and short answers)	1,2,3,4,5	30	Marks out of 100 is reduced to 25
	Physical exercises		50	
	Viva-voce		20	
			Total	100

Passed in BOS meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
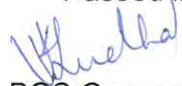Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19MABC1201	Course Title: Ordinary Differential Equations and Complex Variables (Common to AU,ME,MC,PR CE,EC,EE&EI)		
Course Category: Basic Science	Course Level: Introductory		
L:T:P(Hours/Week)3: 1: 0	Credits:4	Total Contact Hours:60	Max Marks:100

Pre-requisites

> 19MABC1101-Matrices and Calculus

Course Objectives

The course is intended to:

1. Explain the concepts of vector differentiation and integration.
2. Determine the solution of second and higher order ordinary differential equations
3. Construct analytic functions
4. Use the concept of complex integration to evaluate definite integrals.
5. Apply Laplace transform techniques to solve ordinary differential equations

Unit I   Vector Calculus   9+3 Hours

Gradient – Divergence – Curl – Line integrals – Surface integrals – Volume integrals – Theorems of Green, Gaussand Stokes (without proof)and their applications.

Unit II   Complex Variables (Differentiation)   9+3Hours

Cauchy-Riemann equations – Analytic functions – Properties – Harmonic functions – Finding harmonic conjugate – Conformal mapping (w=z+a, w= az, w=1/z) – Mobius transformation and their properties.

Unit III   Complex Variables (Integration)   9+3 Hours

Contour integrals – Cauchy Integral formula (without proof) – Cauchy Integral theorem – Taylor's series – Singularities of analytic functions – Laurent's series–Residues – Cauchy Residue theorem (without proof) – Evaluation of real definite integrals around unit circle and semi-circle (Excluding poles on the real axis).

Unit IV   Ordinary Differential Equations of Higher Orders   9+3 Hours

Second and higher order linear differential equations with constant coefficients – Second order linear differential equations with variable coefficients (Cauchy - Euler equation–Legendre's equation) – Method of variation of parameters – Solution of first order simultaneous linear ordinary differential equations

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit V   Laplace Transform   **9+3 Hours**

Laplace Transform – Properties of Laplace Transform – Laplace transform of integrals – Laplace transform of periodic functions -Inverse Laplace transforms - Convolution theorem – Solution of ordinary differential equations by Laplace Transform method– Applications on engineering problems.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explain the concepts of vector differentiation and integration.	Apply
CO2: Use the concept of complex variables to construct analytic functions	Apply
CO3: Use the concept of complex integration to evaluate definite integrals	Apply
CO4: Determine the solution of second and higher order ordinary differential equations	Apply
CO5: Apply Laplace transform techniques to solve ordinary differential equations	Apply

Text Book(s):

T1.Erwinkreyzig, Advanced Engineering Mathematics, 9th edition, John Wiley& Sons, 2006.

T2.Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, NewDelhi, 2008.

T3.Ramana B.V., higher Engineering Mathematics, Tata McGraw-Hill, New Delhi, 11th Reprint, 2010.
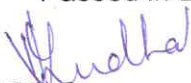
Reference Book(s):

R1. G.B.Thomas and R.L Finney, Calculus and Analytic Geometry, 9th edition, Pearson, Reprint, 2002.

R2. N.P.Bali and Manish Goyel, A text book of Engineering Mathematics, Laxmi Publication, Reprint, 2008.

R3. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Web References:

1. https://onlinecourses.nptel.ac.in/noc16_ma05

2. https://nptel.ac.in/courses/122101003/2

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

3. https://nptel.ac.in/courses/111105035/22

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	30
	CCET II	3,4	50	
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19ENHG2201	Course Title: Communication Skills – II (Common to all B.E/B.Tech Programmes)			
Course Category: Humanities		Course Level: Introductory		
L:T:P(Hours/Week)2: 0: 2	Credits:3	Total Contact Hours:60		Max Marks:100

Pre-requisites

> 19ENHG2101-Communication Skills- I

Course Objectives

The course is intended to:

1. Listen and understand monologues and dialogues of a native speaker on par with B2 of CEFR level
2. Speak in simple sentences to convey their opinion and ideas on par with B2 of CEFR level
3. Read and infer a given text on par with B2 of CEFR level
4. Draft basic formal written communication on par with B2 of CEFR level

Unit I	Listening	15 Hours

Importance and purpose of extensive listening and intensive listening -Body Language – Listening tasks on complex and abstract themes- Correlating Ideas related to listening input – importance of empathetic- listening for main ideas – Paraphrasing- Listening to native speakers English –Compound and Complex sentences - Developing ideas – Listening to compose paragraphs.

Unit II	Speaking	15 Hours

Jotting down ideas collected from listening to speak – organising the ideas – Expressing one's view coherently – Understanding grammatical elements (Noun – Pronoun Antecedent) – Expressing ideas assertively – Answering questions during presentations – Understanding the use of discourse markers – word stress and sentence stress – voice modulation and pauses – Highlighting significant points – interpretation of visual data – Using verbal cues - Preparing simple hand - outs.

Unit III	Reading	15 Hours

Reading strategies – Skimming &Scanning – Inferring meaning- Barriers to reading – sub vocalisation, Eye fixation, Regression – Speed Reading Techniques - Reading different types of texts and their contexts with speed – Note making – Reading a review – Paraphrasing – Reading to comprehend

Unit IV   Writing   **15 Hours**

Reported speech& Concord (Subject - verb Agreement) - Report writing - Different kinds of Report - Structure of the report - Writing Proposal - Plagiarism – References – Appendices – Techniques for Report writing – Registers.

List of Tasks:

1. BEC Vantage Listening Test- I & Speaking Test-1.
2. BEC Vantage Listening Test-2 & Speaking Test-2.
3. BEC Vantage Listening Test-3 & Speaking Test-3.
4. BEC Vantage Listening Test-4 & Speaking Test-4.
5. BEC Vantage Listening Test-5 & Speaking Test-5.
6. BEC Vantage Listening Test-6 & Speaking Test-6.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Listen actively and empathetically, and paraphrase discussions and presentations on complex and abstract themes and topics	Apply
CO2: Express one's views coherently, fluently and confidently highlighting the significant points with supporting details	Apply
CO3: Read and comprehend different types of texts and their contexts reasonably at moderate speed	Understand
CO4: Write detailed reports on variety of subjects synthesizing information gathered during listening & reading citing appropriate references	Apply

Text Book(s):

T1. Whitby Norman, Business Benchmark Upper Intermediate Students' Book CUP Publications, 2nd Edition, 2014

T2. Learners Book prepared by the Faculty members of Department of English

Reference Book(s):
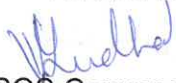
R1.Cambridge BEC Vantage - Practice Tests, Self-study Edition, Cambridge University Press, 2002

R2. Hewings Martin - Advanced Grammar in use - Upper-intermediate Proficiency, CUP, 3rd Edition, 2013.

Web References:

1. http://www.grammarinenglish.com -Jan 23, 2018
2. https://www.northshore.edu/support_centre /pdf/listen-notes.pdf

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

3. http://www.examenglish.com/BEC/BEC_Vantage.html- Jan 23, 2018

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-		2	3	-	-	-	-
CO2	2	-	-	-	-	-	-	1	2	3	-	-	-	-
CO3	1	-	-	-	-	-	-	1		3	-	-	-	-
CO4	2	-	-	-	-	-	-	1		3	-	-	-	-

High-3; Medium-2; Low-1

Assessment pattern:

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	2,3,4	50	20
	CCET II	2,3,4	50	
	CCET III	2,3,4	50	
	Continuous Assessment – Practical	2,3,4	75	10
	Final Assessment – Practical	1,2	50	10
End Semester Examination	ESE	2,3,4	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19PHBC2001	Course Title: Physics for Electrical Sciences (common to EC,EE,EI)			
Course Category: Basic Science	Course Level: Introductory			
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75		Max Marks:100

Pre-requisites

> Nil

Course Objectives

The course is intended to:

1. Explain the concepts of static electric field
2. Explain the concepts of static magnetic field
3. Explain the behavior of materials in electric and magnetic fields
4. Explain electric and magnetic fields using Maxwell's equation
5. Explain the phenomenon of Electromagnetic wave propagation

Unit I	Electrostatics	9 Hours

Definition of electric charge-Coulomb's Law – Electric field intensity – Field intensity due to point and line charges – Electric flux density -Gauss's law-Application ofGauss's law: Due to a line charge and a plane sheet of charge – Electric potential-Equipotential surfaces-Potential gradient.

Unit II	Magnetostatics	9 Hours

Definition of magnetic flux- magnetic field intensity-Lorentz Law of force-Biot–savart Law, Ampere's Law-Application of Ampere's Law: Magnetic induction due to a long linear conductor and solenoid- Magnetic field due to straight conductors- circular loop – Magnetic flux density (B) - Magnetic potential.

Unit III	Electric and Magnetic Fields in Materials	9 Hours

Dielectrics: An atomic view-Dielectric Polarization-Dielectrics and Gauss's law-Dielectric Strength- Energy stored in a dielectric medium - Capacity of a condenser - Capacitance - coaxial, Spherical capacitor- Poisson and Laplace Equation.

Magnetic susceptibility and permeability-properties of dia, para and ferro magnetic materials-hysteresis loop.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Electromagnetic Induction   9 Hours

Faraday's law – Lenz's law–Time varying magnetic field-self Inductance - self Inductance of a solenoid- Mutual inductance- Mutual inductance of two solenoids. Charge conservation law-continuity equation- displacement current- Maxwell's equations

Unit V   Electromagnetic Waves   9 Hours

Electromagnetic waves in free space-Poynting vector-Propagation of electromagnetic waves in dielectrics– Phase velocity- Propagation of electromagnetic waves through conducting media-penetration or skin depth.

List of Experiments   30 Hours

1. Verification of Ohms 'law.
2. Test the Faraday's hypothesis of magnetic field induction.
3. Determination of inductance using Maxwell's bridge.
4. Determination of specific resistance of the given material using Carey foster's bridge.
5. Determination of wavelength of the given light source using spectrometer.
6. Determination of Dielectric constant of a given material.

Course Outcomes At the end of this course, students will be able to:	Cognitive Level
CO1: Explain the laws and concepts of static electric field.	Understand
CO2: Explain the laws and concepts of static magnetic field.	Understand
CO3: Explain the behavior of materials in electric and magnetic fields.	Understand
CO4: Explain time varying electric and magnetic fields using Maxwell's equation.	Understand
CO5: Explain the phenomenon of Electromagnetic wave propagation in different media.	Understand

Text Book(s):

T1. R.K.Gaur and S.L.Gupta, "Engineering Physics", DhanpatRai publications, New Delhi, 8th edition, 2011.

T2. M.N.Avadhanulu and P.G.Kshirsagar, "Text Book of Engineering Physics", S. Chand and Company Ltd., New Delhi, 2014.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

T3. W. H. Hayt and John A. Buck, "Engineering Electromagnetics", Tata McGraw Hill, New Delhi. 6th Edition, 2014.

Reference Book(s):

R1.David Griffiths, "Introduction to Electrodynamics", 4th Edition, Pearson Education, 2013.

R2.D. Halliday., R. Resnick and J. Walker, "Fundamentals of Physics", Wiley Publications, 2008.

R3.K. A. Gangadhar and P. M. Ramanathan, " Electromagnetic Field Theory", Khanna Publishers, New Delhi, 5th Edition, 2013.

R4.Mathew. N. O. Sadiku, " Elements of Electromagnetics", 4th Edition, Oxford University Press, 2009.

R5.John D. Kraus and Daniel A. Fleisch, " Electromagnetic with Applications", Tata McGraw Hill, New Delhi. 5th Edition, 2010.

Web References :

1. http://openems.de/start/index.php
2. http://nptel.iitm.ac.in

Course Articulation Matrix

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

Assessment pattern:

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	20
	CCET II	3,4	50	
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19ECSN2201	Course Title: Electric Circuits and Electron Devices		
Course Category: Engineering Science	Course Level: Introductory		
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours: 75	Max Marks:100

Pre-requisites

> ➢ 19ECSN2101-Fundamentals of Electrical and Electronics Engineering

Course Objectives

The course is intended to:

1. Analyze DC circuits

2. Analyze AC circuits

3. Analyze steady state and transient response of Electric circuits

4. Explain the characteristics, biasing techniques and applications of Bipolar Junction Transistor.

5. Explain the characteristics, biasing techniques and applications of Field Effect Transistor.

Unit I	DC Analysis of Electric Circuits	9 Hours

Mesh current and node voltage method of analysis - Network Theorems: Superposition theorem - Thevenin's theorem - Norton's theorem - Maximum power transfer theorem.

Unit II	AC Analysis of Electric Circuits	9 Hours

Mesh current and node voltage method of analysis - Network Theorems: Superposition theorem - Thevenin's theorem - Norton's theorem - Maximum power transfer theorem.
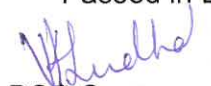
Unit III	Steady State and Transient Analysis	9 Hours

Steady state and Transient response - DC response of an R-L, R-C and R-L-C circuits – AC response of an R-L, R-C and R-L-C circuits.
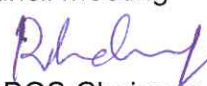
Unit IV	Bipolar Junction Transistors	9 Hours

Characteristics of BJT - Transistor as a switch and Amplifier-Transistor Biasing: Q-point - AC and DC load line analysis - Voltage divider Bias – Bias stability- Bias compensation techniques.

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit V   Field Effect Transistors   9 Hours

Characteristics of FET- FET biasing: Voltage divider bias – Applications of FET as VVR – Comparison of BJT and FET - MOSFET: Symbol- Structure - Operation – Drain and transfer characteristics- MOSFET Biasing: Voltage Divider Bias- Introduction to CMOS.

List of Experiments   30 Hours

1. Verification of Superposition theorem

2. Verification of Thevenin's theorem.

3. Verification of Maximum Power transfer theorem.

4. Verification of Series and Parallel RLC circuits under resonance condition.

5. Characteristics of BJT under CE mode

6. Characteristics of FET under CS mode

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Analyze Electric circuits under DC conditions using Appropriate network theorems.	Analyze
CO2: Analyze Electric circuits under AC conditions using Appropriate network theorems.	Analyze
CO3: Analyze steady state and transient response of Electric circuitsusing step and sinusoidal signals	Analyze
CO4: Explain the characteristics, biasing techniques and applications of Bipolar Junction Transistor.	Understand
CO5: Explain the characteristics, biasing techniques and applications of Field Effect Transistor.	Understand

Text Book(s):

T1. M.Armugam and N.Premkumar, "Electric Circuit Theory",4th Edition, Kanna Publishers,2010

T2. Millman J, Halkias.C and Sathyabratajit, "Electronic Devices and Circuits" 2nd edition, Tata McGraw-Hill, New Delhi, 2007.

Reference Book(s):

R1.Circuits and Networks, Sudhakar & Shyammohan, 4thEdition, Tata McGraw-Hill,2010.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

R2. Networks and systems, D. Roy Choudhary, 1st Edition, New Age International Publishers

R3. Solid State Electronic Devices, G. Streetman, and S. K. Banerjee, 6th Edition Pearson , 2006.

R4. Donald A Neaman, —Semiconductor Physics and Devices‖, 4th Edition, Tata McGrawHill Inc. 2012.

R5. Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, —Electronic Devices and circuits,3rd Edition, Tata McGraw- Hill, 2008.

Web References:

1.https://nptel.ac.in/downloads/108105053/

2.https://nptel.ac.in/courses/108105053/pdf/L-10(GDR)(ET)%20((EE)NPTEL).pdf

3.https://www.btechguru.com/courses--nptel--metallurgy-and-material-science--electronic-materials,-devices,-and-fabrication-video-lecture--MMS--MM113106062V.html

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	1	2	3	-		-	-
CO2	3	-	-	-	-	-	-	1	2	3	-		-	-
CO3	3	-	-	-	-	-	-	1	2	3	-		-	-
CO4	1	-	-	-	-	-	-	1	2	3	-		-	-
CO5	1	-	-	-	-	-	-	1	2	3	-	-	-	-

High-3; Medium-2; Low-1

Assessment pattern:

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	20
	CCET II	3,4	50	
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19CSSC2001	Course Title: C Programming (Common to AU, ME,MC,PR CE,EC,EE&EI)		
Course Category: Engineering Science	Course Level: Introductory		
L:T:P(Hours/Week)3: 0: 2	Credits:4	Total Contact Hours:75	Max Marks:100

Pre-requisites

> Nil

Course Objectives

The course is intended to:

1. Explain about computer organization and problem solving techniques
2. Write programs using appropriate programming constructs
3. Develop programs using arrays, functions & strings
4. Implement programs using pointers, structures& unions
5. Write programs using files & preprocessor directives

Unit I   Introduction   7 Hours

Generation and Classification of Computers –Basic Organization of a Computer – Software development life cycle – Problem Solving Techniques :Algorithm,Pseudocode andFlow Chart.

Unit II   C Programming Basics   10 Hours

Introduction to C programming – Structure of a C program – Keywords – Identifiers-Constants–Variables –Data Types– Operators and Expressions –Formatted & Unformatted I/O functions–Decision statements –Loop control statements.

Unit III   Arrays,Functions and Strings   10 Hours

Arrays:Characteristics –One-dimensional and Two-dimensional arrays – Functions: Declaration&Definition of function –Built in function – User defined function –Types of functions –Call by value &reference– Strings: Formatting strings–String handling functions.

Unit IV   Pointers, Structures & Union   9Hours

Pointers: Features and Types of pointers – Arithmetic operations with pointers–Pointers and Arrays –Structures: Features– Operations on Structures–Array of structures – Unions.

Unit V   Files & Pre-Processor Directives   9 Hours

Introduction to Files –Stream and File Types–File operations (Open,close,read,write) – Command line arguments–Pre-processor Directives: Macro Expansion, File Inclusion, Conditional Compilation.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

List of Exercises   **30 Hours**

1. Programs to process data types, operators and expression evaluation(any 1)
   a. To find area of rectangle/circle/square
   b. To find the simple interest and compound interest

2. Programs using decision and looping statements(any 2)
   a. To find the maximum number among 3 given numbers
   b. To check whether given year is leap year or not
   c. To display the Fibonacci series
   d. To find the factorial of a number

3. Programs using Arrays
   a. To search for particular number among N numbers(1D array)
   b. To compute matrix addition (2 D array)

4. Programs using Functions and Strings(any 2)
   a. To swap two numbers using call by reference
   b. To find the cube of a number
   c. To manipulate strings using string functions
   d. To check whether the string is palindrome or not

5. Programs using Pointer, Structure & Union
   a. To perform arithmetic operations using pointers
   b. To display the information of N students using Structure
   c. To display the employee details using Union

6. Programs using Files (any 1)
   a. To read the contents of a text file
   b. To copy the contents from one file into another

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explain about computer organization and problem solving techniques	Understand
CO2: Write programs for the given scenario using appropriate programming constructs	Apply
CO3: Develop programs using arrays, functions & strings for the given scenario	Apply
CO4: Implement programs for given application using pointers, structures & unions	Apply
CO5: Write programs using files & preprocessor directives for simple problems	Apply

Text Book(s):

T1.Ashok N.Kamthane, Amit.N.Kamthane, "Programming in C", Third Edition, Pearson Education, 2015.

Reference Book(s):

R1. Ajay Mittal, "Programming in C-A Practical Approach ",Third Edition, Pearson Education, 2010.

R2. Yashavant P.Kanetkar, "Let Us C", 16th Edition,BPB Publications,2018

R3. PradipDey,Manas Ghosh, "Computer Fundamentals and Programming in C", 2nd Edition,Oxford University Press,2013

Web References:

1. http://www.cprogramming.com/
2. http://www.c4learn.com/

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment pattern:

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in BOS meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19MESC4001	Course Title: Engineering Drawing		
	(Common to EC,EI,CS & IT)		
Course Category :Engineering Science	Course Level: Introductory		
L:T:P(Hours/Week)1: 0: 3	Credits: 2.5	Total Contact Hours: 60	Max Marks:100

Pre-requisites

 > NIL

Course Objectives

The course is intended to:

1. Develop skills for communication of concepts and ideas.

2. Expose them to existing national standards related to technical drawings.

Unit I	Orthographic Projection	12 Hours

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. Projection of points, Projection of straight lines located in the first quadrant. Determination of true lengths and true inclinations. Visualization principles –conversion of pictorial into orthographic views.

Unit II	Projection of Solids	12 Hours

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

Unit III	Projection of Sectioned Solids	12 Hours

Sectioning of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by cutting planes inclined to one reference plane and perpendicular to the other – Orthographic views of sections of simple solids.

Unit IV	Development of Surfaces	12 Hours

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Unit V   **Isometric Projection and Computer Aided Drafting**   **12 Hours**

Principles of isometric projection – Isometric scale –Isometric projections of simple solids and truncated solids.

Course Outcomes At the end of this course, students will be able to:	Cognitive Level
CO1: Sketch the orthographic projections of the given pictorial view of the object using first angle projection	Apply
CO2: Sketch the projections of simple solids such as prism, pyramid, cylinder and cone using rotating object method	Apply
CO3: Sketch the projections of simple sectioned solids with all necessary dimensions meeting the standards	Apply
CO4: Sketch the lateral surface of simple solids using straight line and radial line development methods	Apply
CO5: Sketch the isometric view of simple solids and truncated solids using principles of isometric projection	Apply

Text Book(s):

T1. Cencil Jensen, Jay D.Helsel and Dennis R. Short, " Engineering Drawing and Design", Tata McGraw Hill India, New Delhi, 7th Edition (2017).

T2. Bhatt N.D. and Panchal V.M., "Engineering Drawing",Charotar Publishing House, Gujarat, 53rd edition (2015).

T3. K. V. Natrajan, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 48th edition (2018).

Reference Book(s):

R1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill India, New Delhi, 2nd edition, 2013.

R2. John K.C., "Engineering Graphics", PHI Learning, Delhi, 1stt edition 2009.

R3. Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw India, New Delhi, 3rd edition,2008,.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Publications of Bureau of Indian Standards

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Web References:

1. http://nptel.ac.in/courses/112103019/
2. https://en.wikipedia.org/wiki/Engineering_drawing

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	-	-	-	2	2	-	-	-	-
CO2	2	-	-	-	-	-	-	-	2	2	-	-	-	-
CO3	2	-	-	-	-	-	-	-	2	2	-	-	-	-
CO4	2	-	-	-	-	-	-	-	2	2	-	-	-	-
CO5	2	-	-	-	-	-	-	-	2	2	-	-	-	-

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	Each Lab Experiment	1,2,3,4 ,5	75	75
	Cycle Test 1	1,2,3	50	25
	Cycle Test 2	4,5	50	
			Total	100

Passed in BOS meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19PSHG3001	Course Title: Wellness for Students (Common to all B.E/B.Tech Programmes) (2019 Batch Only)		
Course Category: Humanities		Course Level: Introductory	
L:T:P(Hours/Week) 0: 0: 2	Credits: 1	Total Contact Hours: 30	Max Marks:100

Pre-requisites

> NIL

Course Objectives

The course is intended to:

1. Articulate the importance of wellness for success in life

2. Understand the dimensions of wellbeing and relevant practices

3. Guide in adopting such practices to improve wellness

4. Reflect the impact of changes sensed on personal and social effectiveness.

Unit I   **Wellness - Importance and Dimensions**

Values and aspirations – goals – SMART Goals – means for achieving goals – job Vs career – success in life – attributes of successful persons. Maslow's Hierarchy of needs motivation - Concept of wellness – impact of absence of wellness - Wellness as important component to achieve success.

Wellbeing as per WHO - Dimensions of Wellbeing: Physical, Mental, Social, Spiritual – indicators and assessment methods – Guna – causes and impact - multiple dimensions of human structure (physical, astral, causal bodies) – human-panchabootha relationship.

Unit II   **Practices for Physical Wellness through Yoga**

Simplified Physical Exercises: Hand, Leg, Neuromuscular breathing, eye exercises, kapalabathy, makarasanam 1 & 2, body massage, 14-points acupressure – Suryanamaskar - relaxation. Simple asanas.

Unit III   **Practices for Physical Wellness through Exercises**
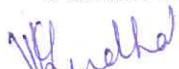
Fitness as a subset of Wellness – health related physical fitness - skill related physical fitness. Exercises related ailment and injuries - safety and precautions - first aid.

Fitness development: Muscular strength – exercises (calisthenics): pull-up, sit-up, push-up and weight training; Explosive power – exercises: vertical jump, long jump; Cardio respiratory endurance– exercises: walking, jogging, treadmill, stair climbing, bicycling, skipping; Flexibility – exercises: stretching.

Speed, agility, balance and coordination – exercises: sprint, cone drill, ladder drill, hurdle drill, ball throw - mental agility exercises.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Practices for Mental Wellness

Meditation: Mind and its functions - mind wave frequency - Agna, Thuriyam and Shanthi meditation – introspection: analysis of thoughts, moralization of desire, neutralization of anger and eradication of worries - simple mindfulness exercises.

Unit V   Practices for Social and Spiritual Wellness

Kayakalpa yoga - youthfulness and life force - cultural education – greatness of guru – universal compassion – fivefold culture. Greatness of friendship and social welfare – individual, family and world peace – blessings and benefits.

Food & sleep for wellness: balanced diet - good food habits for better health (anatomic therapy) – hazards of junk food - food and the gunas.

Course Outcomes
At the end of this course, students will be able to:
CO1.Explain the concept of wellness and its importance to be successful in career and life
CO2.Explain the dimensions of wellness and practices that can promote wellness
CO3.Demonstrate the practices that can promote wellness
CO4. Sense and improve the wellness periodically and its impact on personal effectiveness
CO5. Maintain harmony with self, family, peers, society and nature

Text Book(s):

T1. Reading material and workbook prepared by PS team of the college.

Reference Book(s):

R1. Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar ,"Value education for harmonious life (Manavalakalai Yoga)", Vethathiri Publications, Erode, I Ed. (2010).

R2. Dr.R.Nagarathna, Dr.H.R.Nagendra, "Integrated approach of yoga therapy for positive health", Swami Vivekananda Yoga Prakashana, Bangalore, 2008 Ed.

R3. Tony Buzan, Harper Collins, The Power of Physical Intelligence (English).

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course offering:

Orientation programme (3 days)	CO1 and CO2
Student practice (weekly review classes)	CO3
Student journal writing (interim reviews)	CO4 and CO5

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code:19CHMG6201	Course Title: Environmental Sciences
	(Common to all B.E/B.Tech Programmes)

Course Category: Mandatory Non-Credit Course	Course Level: Introductory	
L:T:P(Hours/Week)1: 0: 0	Total Contact Hours:15	Max. Marks: 100

Pre-requisites

> NIL

Course Objectives

The course is intended to:
1. Create awareness for conservation and equitable use of natural resources.
2. Explain the measures of prevention of pollution and disaster management.
3. State the importance of environmental legislation in India.
4. Expose the general environmental issues relevant to human health.
5. Explain the innovative measures for day to day environmental issues.

Unit I   Natural Resources   2 Hours

Role of individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit II   Environmental Pollution and Disaster Management   2 Hours

Role of an individual in prevention of pollution; Disaster management : floods, earthquake, cyclone and landslides.

Unit III   Environmental Ethics and Legislations   2 Hours

Environmental ethics : Environment Protection Act; Air Act; Water Act ; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation.

Unit IV   Environmental Issues and Public Awarness   2 Hours

Public awareness - Environment and human health

Unit V   Environmental Activities   7 Hours

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

(a) Awareness Activities:

i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste
ii) Slogan making event
iii) Poster making event

b) Actual Activities:

i) Plantation
ii) Cleanliness drive
iii) Drive for segregation of waste
iv) To know about the different varieties of plants
v) Shutting down the fans and ACs of the campus for an hour or so

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Describe the measures for conservation and equitable use of natural resources	Understand
CO2: Describe the measures for pollution prevention and disaster management	Understand
CO3: Brief the importance of environmental legislation in India	Understand
CO4: Explain the general environmental issues in relevant to human health	Understand
CO5: Demonstrate innovative measures for day to day environmental issues	Understand

Text Book(s):

T1.Benny Joseph, "Environmental Studies", Tata McGraw Hill, New Delhi, 2006.
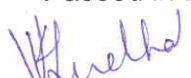
T2.Mackenzie Davis and Susan Masten, "Principles of environmental engineering and science", Mc-Graw Hill, 3rd Edition, 2014.

Reference Book(s):

R1.Trivedi R.K. "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol.I and II, Enviro Media.

R2.Cunningham, W.P.Cooper,T.H. Gorhani, "Environmental Encyclopedia", Jaico Publishing House, Mumbai, 2001.

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Assessment Pattern

Component	Marks	Details
Attendance	10	Minimum 80% and 1 mark for every 2% observed
Knowledge Test	40	Objective type questions
Activity(ies)	50	Report on the activity performed
Total	**100**	

Non-letter Grades

Marks Scored	Performance Level
70 & above	Good
30 – 69	Average
< 30	Fair

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19PSHG6001	Course Title: Wellness for Students (Common to all B.E/B.Tech Programmes) (2020 Batch onwards)		
Course Category: Humanities	Course Level: Introductory		
L:T:P(Hours/Week)0: 0: 2	Credits:1	Total Contact Hours:30	Max. Marks:100

Pre-requisites

> NIL

Course Objectives

The course is intended to:

1. Set SMART goals for academic, career and life
2. Apply time management techniques
3. Articulate the importance of wellness for success in life.
4. Understand the dimensions of wellbeing and relevant practices

Unit I   Goal Setting

Understanding Vision and mission statements - Writing personal mission statements – 'Focus' as a way of life of most successful people. Clarifying personal values, interests and orientations – Awareness of opportunities ahead – Personal SWOT analysis - Principles driving goal setting: Principle of response and stimuli, Circle of influence and circle of concern, What you see depends on the role you assume. Potential obstacles to setting and reaching your goals - Five steps to goals setting: SMART goals, Inclusive goals, Positive stretch, Pain vs gain, Gun-point commitment.

Unit II   Time Management - Tools and Techniques

Importance of planning and working to time. Pareto 80-20 principle of prioritization – Time quadrants as a way to prioritize weekly tasks – The glass jar principle - Handling time wasters – Assertiveness, the art of saying 'NO' – Managing procrastination

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit III   Practices for Physical Wellness

Concept of wellness – impact of absence of wellness - Wellness as important component to achieve success. Well being as per WHO - Dimensions of Wellbeing: Physical, Mental, Social, Spiritual – indicators and assessment methods

Simplified Physical Exercises. Fitness as a subset of Wellness – health related physical fitness - skill related physical fitness. Joint movements, Warm up exercises, simple asanas, WCSC simplified exercises.

Unit IV   Practices for Mental Wellness

Meditation: Mind and its functions - mind wave frequency – Simple basic meditation – WCSC meditation and introspection tables. Greatness of friendship and social welfare – individual, family and world peace – blessings and benefits.

Food & sleep for wellness: balanced diet - good food habits for better health (anatomic therapy) – hazards of junk food - food and the gunas

Unit V   Putting into Practice

Practicals: Using the weekly journal – Executing and achieving short term goals – Periodic reviews.

Course Outcomes	Cognitive/ Affective
At the end of this course, students will be able to:	
CO1. Set well-articulated goals for academics, career, and personal aspirations	Apply
CO2. Apply time management techniques to complete planned tasks on time	Apply
CO3. Explain the concept of wellness and its importance to be successful in career and life	Apply
CO4. Explain the dimensions of wellness and practices that can promote wellness	Apply
CO5. Demonstrate the practices that can promote wellness	Valuing

Text book(s):

T1.   Reading material, workbook and journal prepared by PS team of the college.

Reference Book(s):
R1. Stephen R Covey, "First things first", Simon & Schuster Uk, Aug 1997.
R2. Sean Covey, "Seven habits of highly effective teenagers", Simon & Schuster Uk, 2004.

Passed in BOS meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

R3. Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar, "Value education for harmonious life (Manavalakalai Yoga)", Vethathiri Publications, Erode, I Ed. (2010).

R4. Dr. R. Nagarathna, Dr.H.R. Nagendra, "Integrated approach of yoga therapy for positive health", Swami Vivekananda Yoga Prakashana, Bangalore, 2008 Ed.

R5.Tony Buzan, Harper Collins, The Power of Physical Intelligence (English).

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	1	1	-	1
CO2	-	-	-	-	-	-	-	-	1	-	1	1
CO3	-	-	-	-	-	-	-	-	1	-	-	1
CO4	-	-	-	-	-	-	-	-	1	-	-	1
CO5	-	-	-	-	-	1	1	-	1	-	-	1

High-3; Medium-2; Low-1

Assessment Pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	Personal Effectiveness	1,2,5	35	75
	Yoga and physical Exercise: Physical Exercises	3,4,5	20	
	Meditation		10	
	Assessment of student's workbook		10	
End Semester Examination	Written test (MCQ and short answers)	1,2,3,4,5	30	Marks out of 100 is reduced to 25
	Physical exercises		50	
	Viva-voce		20	
			Total	100

Passed in BOS meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19MABC1302	Course Title: NUMERICAL METHODS AND LINEAR ALGEBRA		
	(Common to EC, EE , EI & MC)		
Course Category: Basic Science		Course Level: Introductory	
L:T:P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max Marks:100

Pre-requisites

➢ 19MABC1102 -Matrices and Calculus

➢ 19MABC1201-Ordinary Differential Equation and Complex variables

Course Objectives

The course is intended to:

1. Solve the system of linear equations, nonlinear equations &calculate the dominant Eigen value
2. Determine the unknown values from the given set of data & Compute derivatives and integrals
3. Solve first ordinary differential equation
4. Apply the concept of vector spaces to electrical network problems
5. Apply the concept of Inner product spaces in Fourier approximation

Unit I Solution Of Equations And Eigen value Problems   9+3 Hours

Solution of system of linear equations – Direct methods: Gaussian elimination method – Indirect methods: Gauss Jacobi method, Gauss-Seidel method – sufficient conditions for convergence – Solution of nonlinear equations: Newton Raphson method – Power method to find the dominant Eigen value and the corresponding Eigen vector. Application of Eigen value and the corresponding Eigen vector.

Unit II Interpolation, Numerical Differentiation And Integration   9+3Hours

Newton's forward, backward interpolation — Lagrange's interpolation. Numerical Differentiation and Integration — Trapezoidal rule — Simpson's 1/3 rule — Double integration using Trapezoidal rule.

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit III   Numerical Solution Of Ordinary Differential Equation   9+3Hours

Numerical solution of first order ordinary differential equation-Single step method: Taylor's series-Euler's method - Runge-Kutta method of fourth order — Multi step method: Milne's and Adams — Bash forth predictor corrector methods for solving first order equations.

Unit IV   Vector Spaces   9+3 Hours

System of linear equations -Vector spaces- Subspace of a vector space- basis and dimension of vector space - linear combination and spanning sets of vectors -linear independence and linear dependence of vectors-Row space, Column space and Null space- Rank and nullity of subspaces. Applications to linear equations: Simple electrical network problems to find loop current using Kirchhoff's voltage law.

Unit V   Orthogonally And Inner Product Spaces   9+3 Hours

Inner product of vectors: length of a vector, distance between two vectors, and orthogonality of vectors-Orthogonal projection of a vector-Gram-Schmidt process to produce orthogonal and orthonormal basis -Inner product spaces- Fourier approximation of continuous functions using inner product spaces.

Course Outcomes At the end of this course, students will be able to:	Cognitive Level
CO1: Solve the system of linear equations, nonlinear equations & calculate the dominant Eigen value	Apply
CO2: Determine the unknown values from the given set of data & compute derivatives and integrals	Apply
CO3: Solve first ordinary differential equation	Apply
CO4: Apply the concept of vector spaces to electrical network problems	Apply
CO5: Apply the concept of Inner product spaces in Fourier approximation	Apply

Text Book(s):
1. Grewal, B.S. and Grewal, J. S., "Numerical Methods in Engineering and Science", Eleventh Edition, Khanna Publishers, New Delhi, 2013.
2. David C Lay, "Linear Algebra and its Applications', Fifth Edition, Pearson Education, 2015.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Reference Book(s):

1. Gerald, C. F. and Wheatley, P. O., "Applied Numerical Analysis", Seventh Edition, Pearson Education Asia, New Delhi, 2006.

2. Jain M. K., Iyengar, S. R. and Jain, R. K, "Numerical Methods for Scientific and Engineering Computation', New Age Publishers, 2012.

3. Sastry.S.S, "Introductory Methods of Numerical Analysis", 3 Edition, PHI, 2003.

4. Gilbert Strang, "Linear algebra and its Applications', Fourth Edition, Cengage Learning India Private Limited, 2012.

Web References:

1. http://nptel.ac.in/courses/122104018/node2.html
2. http://nptel.ac.in/courses/111105038/

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Assessment pattern:

	Assessment Component	CO .No.	Marks	Total
Continuous Comprehensive Evaluation	CCET 1	1,2	50	30
	CCET 2	3,4	50	
	Retest	1,2,3,4	50	
	CCET 3	5	50	
	Tutorial	1,2,3,4,5	30	10
	Quiz	1,2,3,4,5		
	Assignment	1,2,3,4,5		
End Semester Examination	ESE	1,2,3,4,5	100	60
Total				100

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN1301	Course Title: Analog Circuits- I		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week)3: 0: 0	Credits:3	Total Contact Hours: 45	Max Marks:100

Pre-requisites

➤ 19ECSN2101- Fundamentals of Electrical and Electronics Engineering

➤ 19ECSN2201- Electric Circuits and Electron devices

Course Objectives

The course is intended to:

1. Analyze BJT and FET Amplifiers
2. Select the appropriate Power Amplifier for a given application
3. Analyze various feedback amplifiers
4. Analyze Tuned Amplifier
5. Explain the characteristics of Operational Amplifier

Unit I	Analysis of BJT and FET Amplifiers	9 Hours

Analysis of BJT amplifier: LF response of CE, CB and CC Amplifier using h-parameter model. HF response of Common emitter amplifier-Hybrid π model – Definition of Cut off frequencies and bandwidth. High frequency response of Common source FET amplifier.

Unit II	Large Signal Amplifiers	9 Hours

Classification of Large signal amplifiers: Class A- direct coupled and transformer coupled. Class B- push pull and complementary symmetry –Cross over distortion- Class AB Power amplifier.

Unit III	Feedback Amplifiers	9 Hours

Types of Feedback- The four basic feedback topologies - Input and Output resistances with Negative feedback - Method of identifying feedback topologies.

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Tuned Amplifiers

9 Hours

Single tuned amplifier– Effect of cascading single tuned amplifiers on bandwidth – Stagger tuned amplifiers –Class C tuned amplifier. Neutralization - Hazeltine neutralization and Rice neutralization.

Unit V   OP-AMP and Its Characteristics

9 Hours

Block Diagram of Op-amp –CMRR- Ideal Op-amp characteristics and its equivalent circuit – DC characteristics - AC characteristics – Concept of frequency compensation-methods of improving slew rate.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Analyze BJT and FET Amplifiers at low and high frequency using h-parameter and hybrid- π model	Analyze
CO2: Select the appropriate Power Amplifier for a given application	Analyze
CO3: Analyze various Feedback Amplifiers using appropriate feedback topologies	Analyze
CO4: Analyze the frequency response characteristics of Tuned Amplifier and it's neutralization techniques	Analyze
CO5: Explain the characteristics of Operational Amplifier in terms of AC and DC parameters	Understand

Text Book(s):

T1. Anil K.Maini and VarshaAgarwal, "Electronic Devices and Circuits", Wiley India Private Ltd, New Delhi, 2009.

T2. S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, "Electronic Devices and Circuits", Second Edition, Tata McGraw-Hill, New Delhi, 2007.

Reference Book(s):

R1. Roy Choudhary.D., Sheil.B.Jani, "Linear Integrated Circuits", Second Edition, New Age, 2003.

R2. Robert L. Boyelstad and Louis Nasheresky, "Electronics Devices and Circuit Theory", Ninth Edition, Pearson Education/ PHI, New Delhi 2002.

R3. David A. Bell, "Electronics Devices and Circuits", Fifth Edition, Oxford University Press, 2008.

R4. Sedra/ Smith, "Micro Electronic Circuits" Oxford University Press, 2004.

Passed in Board of Studies meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Web References:

1. https://nptel.ac.in/courses/117/107/117107094/

2. https://nptel.ac.in/courses/117/106/117106088/

Course Articulation matrix

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

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	30
	CCET II	3,4	50	
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ITSN2302		Course Title: Data Structures and Algorithms - I		
Course Category: Engineering Science		Course Level: Practice		
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75		Max. Marks:100

Pre-requisites

➤ 19CSSC2001- C Programming

Course Objectives

The course is intended to:

1. Construct programs using pointers
2. Write programs using structures and unions
3. Implement linear data structures
4. Develop programs using stack and queue
5. Demonstrate a familiarity with sorting and searching techniques in data structures

UNIT I   Pointers   **9 Hours**

Introduction to pointers- Accessing the address of a variable- Declaring & Initializing pointer Variable- Accessing a variable through its pointers- Pointer & Arrays- Array of pointers- Pointers as Function arguments- Pointers to Functions.

UNIT II   Structures and Union   **9 Hours**

Structures: Declaration & Initialization of Structures - Structure within Structure - Array of Structures -Pointer to Structures - Structure and Functions –Typedef- Union: Declaration & Initialization of Union -Operations on Union -Enumerations.

UNIT III   Linear Data structure - List   **9 Hours**
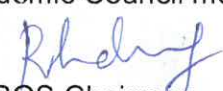
Data Structures types - Abstract Data Types - List ADT: Array and Linked List Implementation -Doubly Linked List - Circularly Linked List-Applications of List: Radix sort.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

UNIT IV   Linear Data structures-Stack and Queue   9 Hours

Stack ADT: Stack Model - Array and Linked List Implementation of Stack - Applications :Balancing Symbols - Postfix Expressions- Infix to Postfix Conversion – Queue ADT: Queue Model -Array and Linked List Implementation of Queue - Applications of Queue.

UNIT V   Sorting and Searching Techniques   9 Hours

Sorting Techniques: Bubble sort - Merge sort - Quick sort - Applications of Sorting - Searching Techniques: Linear Search - Binary Search- Applications of Searching.

List of Exercises   30 Hours
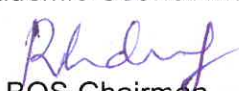
1. Develop C program using array of pointers
2. Develop C program using Structure pointers
3. Create a C program to implement Singly Linked list using Linked list implementation
4. Create a C program to implement Stack using array and linked list implementation
5. Create a C program to implement Queue using array and linked list implementation
6. Create a C program to implement Merge Sort / Quick Sort / Bubble Sort

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Construct programs using pointers for given scenario	Apply
CO2: Write programs using structures and unions for various real time applications	Apply
CO3: Implement Linear data structures such as Linked List using C	Apply
CO4: Develop programs using stack and queue for given application	Apply
CO5: Implementation of Sorting and Searching Techniques	Apply

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Text Book(s):

T1. E.Balagurusamy, "Programming in ANSI C", 4th Edition, Tata McGraw-Hill Education,2017. (UNIT I,II)

T2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, New Delhi, 2011. (UNIT III,IV,V)

Reference Book(s):

R1. Ajay Mittal, "Programming in C - A Practical Approach", 3rd Edition, Pearson Education, 2010.

R2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education; Third edition, 2017.

Web References:

1. https://www.coursera.org/specializations/data-structures-algorithms
2. http://www.csse.monash.edu.au/~lloyd/tildeAlgDS
3. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
4. http://www.c4learn.com

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN2301	Course Title: Transmission Lines and Waveguides		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max Marks:100

Pre-requisites

> 19PHBC2001- Physics for Electrical Sciences

Course Objectives

The course is intended to:

1. Analyze two port network and transmission line parameters
2. Analyze power measurement in transmission lines
3. Select appropriate matching sections for impedance matching
4. Analyze various modes of propagation in parallel plane and rectangular waveguides
5. Analyze various modes of propagation in circular waveguides and cavity resonator

Unit I   Transmission Line Theory   9 Hours

Introduction – Definition of Two Port Network parameters - The Lumped element circuit model for a transmission line – General solution of transmission line-propagation constant, characteristic impedance - reflection on a line not terminated by Z_o - Waveform distortion, condition for distortion less line.

Unit II   High Frequency Transmission Lines   9 Hours

Approximations at high frequencies - Line of zero dissipation - Voltage and current on the dissipation-less line, Standing Waves, Standing Wave Ratio - Input impedance of the dissipation-less line - Open and short circuited lines - Power and impedance measurement on lines.
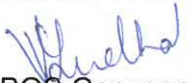
Unit III   Impedance Matching in Transmission Lines   9 Hours

Impedance matching: Quarter wave transformer, Half wave line, Eighth wave line – Smith chart – transmission line calculations using Smith chart - Single stub matching.
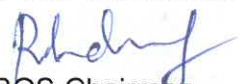
Unit IV   Parallel Plane and Rectangular Waveguides   9 Hours

Parallel Plane Waveguides: Waves between parallel planes – TE, TM and TEM waves- Characteristics, Velocities of propagation.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Rectangular Waveguides: TE and TM waves - characteristics, Impossibility of TEM waves in hollow wave guides- Dominant Mode - definition of Wave Impedance

Unit V   Circular Waveguides and Rectangular Cavity Resonator   9 Hours

Circular Waveguides: Bessel's function, Solution of the field equation in cylindrical co-ordinates, TE and TM waves, Characteristics.
Rectangular Cavity Resonator: Rectangular cavity, TE and TM mode, resonant frequency, dominant mode, Q factor – Unloaded Q for TE_{101} mode.

List of Experiments   30 Hours

1. Measurement of cutoff frequency and attenuation in a coaxial line
2. Determination of SWR and reflection coefficient of a device using VNA
3. Determination of line parameters using Smith chart utility software
4. Design of Quarter wave transformer
5. Determination of VSWR and Reflection coefficient using slotted line section
6. Measurement of frequency and wavelength of dominant mode in RWG

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Analyze the basic transmission line parameters using the analogy between lumped and distributed model	Analyze
CO2: Analyze power measurement in transmission lines at high frequencies by approximating their parameters	Analyze
CO3: Select appropriate matching sections to minimize the impedance mismatch in a transmission line	Apply
CO4: Analyze various modes of propagation in parallel plane and rectangular waveguides by using wave equations	Analyze
CO5: Analyze various modes of propagation in circular waveguides and cavity resonator by using wave theory approach	Analyze

Text Book(s):

T1. A Sudhakar, S Shyam mohan and Palli, Circuits and Network (Analysis and synthesis) Tata McGraw-Hill, 2010.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   •   BOS Chairman

T2. John D Ryder, "Networks, Lines and Fields", PHI, 2nd Edition New Delhi, 1999

T3. Jordan. E.C. and Balmain.K.G, "Electromagnetic Waves and Radiating Systems", 2nd Edition, PHI, New Delhi, 1995.

Reference Book(s):

R1. Alexander C. and Sadiku M. N. O., —Fundamentals of Electric Circuits ", Tata McGraw Hill, New Delhi, 2013.

R2. Umesh Sinha,"Transmission Lines and Networks", Satya Prakashan (Tech. India Publications, New Delhi), 2001

R3. David M. Pozar, "Microwave Engineering", Third Edition, John Wiley, 2009.

R4. David K. Cheng,"Field and Wave Electromagnetics", Pearson Education, Second Edition,2004

R5. G.S.N Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson Education, First edition 2005.

Web References:

1. http://www.nptel.ac.in/courses/117101057/
2. http://www.amanogawa.com/archive/transmissionB.html
3. http://www.falstad.com/circuit/e-tl.html
4. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-013-electromagnetics-and-applications-fall-2005/lecture-notes/
5. http://www.indiabix.com/electronics-circuits/simple-transmission-lines/

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman
Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Course Code: 19ECCN1302	Course Title: Digital Principles and System Design			
Course Category:Professional Core		Course Level: Practice		
L:T:P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60		Max Marks:100

Pre-requisites: The student should have undergone the course(s):

 ➢ 19ECSN2201- Electric Circuits and Electron devices

Course Objectives

The course is intended to:

1. Illustrate the number systems and boolean laws
2. Explain minimization techniques and operation of logic families
3. Develop combinational logic
4. Design synchronous sequential circuits
5. Design asynchronous sequential circuits

Unit I	Basic Concepts in Boolean Algebra	10 Hours

Number System: Review of decimal, binary, octal and hexadecimal numbers –Complements: 1's and 2's – Arithmetic operation of Signed binary numbers - Digital Logic Gates – Universal gate Implementation.

Boolean algebra: Basic Theorems, properties and-- Representation of Boolean functions in Canonical and standard forms.

Unit II	Minimization Techniques and Logic Families	12 Hours

Minimization Techniques: Simplifications of Boolean expression using 3 and 4 variable K map method and Mc-Cluskey method.

Logic Families: Characteristics and operation of TTL, ECL, CMOS logic.

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit III   Combinational Logic   12 Hours

Combinational Circuits: Design Procedure of adder-half adder, full adder,4-bit RCA, Subtractor: half subtractor, full subtractor,4-bit subtractor, Comparator: 4-bit magnitude comparator, code converters-binary to excess-3,binary to gray,Encoders-8 to 3, Decoders- 3 to 8, Multiplexers-8 X 1 and De-multiplexers-1 X 8.

Unit IV   Synchronous Sequential Logic   13 Hours

Flip flops: SR, JK, T, D -- Level and Edge Triggering – Analysis of sequential circuits - Design of sequential circuits– **Registers:** Shift registers – SISO, SIPO, PISO, PIPO –**Counters:** Design of 3-bit synchronous and ripple counter.

Unit V   Asynchronous Sequential Logic   13 Hours
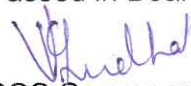
Analysis of Asynchronous Sequential Circuits - Design of Asynchronous Sequential Circuits with primitive flow table, state reduction and state assignment – Races, Cycles and Hazards: Static, Dynamic, Essential, Hazards elimination.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Illustrate the number systems and boolean laws used in digital design	Understand
CO2: Explain minimization techniques in boolean algebra and logic Families	Understand
CO3: Develop combinational circuits using simplification techniques	Apply
CO4: Design synchronous sequential circuits using flip-flops	Apply
CO5: Design an asynchronous sequential circuit eliminating hazards and races.	Apply

Text Book(s):

T1. Morris Mano. M., "Digital Design", Third Edition, Pearson Edn.,2001
T2. William I. Fletcher, "An Engineering Approach to Digital Design ", Prentice-Hall of India, 1980.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Reference Book(s):

R1. Donald D. Givone, "Digital Principles and Design", TMH, 2003

R2. Salivahanan. S and Arivazhagan. S., "Digital Circuits and Design", Fourth Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2012.

R3. R.P. Jain , "Modern Digital Electronics", Tata Mc Graw Hill, 3rd Edition, 2007

Web References:

1. http://www.learnabout-electronics.org//Digital/dig10.php
2. http://nptel.ac.in/courses/117103064/
3. https://nptel.ac.in/courses/108105132/
4. http://www.allaboutcircuits.com/textbook/digital/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	30
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN3301	Course Title: Analog Circuits-I Laboratory		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week)0: 0: 3	Credits:1.5	Total Contact Hours:45	Max Marks:100

Pre-requisites

> 19ECSN2101- Fundamentals of Electrical and Electronics Engineering

> 19ECSN2201- Electric Circuits and Electron devices

Course Objectives
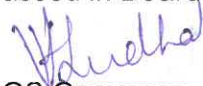
The course is intended to:

1. Construct BJT amplifiers and draw their frequency response characteristics
2. Construct FET amplifier in CS configuration and draw its frequency response characteristics
3. Construct Power Amplifiers using BJT and estimate their efficiencies
4. Construct Feedback amplifiers using BJT and draw its frequency response characteristics
5. Construct and test simple electronic circuits using BJT

LIST OF EXPERIMENTS:

1. Frequency response characteristics of CE amplifier

2. Frequency response characteristics of CC amplifier

3. Frequency response characteristics of CS amplifier

4. Two stage RC coupled amplifier

5. Class A power amplifier

6. Complementary symmetry class-B amplifier

7. Feedback amplifiers using BJT

8. Class C tuned amplifier

9. Relay driver using BJT/FET amplifier

10. Fixed voltage Power supply

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Construct BJT amplifiers in both CE and CC configurations and draw their frequency response characteristics.	Apply
CO2: Construct FET amplifier in CS configuration and draw its frequency response characteristics.	Apply
CO3: Construct Power Amplifiers using BJT and estimate their efficiencies.	Apply
CO4: Construct Feedback amplifiers using BJT and draw its frequency response characteristics.	Apply
CO5: Construct simple electronic circuits and test its performance.	Apply

Reference(s)

R1.Analog Circuits I Laboratory Manual

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Assessment pattern:

Continuous comprehensive Evaluation	Assessment component	Marks	Total Marks
	Each Lab Experiment	75	75
	Cycle Test 1	50	25
	Cycle Test 2	50	
	Total		100

Passed in Board of Studies meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.
HOD.Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN3302	Course Title: Digital Principles and System Design Laboratory		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week)0: 0: 3	Credits:1.5	Total Contact Hours:45	Max Marks:100

Pre-requisites

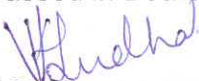➤ 19ECSN2201- Electric Circuits and Electron devices

Course Objectives

The course is intended to:

1. Understand number representations and conversion between different representations in digital electronic circuit.
2. Understand simplification of Boolean expressions and operation of logic families.
3. Understand various combinational circuits.
4. Understand concepts of asynchronous sequential circuits.
5. Understand different concepts of synchronous sequential logic circuits.
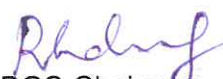
LIST OF EXPERIMENTS:

1. Realization and logic verification of full adder and full subtractor using gates.
2. Implementation of 4*1 multiplexer and 1*4 demultiplexer using gates.
3. Design and logic verification of 3-bit comparator using gates.
4. Design and logic verification of binary to BCD converter and BCD to seven segment display using gates.
5. Design and logic verification of 4-bit Serial In-Parallel out shift register using gates..
6. Design and logic verification of 3-bit synchronous Counter using gates..
7. Design and simulation of 3 to 8 decoder and 8 to 3 encoder using Verilog HDL code .
8. Design and simulation of 4-bit RCA using Verilog HDL code.

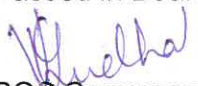Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

9. Design and simulation of JK Flip flop using Verilog HDL code

10. Design and simulation of synchronous counter which counts for specified states using Verilog HDL code.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Build different types of codes and number systems which are used in digital Communications.	Apply
CO2: Apply minimization techniques to simplify digital circuits and compare different types of logic families.	Apply
CO3: Analyze and design Combinational Circuits.	Analyze
CO4: Analyze and design Synchronous Sequential logic circuits.	Analyze
CO5: Analyze and design Asynchronous Sequential logic circuits.	Analyze

Reference(s)

R1. Laboratory manual prepared by the department of ECE
R2. Samir Palnitkar, "Verilog HDL: A Guide to Digital Design and Synthesis, Second edition, Prentice Hall, 2003.
R3. Donald E.Thomas, Philip R.Moorby, " The Verilog Hardware description Language",Fifth Edition, Kluwer Academic Publishers, 2002.

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment pattern:

Continuous comprehensive Evaluation	Assessment component	Marks	Total Marks
	Each Lab Experiment	75	75
	Cycle Test 1	50	25
	Cycle Test 2	50	
	Total		100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Course Code: 19MABG1401	Course Title: Probability and Statistics (common to all B.E/B.Tech programmes)		
Course Category: Basic Science	Course Level: Introductory		
L:T:P(Hours/Week)3: 1: 0	Credits:4	Total Contact Hours:60	Max Marks:100

Pre-requisites

> NIL

Course Objectives

The course is intended to:

1. Calculate expectations and variances of random variables
2. Apply the concepts of standard distributions to solve practical problems
3. Calculate the correlation and regression for two variables
4. Test the samples based on hypothesis
5. Analyze the samples based on variance

UNIT I   Probability and Random Variables   9+3 Hours

Axioms of Probability- Conditional Probability- Total Probability -Baye's Theorem- Random Variables- Probability Mass Function- Probability Density Functions- Properties - Moments-Moment generating functions and their properties.

Unit II   Standard Distributions   9+3Hours

Binomial- Poisson- Uniform –Exponential- Normal Distributions and their properties-Functions of a random variable.

UNIT III   Two Dimensional Random Variables   9+3Hours

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables.
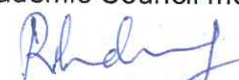
UNIT IV   Testing of Hypotheses   9+3Hours

Sampling Distributions- Testing of hypotheses for mean, variance, proportions and differences

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener

BOS Chairman
Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

using Normal, t, Chi-Square and F distributions – Tests for independence of attributes and Goodness of fit.

UNIT V   Design of Experiments   **9+3 Hours**

Analysis of Variance (ANOVA)- One way Classification – Completely Randomized Design(CRD) – Two way Classification – Randomized Block Design (RBD) – Latin square.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Calculate expectations and variances of random variables	Apply
CO2: Apply the concepts of standard distributions to solve practical problems	Apply
CO3: Calculate the correlation and regression for two variables	Apply
CO4: Test the samples based on hypothesis	Apply
CO5: Analyze the samples based on variance	Apply

Text Book(s):

T1. Veerarajan T, "Probability, Statistics and Random process", 4th Edition, Tata McGraw-Hill, New Delhi, 2013.

T2. Dr.J.Ravichandran, "Probability and Statistics for Engineers", 1st Edition, Wiley India Pvt.Ltd.,2010.

Reference Book(s):

R1.   R.E. Walpole,R.H. Myers, S.L. Myers, and K Ye, "Probability and Statistics for Engineers and Scientists", 9th Edition Pearson Education, Asia, 2016.

R2.   M.R. Spiegel,J. Schiller and R.A. Srinivasan, "Schaum's Outlines Probability and Statistics", 3rd Edition,Tata McGraw Hill edition, 2009.

R3.   Morris DeGroot, Mark Schervish, "Probability and Statistics", Pearson Educational Ltd,4th Edition, 2014.

R4.   Johnson and C.B. Gupta,"Probability and Statistics for Engineers", 9th Edition,Pearson Education, Asia, 2016.

Web References:

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

1. Unit I to Unit IV: https://onlinecourses.nptel.ac.in/111105041/

2. Unit I to Unit IV: https://nptel.ac.in/courses/111105090/

3. Unit V : https://nptel.ac.in/courses/111104075/

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Assessment pattern:

	Assessment Component	CO .No.	Marks	Total
Continuous Comprehensive Evaluation	CCET 1	1,2	50	30
	CCET 2	3,4	50	
	Retest	1,2,3,4	50	
	CCET 3	5	50	
	Tutorial	1,2,3,4,5	30	10
	Quiz	1,2,3,4,5		
	Assignment	1,2,3,4,5		
End Semester Examination	ESE	1,2,3,4,5	100	60
Total				100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN1401	Course Title: Analog Circuits- II		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week)3: 1: 0	Credits:4	Total Contact Hours: 60	Max Marks:100

Pre-requisites

> 19ECCN1301- Analog Circuits I

Course Objectives

The course is intended to:

1. Design arithmetic, calculus and rectifier circuits using op-amps
2. Design comparators and data converters using op-amps
3. Design Oscillators using op-amps/BJT
4. Design Wave shaping circuits using op-amps and BJT
5. Analyze the applications of special function ICs

Unit I   Application of OP-AMP   9 +3 Hours

Inverting and Non-inverting amplifier - Voltage follower – Summing amplifier – Subtractor - Instrumentation Amplifier- OP-AMP circuits using diodes: Half wave, full wave rectifiers and precision rectifiers.–Integrator – Differentiator.

Unit II   Comparators and Converters   9 +3 Hours

Comparator- Zero crossing detector, DAC and ADC - specifications –Weighted resistor type and R-2R ladder type - Flash type, Successive approximation type and dual slope type.

Unit III   Oscillators   9+3 Hours

RC Oscillators using OP-AMP: RC phase shift and Wein bridge. LC oscillators using BJT: Hartley and Colpitt's oscillator. Crystal oscillator.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Wave shaping Circuits   **9 +3 Hours**

Multivibrators: Astable, Monostable and Bistable - Schmitt trigger using BJT and OP-AMP.

Unit V   Special Function ICs and its Applications   **9 +3 Hours**

IC 555 timer and IC 565 PLL - applications. Fixed and variable voltage regulators.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Design arithmetic, calculus and rectifier circuits using op-amps	Apply
CO2: Design comparators and data converters using op-amps	Apply
CO3: Design RC Oscillators using op-amps and LC Oscillators using BJT	Apply
CO4: Design waveshaping circuits using op-amps and BJT	Apply
CO5: Analyze the applications of special function ICs such as timer, PLL and voltage regulator	Analyze

Text Book(s):

T1. Roy Choudhary.D., Sheil.B.Jani, "Linear Integrated Circuits", Second Edition, New Age, 2003.

T2. S.Salivahanan, N. Suresh Kumar and A. Vallavaraj, "Electronic Devices and Circuits", Second Edition, Tata McGraw-Hill, New Delhi, 2007.

T3. RamakantA.Gayakward, "Op-amps and Linear Integrated Circuits", Fourth edition, Pearson Education, 2003.

Reference Book(s):

R1. Anil K.Maini and Varsha Agarwal, "Electronic Devices and Circuits", WileyIndia Private Ltd, New Delhi, 2009.

R2. Robert L. Boyelstad and Louis Nasheresky, "Electronics Devices and Circuit Theory", Ninth Edition, Pearson Education/ PHI, New Delhi 2002.

R3. David A. Bell, "Electronics Devices and Circuits", Fifth Edition, Oxford University Press, 2008.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

R4. Sedra/ Smith, "Micro Electronic Circuits" Oxford University Press, 2004.

Web References:

1.https://nptel.ac.in/courses/117101106/

2.https://freevideolectures.com/course/2915/linear-integrated-circuits
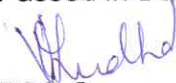
Course Articulation Matrix:

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

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	30
	CCET II	3,4	50	
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Course Code: 19ITSN2401	Course Title: Data Structures and Algorithms - II		
Course Category: Engineering Science	Course Level: Practice		
L:T:P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

> 19ITSN2302-Data Structures and Algorithms - I

Course Objectives

The course is intended to:

1. Write java programs using appropriate programming paradigm
2. Understand the principles of inheritance, polymorphism and interfaces
3. Obtain code reusability and explore exception handling mechanism
4. Perform various operations on trees
5. Implement the traversal methods on graphs

UNIT I   INTRODUCTION   9 Hours

Introduction to java – Basics of OOPS Concepts - Java Virtual Machine - Structure of Java Program -Java Tokens - Constants - Variables -Data Types - Scope of Variables - Operators - Java Statements -Defining a Class - Defining Methods -Creating Objects - Accessing Class Members-Arrays-Applications of Java: Server, Client and Embedded Devices.

UNIT II   OBJECT ORIENTED PROGRAMMING USING JAVA   9 Hours

Constructors - Garbage Collection - Method Overloading -Static Members -Inheritance: Extending a Class -Overriding Methods - Super Keyword -Final Variables and Methods - Final Classes - Abstract Classes and Methods – Interfaces- Extending Interfaces - Implementing Interfaces.

UNIT III   PACKAGES, STRING AND EXCEPTION HANDLING   9 Hours

Packages –Creating and Importing Packages - Visibility Control - String Class -String Buffer - Exception Types -Uncaught Exceptions -Using Try Catch -Multiple Catch -Nested Try -Throw - Throws - Finally.

Passed in Board of Studies meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003.

UNIT IV   TREES   8 Hours

Tree - Preliminaries - Binary tree - Tree traversal - Applications - Expression tree - Binary search tree - BST Operations - AVL tree.

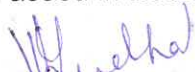## UNIT V   GRAPHS   10 Hours

Representation of graph - Graph Traversals: Depth first and Breadthfirst traversal - Applications of graphs - Topological sort - Shortest path algorithms: Dijkstra's & Floyd's algorithms - Minimum Spanning Tree: Prim's and Kruskal'salgorithms.

List of Exercises   30 Hours

1. Creation of classes and use of different types of functions

2. Programs using Inheritance

3. Developing user defined interfaces

4. Creation of User defined package with appropriate usage of access modifiers

5. Implementation of Binary search tree

6. Implementation of Dijkstra's algorithm

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Write java programs to solve simple business problems	Apply
CO2: Apply inheritance and interfaces in order to attain code minimization and reusability	Apply
CO3: Create user defined packages and exception handling mechanism to obtain data encapsulation	Apply
CO4: Implement various operations on trees for real world applications	Apply
CO5: Implement the graph traversal methods	Apply

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Text Book(s):

T1. Schildt. H., "Java - The complete Reference", 10th Edition, McGraw Hill Education, 2014. (Unit 1, 2 & 3)

T2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in Java", Pearson Education Asia, New Delhi, Third Edition, 2012. (Unit 4 & 5)

Reference Book(s):

R1. Deitel and Deitel," Java How to Program", Prentice Hall, 10th Edition, 2014

R2. Bert Bates &Kathy Sierra, " Head First Java: A Brain-Friendly Guide",2nd Edition,O'Reilly Media, 2009

R3. Lafore, "Data Structures & Algorithms in Java", 2nd Edition, Pearson, 2007

R4. Goodrich M T and Tamassia R, "Data Structures and Algorithms in Java", 5th edition, Wiley publication, 2010.

Web References:

1. https://nptel.ac.in/courses/106105191/
2. https://nptel.ac.in/courses/106102064/
3. https://www.coursera.org/learn/object-oriented-java?specialization=java-object-oriented
4. https://www.coursera.org/learn/data-structures

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	20
	CCET III	5	50	
	Continuous Assessment – Practical	1,2,3,4,5	75	10
	Final Assessment – Practical	1,2,3,4,5	50	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN1402	Course Title: Signals and Systems		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max Marks:100

Pre-requisites

> 19MABC1201 -Ordinary Differential Equations and Complex Variables

Course Objectives

The course is intended to:

1. Classify various continuous time and discrete time signals
2. Classify various continuous time and discrete time systems
3. Interpret the spectral characteristics of continuous time periodic and aperiodic signals
4. Analyse Linear Time Invariant (LTI) continuous time systems
5. Understand the sampling process

Unit I   Classification of Signals   9+4Hours

Continuous Time (CT) and Discrete Time (DT) signals – Deterministic and Random signals Periodic and Aperiodic signals – Even and Odd signals – Energy and Power Signals – Unit step and Unit ramp Unit impulse signals - Operation on signals: Time shifting, scaling and folding.

Unit II   Classification of Systems   9+4Hours

Continuous time systems – Discrete time systems – Linear system – Time invariant system – causal system – BIBO stable system – system with and without memory – LTI system.

Unit III   Analysis of Continuous Time Signals   9+4Hours

Fourier Series – Representation of Continuous time Periodic signals – properties of Continuous Time Fourier Series – Fourier Transform – Representation of Continuous time signals – properties of Continuous Time Fourier Transform.

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Analysis of Continuous Time Systems   **9+4Hours**

System modeling: Differential equation – impulse response – convolution integral – Laplace transform – properties of Laplace transform – Analysis and characterization of LTI systems using Laplace transform.

Unit V   Sampling and Reconstruction   **8 Hours**

Sampling of continuous time signals – Frequency domain representation of sampling – Sampling theorem – Effects of under sampling – Aliasing -- Reconstruction of continuous time signals from samples.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Apply mathematical operations to classify various continuous time and discrete time signals based on their properties	Apply
CO2: Apply mathematical operations to classify various continuous time and discrete time systems based on their properties	Apply
CO3: Interpret the spectral characteristics of continuous time periodic and aperiodic signals using Fourier analysis	Apply
CO4: Apply Laplace Transform to represent and study the characteristics of Linear Time Invariant(LTI) continuous time systems	Apply
CO5: Understand the process of sampling and the effects of under sampling	Understand

Text Book(s):

T1. Allan V. Oppenheim, S. Wilsky and S.H.Nawab "Signals and System", Pearson Education, 2007

T2. Simon Haykins and Barry Van Veen, "Signals and Systems", John Wiley &Sons, 2004.

Reference Book(s):

R1. H P Hsu, RakeshRanjan, "Signals and Systems", Schaum's Outlines, Tata McGraw Hill, Indian Reprint, 2007

R2. Edward W Kamen, Bonnie S Heck, "Fundamentals of Signals and Systems Using the Web and MATLAB", Pearson Education, 2007

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman
Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

R3. Vinay K Ingle, John G Proakis, "Digital Signal Processing using MATLAB", Cengage Learning, 3rd edition, 2011

R4. Sanjit K Mithra, "Digital Signal Processing Laboratory using MATLAB", Tata McGraw Hill, 1999

Web References:

1. https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/
2. http://www.ws.binghamton.edu/fowler/Fowler%20Personal%20Page/EECE301%20-%20Flipped.htm
3. https://nptel.ac.in/courses/117/104/117104074/

Course Articulation Matrix

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

High-3; Medium-2;Low-1

Assessment pattern

	Assessment Component	CO. No.	Marks	Total
Continuous Assessment	CCET I	1,2	50	
	CCET II	3,4	50	30
	CCET III	5	50	
	Tutorials / Quiz / Assignments	1,2,3,4,5	30	10
End Semester Examination	ESE	1,2,3,4,5	100	60
			Total	100

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.,
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19ECCN3401	Course Title: Analog Circuits - II Laboratory		
Course Category: Professional Core	Course Level: Practice		
L:T:P(Hours/Week)0: 0: 3	Credits:1.5	Total Contact Hours:45	Max Marks:100

Pre-requisites

> 19ECCN1301-Analog Circuits – I

> 19ECCN3301-Analog Circuits - I laboratory

Course Objectives

The course is intended to:

1. Design and Verify arithmetic and Calculus operations using op-amp circuits
2. Design and verify Digital to Analog Converters
3. Design and verify RC and LC oscillators
4. Construct and test square wave generator and squaring circuit and voltage regulator circuit
5. Design and verify simple electronic circuits

LIST OF EXPERIMENTS:

1. Arithmetic operations using op-amp.
2. Calculus circuits using op-amp.
3. Comparator circuits using op-amp.
4. Digital to Analog converter
5. RC Phase shift oscillator using Op-amp
6. LC oscillators using BJT
7. Application of Astable Multivibrator
8. Regenerative comparator.
9. Applications of 555
10. Voltage regulator

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D..
HOD. Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Outcomes

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Design and Verify arithmetic and Calculus operations using op-amp circuits	Apply
CO2: Design and verify Digital to Analog Converters	Apply
CO3: Design and verify RC and LC oscillators	Apply
CO4: Construct and test square wave generator and squaring circuit and Voltage regulator circuit using op-amp	Apply
CO5: Design and verify simple electronic circuits using timer and PLL	Apply

Reference(s)

R1. Analog Circuits -II Laboratory Manual

Course Articulation Matrix

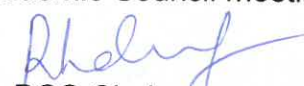| CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	-	2	2	-	-	-	2	2	-	-	1	-
CO2	2	1	-	2	2	-	-	-	2	2	-	-	1	-
CO3	2	1	-	2	2	-	-	-	2	2	-	-	1	-
CO4	2	1	-	2	2	-	-	-	2	2	-	-	1	-
CO5	2	1	-	2	2	-	-	-	2	2	-	-	1	-

High-3; Medium-2; Low-1

Assessment pattern:

Continuous comprehensive Evaluation	Assessment component	Marks	Total Marks
	Each Lab Experiment	75	75
	Cycle Test 1	50	25
	Cycle Test 2	50	
	Total		100

Passed in Board of Studies meeting

Approved in Academic Council meeting

BOS Convener

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.,
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Course Code: 19PSHG6002	Course Title: Universal Human Values 2 :Understanding Harmony		
Course Category: Humanities		Course Level: Practice	
L:T:P (Hours/Week) 2:1: 0	Credits:3	Total Contact Hours:45	Max Marks:100

Pre-requisites

> 19SHMG6101- Induction Program (UHV1)

Course Objectives

The course is intended to:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.

2. Strengthening of self-reflection

3. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence

4. Development of commitment and courage to act

Unit I   Introduction to Value Education   **6+3 Hours**

Need for the Value Education;. Self -exploration as the process   for value education ; Continuous Happiness and Prosperity: A look at basic Human Aspirations; Right understanding: Relationship and Physical Facilities ; Happiness and Prosperity: current scenario ; Method to fulfill the Basic human aspirations

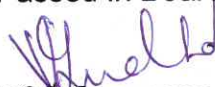**Unit II   Harmony in Human Being**   **6+3 Hours**

Human being as a co-existence of self ('I') and the material 'Body'; needs of Self ('I') and 'Body'; The Body as an instrument of 'I' ; Harmony in the self('I'); Harmony of the self('I') with body ;Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III   Harmony in the Family and Society   **6+3 Hours**

Harmony in the Family the basic unit of human interaction; Values in human to human relationship; Trust as the foundational values of relationship; Respect as the right evaluation ;Understanding harmony in the society (society being an extension of family); Vision for the universal human order

Passed in Board of Studies meeting   Approved in Academic Council meeting

BOS Convener   BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003

Unit IV   Harmony in the Nature

6+3 Hours

Understanding the harmony in the Nature Interconnectedness, self-regulation and mutual fulfillment among the four orders of nature; Existence as Co-existence at all levels; Holistic perception of harmony in existence.

Unit V   Harmony on Professional Ethics

6+3 Hours

Natural acceptance of human values ;Definitiveness of Ethical Human Conduct; Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order; Competence in professional ethics ;Case study: holistic technologies, management models and production systems ;Strategy for transition towards value based life and profession.

Course Outcomes	Affective Level
At the end of this course, students will be able to:	
CO1: Reflect on values, aspiration, relationships and hence identify strengths and weaknesses.	Responding
CO2: Appraise physical, mental and social well being of self and practice techniques to promote well being.	Responding
CO3: Value human relationships in family and society and maintain harmonious relationships.	Valuing
CO4: Respect nature and its existence for survival and sustainable of all life forms and hence practice conservation of nature	Valuing
CO5: Appreciate ethical behaviour as a result of value system in personal and professional situations	Receiving

Text Book(s):

T1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010.

Reference Book(s):

R1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
R2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
R3. The story of stuff, Annie Leonard, Free Press, New York 2010.
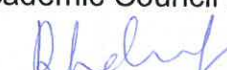
Web References:

1. https://aktu.ac.in/hvpe/ResourceVideo.aspx

2. http://hvpenotes.blogspot.com/

3. https://nptel.ac.in/courses/109/104/109104068/

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR. B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
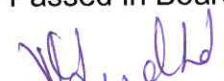POLLACHI - 642 003

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Assessment Pattern

	Assessment component	CO No.	Marks	Total marks weightage
Continuous assessment	Socially relevant project/Group Activities/ Assignments	1,2,3,4,5	20	75%
	Assessment by faculty mentor		10	
	Self-assessment		10	
	Assessment by peers		10	
End Semester Examination	Part A – Objective type – 20x1=20 marks Part B – Short answer questions – 15x 2 = 30 marks Part C – Descriptive Type Questions (Either or Pattern) – 5 x 10 = 50 marks	1,2,3,4,5	100	25%
			Total	100%

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Dr. R. SUDHAKAR, B.E., M.E., Ph.D.
HOD, Electronics and Communication Engineering
Dr. Mahalingam College of Engineering and Technology
POLLACHI - 642 003