



**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

## **Curriculum and Syllabi**

### **B.E Electronics and Instrumentation Engineering**

**Semester I to VI**

**Regulations 2019**

**Dr. Mahalingam College of Engineering and Technology, Pollachi – 642003.**  
(An autonomous institution approved by AICTE and affiliated to Anna University)

**Department of Electronics and Instrumentation Engineering**

**Vision:**

To develop globally competent instrumentation engineers and entrepreneurs with societal, environmental and human values

**Mission:**

**Supportive Learning Environment:** Provide suitable learning environment to the graduates with innovative learning resources and adequate infrastructure

**Engineering Skills:** Enhance electronic, instrumentation and automation skills of the engineering graduates to fulfill the industrial requirements

**Sustainable and Eco-Friendly:** Create awareness among the graduates for sustainable, ecofriendly products and safety standards

**Ethical and Professional Responsibility:** Enrich continuous learning, communicative, collaborative and administrative skills of the engineering graduates to become ethical, social responsible engineers and entrepreneurs

  
OBE Coordinator

  
Programme Coordinator

  
Head of the Department

  
Head - OBE

**Programme: B.E. Electronics and Instrumentation Engineering**

**Programme Educational Objectives (PEOs) - Regulations 2019**

B.E. Electronics and Instrumentation Engineering graduates will:

**PEO.1 Technical Knowledge:** Actively apply technical and professional skills in engineering practices towards the progress of the organization in competitive and dynamic environment

**PEO.2 Higher studies and Research:** Own their professional and personal development by continuous learning and apply the learning at work to create new knowledge

**PEO.3 Professional and Ethical knowledge:** Conduct themselves in a responsible, professional 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 Instrumentation Engineering programme, graduating students/graduates will be able to:

**PO.1. Engineering Knowledge:** Apply the knowledge of Mathematics, Science and engineering to solve problems in the field of Electronics and Instrumentation Engineering

**PO.2. Problem Analysis:** Identify, formulate/model, analyze and solve complex problems in the field of Electronics and Instrumentation Engineering

**PO.3. 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

**PO.4. Conduct Investigations:** Design and conduct experiment, analyses and interpret data to provide valid conclusions in the field of Electronics and Instrumentation Engineering

**PO.5. Modern Tool Usage:** Apply appropriate techniques and modern software tools for design and analysis of Electronic systems with specified constraints

  
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**PO.6. Engineer and Society:** Apply contextual knowledge to provide engineering solutions with societal, professional and environmental responsibilities

**PO.7. Environment and Sustainability:** Provide sustainable solutions within societal and environmental contexts for problems related to Electronics and Instrumentation Engineering

**PO.8. Ethics:** Comply with code of conduct and professional ethics in engineering practices

**PO.9 Individual and Team work:** Perform effectively as a member/leader in multidisciplinary teams

**PO.10. Communication:** Communicate effectively to engineering community and society with proper aids and documents

**PO.11. Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles to manage projects in multidisciplinary environment

**PO.12. Lifelong Learning:** Recognize the need for, and have the ability to engage in independent and lifelong learning

**Programme Specific Outcomes (PSOs) - Regulations 2019**


**PSO1. Instrument Analysis:** Analyze and monitor the characteristics of electronic measuring instruments to ensure performance, safety and quality of the processes

**PSO2. Controller Selection:** Select the suitable instruments, control schemes and controllers as per the requirements

  
OBE Coordinator

  
Programme Coordinator

  
Head of the Department

  
Head - OBE



**Programme: B.E Electronics and Instrumentation 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			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1101	Matrices and Calculus	3	1	0	4	100	AU,CE,EC,EE, EI,ME & MC
19ENHG2101	Communication Skills – I	2	0	2	3	100	All
19CHBC2001	Chemistry for Electrical Sciences	3	0	2	4	100	EC,EE &EI
19EISN2101	Fundamentals of Instrumentation Engineering	3	0	2	4	100	-
19MESC2001	Introduction to Engineering	2	0	2	3	100	AU,EC,EE,EI, ME& MC
19PSHG3002	Personal Effectiveness	0	0	2	1	100	All
<b>Total</b>		<b>13</b>	<b>1</b>	<b>10</b>	<b>19</b>	<b>600</b>	

**Semester II (2019 Batch)**

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19ENHG2201	Communication Skills - II	2	0	2	3	100	All
19MABC1201	Ordinary Differential Equations and Complex Variables	3	1	0	4	100	AU,CE,EC,EE, EI,ME&MC
19PHBC2001	Physics for Electrical Sciences	3	0	2	4	100	EC,EE&EI
19EISN1201	Electric Circuit Analysis	3	1	0	4	100	-
19CSSC2001	C Programming	3	0	2	4	100	AU,CE,EC,EE EI,ME&MC
19MESC4001	Engineering Drawing	1	0	3	2.5	100	AU,ME,MC,PR, EC,EI
19PSHG3001	Wellness for Students	0	0	2	1	100	All
19CHMG6201	Environmental Sciences	1	0	0	-	100	All
<b>Total</b>		<b>16</b>	<b>2</b>	<b>11</b>	<b>22.5</b>	<b>800</b>	

Passed in Board of Studies meeting

  
 BOS Convener

Approved in Academic Council meeting

  
 BOS Chairman

Head of the Department,  
 Department of Electronics and Instrumentation Engineering,  
 Dr. Mahalingam College of Engineering and Technology,  
 Pollachi - 642 003, Coimbatore District, Tamilnadu.



**Programme: B.E Electronics and Instrumentation 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			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1101	Matrices and Calculus	3	1	0	3	100	AU,CE,EC,EE, EI,ME & MC
19ENHG2101	Communication Skills – I	2	0	2	4	100	All
19CHBC2001	Chemistry for Electrical Sciences	3	0	2	4	100	EC,EE &EI
19EISN2101	Fundamentals of Instrumentation Engineering	3	0	2	4	100	-
19MESC2001	Introduction to Engineering	2	0	2	3	100	AU,EC,EE,EI, ME& MC
19PSHG6001	Wellness for Students*	0	0	2	-	-	All
<b>Total</b>		<b>13</b>	<b>1</b>	<b>10</b>	<b>18</b>	<b>500</b>	

**Semester II (2020 Batch)**

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19ENHG2201	Communication Skills - II	2	0	2	3	100	All
19MABC1201	Ordinary Differential Equations and Complex Variables	3	1	0	4	100	AU,CE,EC,EE, EI,ME&MC
19PHBC2001	Physics for Electrical Sciences	3	0	2	4	100	EC,EE&EI
19EISN1201	Electric Circuit Analysis	3	1	0	4	100	-
19CSSC2001	C Programming	3	0	2	4	100	AU,CE,EC,EE EI,ME&MC
19MESC4001	Engineering Drawing	1	0	3	2.5	100	AU,ME,MC,PR, EC,EI
19PSHG6001	Wellness for Students*	0	0	2	1	100	All
19CHMG6201	Environmental Sciences	1	0	0	-	100	All
<b>Total</b>		<b>16</b>	<b>2</b>	<b>11</b>	<b>22.5</b>	<b>800</b>	

\* Annual Pattern

Passed in Board of Studies meeting

BOS Convener 

Approved in Academic Council meeting

BOS Chairman 

Head of the Department,  
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 Dr. Mahalingam College of Engineering and Technology,  
 Pollachi - 642 003, Coimbatore District, Tamilnadu.





### 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
19EICN1301	Electron Devices and Circuits	3	0	0	3	100	-
19EICN1302	Electrical Machines and Measurements	3	0	0	3	100	-
19EECC2301	Digital Electronics	3	0	2	4	100	EE,EI
19EICN2301	Sensors and Transducers	3	0	2	4	100	-
19EICN3301	Electron Devices and Circuits Laboratory	0	0	3	1.5	100	-
19EICN3302	Electrical Machines and Measurements Laboratory	0	0	3	1.5	100	-
XXXXXXXXXX	One Credit Course	0	0	2	1	100	-
<b>Total</b>		<b>18</b>	<b>3</b>	<b>12</b>	<b>22</b>	<b>900</b>	

### 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
19EICN1401	Linear Integrated Circuits	3	0	0	3	100	-
19EICN1402	Signals and Systems	3	1	0	4	100	-
19EICN2401	Industrial Instrumentation	3	0	2	4	100	-
19CSSC2401	Data Structures and Algorithms	2	0	2	3	100	EE
19EICN3401	Signal Conditioning Laboratory	0	0	4	2	100	-
XXXXXXXXXX	One Credit Course	0	0	2	1	100	-
19PSHG6002	Universal Human Values-2: Understanding Harmony	2	1	0	3	100	All
19EIPN6401	Mini-Project	0	0	4	2	100	All
<b>Total</b>		<b>14</b>	<b>2</b>	<b>14</b>	<b>26</b>	<b>800</b>	<b>-</b>

Course Code	Course Title	Duration	Credits	Marks
19EIPN6001	Internship or Skill Development*	2 Weeks	1	100

\*Refer to clause: 4.8 in UG academic regulations 2019

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 BOS Chairman

Head of the Department,  
 Department of Electronics and Instrumentation Engineering,  
 Dr. Mahalingam College of Engineering and Technology,  
 Polacchi - 642 005, Coimbatore District, Tamilnadu.

### Semester V

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19EICN1501	Control System	3	1	0	4	100	-
19EICN1502	Microprocessor and Microcontroller	3	0	0	3	100	-
19CSSN2502	Object Oriented Programming	3	0	2	4	100	-
XXXXXXXXXX	Professional Elective – I	3	0	0	3	100	-
XXXXXXXXXX	Open Elective – I	3	0	0	3	100	-
XXXXXXXXXX	Online Course - I	3	0	0	3	100	-
19EICN3501	Microprocessor and Microcontroller Laboratory	0	0	3	1.5	100	-
19EICN3502	Control System Laboratory	0	0	3	1.5	100	-
19PSHG6501	Employability Skills	0	0	2	1	100	-
<b>Total</b>		<b>17</b>	<b>0</b>	<b>9</b>	<b>24</b>	<b>800</b>	<b>-</b>

### Semester VI

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19EICN1601	Process Control	3	0	0	3	100	-
19EICN1602	Embedded System Design	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – II	3	0	0	3	100	-
XXXXXXXXXX	Open Elective – II	3	0	0	3	100	-
XXXXXXXXXX	Online Course - II	3	0	0	3	100	-
19EICN3601	Process Control Laboratory	0	0	3	1.5	100	-
19EICN3602	Embedded and IoT Laboratory	0	0	3	1.5	100	-
	Innovative and Creative Project	0	0	4	2	100	-
	Career Planning and Guidance	0	0	2	1	100	-
<b>Total</b>		<b>15</b>	<b>0</b>	<b>12</b>	<b>21</b>	<b>900</b>	<b>-</b>

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

\*Refer to clause: 4.8 in UG academic regulations 2019

Passed in Board of Studies meeting: 10.04.2021

Approved in Academic Council meeting: 10.04.2021

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BOS Chairman

### Semester VII

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19EICN1701	Machine Learning	3	0	2	4	100	-
19EICN1702	Industrial Automation System	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – III	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – IV	3	0	0	3	100	-
XXXXXXXXXX	Open Elective – III	3	0	0	3	100	-
19EICN3701	Industrial Automation Laboratory	0	0	3	1.5	100	
<b>Total</b>		<b>15</b>	<b>0</b>	<b>5</b>	<b>17.5</b>	<b>600</b>	<b>-</b>

### Semester VIII

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

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

\*Refer to clause: 4.8 in UG academic regulations 2019

Semester	I	II	III	IV	V	VI	VII	VIII	Total Credits
<b>Credits</b>	18	22.5	22	27	24	22	17.5	12	<b>165</b>

Passed in Board of Studies meeting: 10.04.2021

Approved in Academic Council meeting: 10.04.2021

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### Professional Electives

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
<b>Electronics Engineering</b>							
19EIEN1001	Industrial Data Communication Networks	3	0	0	3	100	
19EIEN1002	Digital Signal Processing	3	0	0	3	100	
19EIEN1003	VLSI Design	3	0	0	3	100	
19EIEN1004	Automotive Electronics	3	0	0	3	100	
19EIEN1005	Image and Video Processing	3	0	0	3	100	
<b>Sensors and Instrumentation Engineering</b>							
19EIEN1006	Modern Electronic Instrumentation	3	0	0	3	100	
19EIEN1007	Fiber Optics and Laser Instrumentation	3	0	0	3	100	
19EIEN1008	Smart and Wireless Instrumentation	3	0	0	3	100	
19EIEN1009	Bio Medical Instrumentation	3	0	0	3	100	
19EIEN1010	Analytical Instrumentation	3	0	0	3	100	
19EIEN1011	Automobile and Aircraft Instrumentation	3	0	0	3	100	
19EIEN1012	Agricultural Instrumentation	3	0	0	3	100	
19EIEN1013	Instrumentation System Design	3	0	0	3	100	
<b>Control and Automation</b>							
19EIEN1014	Thermal and Fluid Mechanics	3	0	0	3	100	
19EIEN1015	Power Electronics and Drives	3	0	0	3	100	
19EIEN1016	Non-Linear Control System	3	0	0	3	100	
19EIEN1017	Digital Control Engineering	3	0	0	3	100	
19EIEN1018	Fluid Power System	3	0	0	3	100	
19EIEN1019	Robotics and Automation	3	0	0	3	100	
19EIEN1020	Power Plant Instrumentation	3	0	0	3	100	
19EIEN1021	Instrumentation in Process Industries	3	0	0	3	100	
19EIEN1022	Industrial safety and standards	3	0	0	3	100	
19EIEN1023	Industrial Internet of Things	3	0	0	3	100	
<b>Software Engineering</b>							

Passed in Board of Studies meeting: 10.04.2021

Approved in Academic Council meeting: 10.04.2021

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19EIEN1024	Python Programming	3	0	0	3	100	
19EIEN1025	Data Analytics	3	0	0	3	100	
19EIEN1026	Database Management	3	0	0	3	100	
<b>Management</b>							
19EIEN1027	Disaster Management	3	0	0	3	100	
19EIEN1028	Engineering Economics and Cost Analysis	3	0	0	3	100	
19EIEN1029	Principles of Management	3	0	0	3	100	
19EIEN1030	Total Quality Management	3	0	0	3	100	

### Open Electives

Course Code	Course Title	Hours/Week			Credits	Marks
		L	T	P		
19EIOC1001	Industrial Measurement Systems	3	0	0	3	100
19EIOC1002	Electronics System Design	3	0	0	3	100
19EIOC1003	Industrial Internet of Things	3	0	0	3	100
19EIOC1004	Smart Sensor Technology	3	0	0	3	100
19EIOC1005	Factory Automation	3	0	0	3	100
19EIOC1006	Internet of Medical Things	3	0	0	3	100
19EIOC1007	Virtual Instrumentation	3	0	0	3	100

Passed in Board of Studies meeting: 10.04.2021

Approved in Academic Council meeting: 10.04.2021

BOS Convener

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# **Regulations 2019**

**Detailed Syllabi for semester  
I to VI**





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
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

Passed in Board of Studies meeting

  
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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

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

### 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
<b>Total</b>	<b>100</b>	

### Non-letter Grades

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

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BOS Convener

Approved in Academic Council meeting

BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 693, Coimbatore District, Tamilnadu.



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. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> edition, John Wiley & Sons, 2006.  
T2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.  
T3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw-Hill, New Delhi, 11<sup>th</sup> Reprint, 2010.

#### Reference Book(s):

- R1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9<sup>th</sup> edition, Pearson, Reprint, 2002.  
R2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publication, Reprint, 2008.  
R3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36<sup>th</sup> Edition, 2010.

#### Web References:

- [https://onlinecourses.nptel.ac.in/noc16\\_ma05](https://onlinecourses.nptel.ac.in/noc16_ma05)
- <https://nptel.ac.in/courses/122101003/2>
- <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

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### 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

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

### 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.

### Unit IV Writing

**15 Hours**

Writing Simple 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.

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Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

**List of Tasks:**

1. BEC Preliminary Listening Test-1 & 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	Cognitive Level
At the end of this course, students will be able to:	
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, 2<sup>nd</sup> Edition, 2014
- T2. Wood Ian, Williams Anne, Cowper Anna, Pass Cambridge BEC Preliminary, Cengage Learning, 2<sup>nd</sup> 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, 2<sup>nd</sup> Edition, CUP 2000.
- 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](https://www.northshore.edu/support_centre /pdf/listen-notes.pdf)
3. [http://www.examenglish.com/BEC/BEC\\_Vantage.html](http://www.examenglish.com/BEC/BEC_Vantage.html)- Jan 23, 2018

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



### Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
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
<b>Total</b>				<b>100</b>

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



**Unit V Synthesis and Applications of Nano 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  $\text{Fe}^{2+}$  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. Determination of strength of strong acid by conductance measurement

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 nanomaterials	Understand

**Text Book(s):**

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

T2. Wiley Engineering Chemistry, 2<sup>nd</sup> Edition, Wiley India Pvt. Ltd. New Delhi, 2011.

**Reference Book(s):**

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

R2. S. S. Dara, S. S. Umare "A text book of Engineering Chemistry" 12<sup>th</sup> 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 Board of Studies meeting

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Palani - 642 004, Coimbatore District, Tamilnadu.

**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
<b>Continuous Assessment</b>	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
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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BOS ChairmanHead of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code:19EISN2101</b>		<b>Course Title: Fundamentals of Instrumentation Engineering</b>	
<b>Course Category: Engineering Sciences</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)</b> 3 : 0: 2	<b>Credits:4</b>	<b>Total Contact Hours:75</b>	<b>Max Marks:100</b>

**Pre-requisites**

- Nil

**Course Objectives**

The course is intended for the learners to:

1. Explain the basics of electrical quantities and electrical devices
2. Describe the Electronics components
3. Elucidate the units and standards for measurement
4. Explain the Instrumentation system
5. Explain the basic control structure

**Unit I Basics of Electrical Components and Circuits 9 Hours**

Definition of electrical quantities: Charge, Resistivity, Conductivity, Resistance, inductance, capacitance, Voltage, current, Power, Power factor, Energy - AC & DC circuits – Relays and types – Contactors – Solenoids

**Unit II Basics of Electronic Components and Circuits 9 Hours**

Semiconductors – Energy band – Diodes – LED – LDR – Solar cell – Zener diode as voltage regulator – Rectifiers – AC ripple filters - Transistors as Amplifier and switch.

**Unit III Fundamentals of Measurements 9 Hours**

S.I Units and Standards –IEEE and ISA Standards – Unit conversion – Instrument signal levels: Current, voltage and pressure - Calibration – Types of errors – Recorders - Indicators – MC & MI Instruments

**Unit IV Basics of Instrumentation System 9 Hours**

Block diagram of Instrumentation systems - Sensors and Transducers - Classification of Transducers – Signal conditioning circuits – Analog signal to digital conversion – Digital processing unit – Digital to Analog signal Conversion

**Unit V Applications of Control and Instrumentation 9 Hours**

Block diagram of open loop and closed loop system - Open loop system: Electronic weighing scale: Block diagram – Sensing system – Processor – Display System – Closed loop system: Temperature control system: Closed loop structure – Sensing system – controller – Heater driving system – Temperature display.

**List of Experiments: 30 Hours**

1. Serial and parallel circuit (Resistance connection)
2. Electrical wiring (Two switch or simple house wiring)
3. Power supply (AC-DC)

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4. Soldering electronic components (Dot PCB board soldering)
5. Testing and calibration Measuring instruments (Function generator, CRO, etc)
6. RTD based Temperature measurement (Simple potential divider circuit)

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explicate the electrical components and device operation	Understand
CO2: Elucidate the electronic components for device development	Understand
CO3: Summarize the units and standards for measurement	Understand
CO4: Illuminate the structure of Instrumentation system	Understand
CO5: Describe the operation of open and feedback system	Understand

**Text Book(s):**

- T1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 8<sup>th</sup> edition, New Delhi, 2013.
- T2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", 2<sup>nd</sup> Edition, McGraw Hill, 2013.
- T3. William Bolton, "Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering", 5<sup>th</sup> Edition, PHI, 2013.

**Reference Book(s):**

- R1. Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999.
- R2. Jegatheesan, R., "Analysis of Electric Circuits," McGraw Hill, 2015.
- R3. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, McGraw- Hill, New Delhi, 2010.
- R4. M E Van Valkenburg, "Network Analysis", Prentice-Hall of India Pvt Ltd, New Delhi, 2015.
- R5. Sedra and Smith, Microelectronic Circuits, Oxford University Press, 2004.

**Web References:**

1. <https://nptel.ac.in/courses/117103063/>
2. <https://nptel.ac.in/courses/112103174/3>
3. <https://nptel.ac.in/courses/101108056/module7/lecture13.pdf>

**Course Articulation Matrix**

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu,

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				

High-3; Medium-2; Low-1

### Assessment pattern

	Assessment Component	CO .No.	Marks	Total
<b>Continuous Assessment</b>	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
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

Course Code:19MESC2001	Course Title: Introduction to Engineering (Common to AU, ME, PR, MC, EE, EC and 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 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,

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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 Spirit 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.

Course Outcomes	Cognitive Level
<b>At the end of this course, students will be able to:</b>	
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, 5<sup>th</sup> Edition, 2013.

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

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

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Pottachi - 642 003, Coimbatore District, Tamilnadu.

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; 4<sup>th</sup> Edition 2011.

**Web References:**

1. [https://en.wikibooks.org/General\\_Engineering\\_Introduction/Engineering\\_Science](https://en.wikibooks.org/General_Engineering_Introduction/Engineering_Science)
2. <https://science.howstuffworks.com/engineering-channel.html>

**List of RiaLab 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

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Head of the Department,  
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Pollachi - 642 003, Coimbatore District, Tamilnadu.

### 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
<b>Total</b>				<b>100</b>

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 050, Coimbatore District, Tamilnadu.

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

#### 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

#### 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

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Manalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

Course Outcomes:	Cognitive/ Affective
At the end of this course, students will be able to:	
CO1: Identify the strengths, weaknesses and opportunities	Apply
CO2: Set well-articulated goals for academics, career, and personal aspirations	Apply
CO3: Establish the road map to realize the goals	Apply
CO4: Apply time management techniques to complete planned tasks on time	Apply
CO5: Create time and pursue activities of self-interest that add value	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 U.K, Aug 1997.  
R2. Sean Covey, "Seven habits of highly effective teenagers", Simon & Schuster U.K, 2004.

**Course offering**

Orientation programme (2 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

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BOS Convener

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pottaschi - 642 603, Coimbatore District, Tamilnadu.

## Semester - II

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

- 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.

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

**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, 2<sup>nd</sup> 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, 3<sup>rd</sup> Edition, 2013.

**Web References:**

1. <http://www.grammarinenglish.com> - Jan 23, 2018
2. [https://www.northshore.edu/support\\_centre/pdf/listen-notes.pdf](https://www.northshore.edu/support_centre/pdf/listen-notes.pdf)
3. [http://www.examenglish.com/BEC/BEC\\_Vantage.html](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

Passed in Board of Studies meeting

BOS Convener 

Approved in Academic Council meeting

BOS Chairman 

Head of the Department,  
 Department of Electronics and Instrumentation Engineering,  
 Dr. Mahalingam College of Engineering and Technology,  
 Pollachi - 642 603, Coimbatore District, Tamil Nadu.

### 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
<b>Total</b>				<b>100</b>

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BOS Convener

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



Course Code: 19MABC1201	Course Title: Ordinary Differential Equations and Complex Variables (Common to AU, ME, PR, CE, MC, EE, EC and 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

- 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, Gauss and 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

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Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 006, Coimbatore District, Tamilnadu.

**Unit V Laplace Transform****12 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. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> edition, John Wiley & Sons, 2006.
- T2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- T3. Ramana B.V., higher Engineering Mathematics, Tata McGraw-Hill, New Delhi, 11<sup>th</sup> Reprint, 2010.

**Reference Book(s):**

- R1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9<sup>th</sup> edition, Pearson, Reprint, 2002.
- R2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publication, Reprint, 2008.
- R3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36<sup>th</sup> Edition, 2010.

**Web References:**

- [https://onlinecourses.nptel.ac.in/noc16\\_ma05](https://onlinecourses.nptel.ac.in/noc16_ma05)
- <https://nptel.ac.in/courses/122101003/2>
- <https://nptel.ac.in/courses/111105035/22>

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### 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
<b>Total</b>				<b>100</b>

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



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 specific resistance of the given material using Carey foster's bridge.
4. Determination of Dielectric constant of a given material.
5. Determination of inductance using Maxwell's bridge.
6. Determination of wavelength of the given light source using spectrometer.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
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, 8<sup>th</sup> Edition, 2011.
- T2.M.N.Avadhanulu and P.G.Kshirsagar, "Text Book of Engineering Physics", S. Chand & Company Ltd., New Delhi, 2014.
- T3.W. H. Hayt and John A. Buck, "Engineering Electromagnetics", Tata McGraw Hill, New Delhi. 6<sup>th</sup> 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, 5<sup>th</sup> 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. 5<sup>th</sup> Edition, 2010.

**Web References:**

1. <http://openems.de/start/index.php>

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

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				

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

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code:19EISN1201</b>	<b>Course Title: Electric Circuit Analysis</b>		
<b>Course Category: Engineering Science</b>	<b>Course Level: Introductory</b>		
<b>L:T:P(Hours/Week) 3:1: 0</b>	<b>Credits: 4</b>	<b>Total Contact Hours: 60</b>	<b>Max Marks:100</b>

### Pre-requisites

- Nil

### Course Objectives

The course is intended to:

1. Analyze DC circuits
2. Analyze AC circuits
3. Analyze resonance and coupled circuits
4. Analyze three phase circuits
5. Determine transient response of the circuit

### Unit I D.C. Circuit Analysis

**9+ 3 Hours**

Ohm's law – Ideal voltage and current sources – Independent sources – Dependent sources– Circuit elements – Kirchhoff's Laws – Voltage and Current division in series and parallel circuits, Network reduction – Mesh and Nodal analysis with voltage and current sources – Circuit theorems:- Superposition, Thevenin's, Norton's Reciprocity and Maximum Power Transfer – Source transformation – Y- $\Delta$  transformation .

### Unit II A.C. Circuit Fundamentals and Analysis

**9 + 3 Hours**

Sinusoidal voltage and current – RMS value – Form factor – Phasor representation of sinusoidal of voltages –Current and voltage relationship in R, L, and C circuits – Impedance and admittance, power factor concepts in RC, RL and RLC circuits – Impedance combinations– Real power, reactive power, complex power, apparent power – Analysis of simple series and parallel circuits.

### Unit III Resonance and Coupled Circuits

**9 + 3 Hours**

Resonance in parallel and series circuits – Half power frequencies – Bandwidth and Q factor of Resonant circuits – Mutual Inductance – Dot convention – Coefficient of coupling – Sinusoidal steady state analysis of network with coupled inductance.

### Unit IV Three- Phase Circuit Analysis

**9 + 3 Hours**

Three-phase balanced and unbalanced voltage sources – Three - phase balance and unbalanced loads – Line voltage and phase voltage – Phasor diagram and Power in three-phase circuit – Three - phase circuit analysis with star and delta balanced and unbalanced loads

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Pollachi - 642 033, Coimbatore District, Tamilnadu.

– Phasor diagram – Power and power factor measurement in three-phase circuits.

**Unit V Transient Analysis and Two Port Networks**

**9 + 3 Hours**

Source free RC and RL Circuit responses – Step response of RC and RL circuits – source free RLC series and parallel circuit responses – Step responses of RLC series and parallel circuits– Responses of RC, RL and RLC series circuits to sinusoidal excitation. **Two Port Networks:** One-port and two-port networks, driving point impedance and admittance, open and short circuit parameters. Interconnection of Two port networks T and  $\pi$  representations.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1:Analyze DC circuits using circuit reduction techniques and network theorems.	Analyze
CO2:Analyze AC circuits using circuit reduction techniques and network theorems.	Analyze
CO3:Determine circuit parameters in resonance ad coupled circuits.	Analyze
CO4:Analyze three phase circuit behavior with balanced and unbalanced three phase loads.	Analyze
CO5:Determine transient and steady state response of RL, RC and RLC circuit with step input and sinusoidal input.	Analyze

**Text Book(s):**

- T1.Edminister, J.A. and Nahvi, M., “Electric Circuits”, 4<sup>th</sup>Edition, Schaum’s Outline series, McGraw-Hill, 2002.
- T2.Husain, A., “Networks and Systems”, Khanna Publishers, 2000.

**Reference Book(s):**

- R1.Charles K. Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, 2<sup>nd</sup>Edition, McGraw Hill, 2013.
- R2.Joseph A. Edminister, MahmoodNahri, “Electric circuits”, Schaum’s series, McGraw- Hill, New Delhi, 2010.
- R3.Boylsted, R.L., “Essentials of Circuit Analysis”, Prentice Hall, 2003.
- R4.Hayt, Jr.W.H.,Kemmerly, J.E., and Durbin, S.M., “Engineering Circuit Analysis”, TataMcGraw-Hill, 2002.

**Web References:**

- 1.<https://nptel.ac.in/courses/108102097/3>
- 2.<https://nptel.ac.in/courses/108102042/>
- 3. <https://nptel.ac.in/downloads/108105053/>

**Course Articulation Matrix**

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



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

High-3; Medium-2;Low-1


### Assessment pattern

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

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

Course Code:19CSSC2001	Course Title: C Programming (Common to AU, CE, ME, MC, PR, EE, EC and EI)		
Course Category: Engineering Sciences		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 and Flow 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.

#### 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)

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Dr. Mahalingam College of Engineering and Technology,  
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- 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

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 givenscenario	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", 3<sup>rd</sup>Edition, Pearson Education, 2015.

**Reference Book(s):**

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

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


R3.Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", 2<sup>nd</sup>Edition, Oxford University Press,2013.

**Web References:**

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

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		1				
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

### 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
<b>Total</b>				<b>100</b>

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

Course Code: 19MESC4001	Course Title: Engineering Drawing (Common to AU, ME, PR, MC, CS, IT, EC and EI)		
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.

**Unit V Isometric Projection 12 Hours**

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

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Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
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, 7<sup>th</sup> Edition, 2017.
- T2.Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, Gujarat, 53<sup>rd</sup> Edition, 2015.
- T3.K. V. Natrajan, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 48<sup>th</sup> Edition, 2018.

**Reference Book(s):**

- R1.BasantAgarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill India, New Delhi, 2<sup>nd</sup> Edition, 2013.
- R3.John K.C., "Engineering Graphics", PHI Learning, Delhi, 1<sup>st</sup> Edition, 2009.
- R4.Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" TataMcGraw India, New Delhi, 3<sup>rd</sup> Edition, 2008.

**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](https://en.wikipedia.org/wiki/Engineering_drawing)

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BOS Chairman

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	2	1	2	2					2	2				
CO2	2	1	2	2					2	2				
CO3	2	1	2	2					2	2				
CO4	2	1	2	2					2	2				
CO5	2	1	2	2					2	2				

High-3; Medium-2; Low-1

### Assessment pattern

	Assessment Component	CO .No.	Marks	Scale To
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	
<b>Total</b>				100

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Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Palasani - 642 003, Coimbatore District, Tamilnadu.

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

### 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 Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollechi - 642 003, Coimbatore District, Tamilnadu.



#### Unit IV Practices for mental wellness

Meditation: Mind and its functions – mind wave frequency – Agna, Thuriyam and Shanthy 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	Cognitive/ Affective
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	Understand
CO2: Explain the dimensions of wellness and practices that can promote wellness	Understand
CO3: Demonstrate the practices that can promote wellness	Respond
CO4: Sense and improve the wellness periodically and its impact on personal Effectiveness	Value
CO5: Maintain harmony with self, family, peers, society and nature	Internalize

#### 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 Intuition 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 Board of Studies meeting

  
BOS Convener

Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Muthaiah College of Engineering and Technology,  
Pollachi-642 003, Coimbatore District, Tamilnadu.

**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					
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
<b>Continuous Assessment</b>	<b>Yoga:</b> Physical Exercises, KayaKalpa	1,2,3,4,5	15	75
	Meditation		15	
	Assessment of student's workbook		10	
	<b>Sports:</b> Physical Exercises, KayaKalpa		20	
<b>End Semester Examination</b> (combined for yoga and sports)	Assessment of student's workbook	1,2,3,4,5	15	Marks out of 100 is reduced to 25
	Written test (MCQ and short answers)		30	
	Physical exercises		50	
	Viva-voce		20	
			<b>Total</b>	100

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BOS Convener

Approved in Academic Council meeting

BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

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

**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

**Unit III Practices for Physical Wellness**

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

**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.

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BOS Convener

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Manganam College of Engineering and Technology,  
Polkani - 642 005, Coimbatore District, Tamilnadu.

#### 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.
- R3. Vethathiri Maharishi Institute for Spiritual and Intuition 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).

Passed in Board of Studies meeting

BOS Convener

Approved in Academic Council meeting

BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### 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
<b>Continuous Assessment</b>	Personal Effectiveness	1,2,5	35	75
	Yoga and physical Exercise:	3,4,5	20	
	Physical Exercises			
	Meditation			
	Assessment of student's workbook		10	
<b>End Semester Examination</b>	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	
			<b>Total</b>	100

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BOS Convener

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

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 Awareness

2 Hours

Public awareness - Environment and human health

#### Unit V Environmental Activities

7 Hours

##### (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

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Pollachi - 642 603, Coimbatore District, Tamilnadu.

**(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.

**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

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Jyothibai College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### 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
<b>Total</b>	<b>100</b>	

### Non-letter Grades

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

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.





**Unit V Orthogonality 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	Cognitive Level
At the end of this course, students will be able to:	
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):**

T1.Grewal, B.S. and Grewal, J. S., "Numerical Methods in Engineering and Science", Eleventh Edition, Khanna Publishers, New Delhi, 2013.

T2.David C Lay, "Linear Algebra and its Applications", 5<sup>th</sup> Edition, Pearson Education, 2015.

**Reference Book(s):**

R1.Gerald, C. F. and Wheatley, P. O., "Applied Numerical Analysis", Seventh Edition, Pearson Education Asia, New Delhi, 2006.

R2.Jain M. K., Iyengar, S. R. and Jain, R. K, "Numerical Methods for Scientific and Engineering Computation", New Age Publishers, 2012.

R3.Sastry.S.S "Introductory Methods of Numerical Analysis", 4<sup>th</sup> Edition, PHI, 2010.

R4.Gilbert Strang, "Linear algebra and its Applications", 4th 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/>

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### 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 Evaluation	Comprehensive	CCET I	1,2	50	30
		CCET II	3,4	50	
		CCET III	5	50	
		Tutorials	1,2,3,4,5	30	10
		Quiz	1,2,3,4,5		
		Assignments	1,2,3,4,5		
End Semester Examination		ESE	1,2,3,4,5	100	60
Total					100

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pottachi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN1301</b>		<b>Course Title: Electron Devices and Circuits</b>	
<b>Course Category: Professional Core</b>		<b>Course Level: Practice</b>	
<b>L:T:P(Hours/Week)</b> 3: 0: 0	<b>Credits: 3</b>	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

### Pre-requisites

➤ NIL

### Course Objectives

The course is intended to:

1. Explain the operation of Transistors.
2. Explain the operation of Transistor as amplifiers.
3. Explain the structure and applications of thyristors and special diodes
4. Explain the concept of Feedback amplifiers and oscillators
5. Explain the function of wave shaping circuits and multivibrators

### Unit I      **TRANSISTORS** **9 Hours**

BJT, JFET, MOSFET- structure, operation, characteristics -Transistor Biasing

### Unit II      **AMPLIFIERS** **9 Hours**

BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response – FET small signal model, Differential Amplifier, Multistage amplifier- Two stage RC coupled Amplifier, Tuned amplifier -Gain and Frequency Response.

### Unit III      **THYRISTORS AND SPECIAL DIODES** **9 Hours**

UJT, SCR, TRIAC, DIAC, IGBT -structure and characteristics, Schottky barrier diode-Varactor diode –Tunnel diode- LASER diode

### Unit IV      **FEEDBACK AMPLIFIERS AND OSCILLATOR** **9 Hours**

Advantages of negative feedback – voltage / current, series, Shunt feedback –positive feedback –Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators.

### Unit V      **WAVE SHAPING CIRCUITS and MULTIVIBRATOR** **9 Hours**

Wave shaping circuits-Differentiator -Integrator- Diode Clipper -Clampers-Multivibrators-Schmitt trigger.

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Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Explain the structure, characteristics and biasing of BJT and FET.	Understand
CO2: Determine Frequency Response and gain of BJT, FET and multistage amplifiers.	Understand
CO3: Illustrate the current voltage characteristics of UJT, thyristors and special diodes.	Understand
CO4: Analyze Feedback amplifiers and different oscillators for different frequency	Apply
CO5: Design different wave shaping circuits and multivibrators.	Apply

#### Text Book(s):

T1. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5th Edition, 2010.

T2. Robert L. Boylestad, "Electronic Devices and Circuit Theory", 11<sup>th</sup> Edition, Pearson prentice hall, 2015.

#### Reference Book(s):

R1. Balbir Kumar, Shail.B.Jain, "Electronic devices and circuits" PHI learning private limited, 2nd Edition, 2014.

R2. Thomas L. Floyd, "Electronic devices" Conventional current version, Pearson prentice hall, 10<sup>th</sup> Edition, 2017.

R3. J. Millman, C.C. Halkias, and SatyabrathaJit "Electronic Devices and Circuits", Tata McGraw Hill, 2nd Edition, 2008.

R4. Robert L. Boylestad, "Electronic Devices and Circuit Theory", 11<sup>th</sup> Edition, Pearson prentice hall, 2015.

#### Web References:

1. <https://nptel.ac.in/courses/122106025/>
2. <https://nptel.ac.in/courses/117103063/>

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Techn. 1997,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

### Web References:

1. <https://nptel.ac.in>
2. <https://qualifygate.com>
3. <https://www.electrical4u.com>

### Course Articulation Matrix

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

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BOS Convener

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. J. J. Subramanian College of Engineering and Technology,  
Pellur - 642 003, Coimbatore District, Tamilnadu.

Measurement of three phase power - 3 wire and 4 wire supply- single phase and three phase energy meter - theory and Adjustments.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Summarize the characteristics of different types of DC Machines and starters.	Understand
CO2: Summarize the characteristics of different types of AC Machines and starters.	Understand
CO3: Explain the principles and operation of transformers and special machines.	Understand
CO4: Select a suitable instrument for measurement of voltage, current, R, L and C	Apply
CO5: Select a suitable method for the measurement of power and energy in single and three phase circuits.	Apply

**Text Book(s):**

- T1.Nagrath, I.J., and Kothari, D.P., "Electrical Machines", 4th Edition, Tata McGraw - Hill, 2016.
- T2.R.B. Northrop, Introduction to Instrumentation and Measurements, 3rd Edition, Taylor & Francis, New Delhi, 2017
- T3.J.J. Carr, Elements of Electronic Instrumentation and Measurement, Pearson Education India, New Delhi, 2011 (Ref)
- T4.H.S. Kalsi, Electronic Instrumentation, Tata McGraw-Hill, New Delhi, 2010 (Ref)


**Reference Book(s):**

- R1. Theraja, B.L., "A Text book of Electrical Technology", Vol.II, S.C Chandand Co., New Delhi, 2007. (Text Book)
- R2. A.K. Sawhney, A Course in Electrical & Electronic Measurements & Instrumentation, Dhanpat Rai and Co, New Delhi, 2010 (Text Book)
- R3. Bell, A.D., "Electronic Instrumentation and Measurements", 3rd Edition, Oxford University Press India, 2013.

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BOS Convener

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN1302</b>	<b>Course Title: Electrical Machines and Measurements</b>		
<b>Course Category: Professional Core</b>		<b>Course Level: Practice</b>	
<b>L:T:P(Hours/Week) 3: 0: 0</b>	<b>Credits:3</b>	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

### Pre-requisites

➤ NIL

### Course Objectives

The course is intended to:

1. Summarize the operation and characteristics of types of DC Machine.
2. Demonstrate the different types of induction motor.
3. Explain the construction and working of meters used to measure current, voltage, Resistance, Inductance and capacitance.
4. Explain the construction and working of measurement techniques for power and energy.
5. Elaborate the construction and working of potentiometer and instrument transformers.

### Unit I D.C. Machines

**9 Hours**

Construction of D.C. Machines - Principle of operation of D.C. generator -EMF equation -Various excitation schemes- Characteristics of D.C. generators- Principle of operation of D.C. motor- Types-Torque equation -Characteristics-Starters:3 point and 4 point starters

### Unit II A.C. Machines

**9 Hours**

Three phase Induction motor: principle of operation, Types- Starting methods and Speed control. Single phase induction motors: Double field revolving theory- Types - Capacitor start capacitor run motors

### Unit III Transformers and Special Machines

**9 Hours**

Transformers: Principle, Construction, EMF Equation and Equivalent Circuit – Instrument Transformer: - C.T and P.T construction, theory and operation  
Stepper motor-Servo Motors – BLDC

### Unit IV Measurement of Electrical Parameters

**9 Hours**

Types of ammeters and voltmeters – PMMC Instruments – Moving Iron Instruments – Dynamometer type Instruments – bridges for measurement of R, L and C - Wheatstone bridge, Kelvin double bridge, Maxwell bridge, Wein bridge, Schering bridge

### Unit V Power and Energy Measurements

**9 Hours**

Electrodynamic type wattmeter – Theory and its errors– LPF wattmeter– Phantom loading –

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pottachi - 642 003, Coimbatore District, Tamilnadu.



### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1		1	1			2		2				
CO2	1	1		1	1			2		2				
CO3	1	1		1	1			2		2				
CO4	2	1		2	2			2		2				
CO5	2	1		2	2			2		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
<b>Total</b>				<b>100</b>

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Poliachi - 642 083, Coimbatore District, Tamilnadu.

Course Code: 19EECC2301	Course Title: Digital Electronics (Common to EE and EI)		
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

- Fundamental of Instrumentation Engineering

### Course Objectives

The course is intended to:

1. Illustrate the number systems, Boolean laws and simplification techniques
2. Design Combinational circuits
3. Design synchronous sequential circuits
4. Design asynchronous sequential circuits
5. Examine the various memory devices, shift registers and logic families

### Unit I Number System and Boolean Algebra 9 Hours

Review of Number Systems - Complements: 1's and 2's - Arithmetic operation of Signed binary numbers - Boolean Algebra: Basic theorems, Simplification of Boolean functions, Representation of Boolean function in canonical and standard forms - Simplification of Boolean expressions using K maps and Quine Mccluskey method.

### Unit II Combinational Circuits 9 Hours

Basic Gates, Universal gate implementation, Design of Adder, Subtractor, Comparators, Code converters, Encoders, Decoders, Multiplexers, Demultiplexers- Function realization using multiplexer.

### Unit III Synchronous Sequential Circuits 9 Hours

Flip Flops: SR, JK, T, D- Level and Edge Triggering- Analysis of Synchronous sequential circuits - Design of Synchronous sequential circuits with state diagram, state table, state reduction and state assignment - Design of counter.

### Unit IV Asynchronous Sequential Circuits 9 Hours

Analysis of Asynchronous Sequential Circuits - Design of Asynchronous sequential circuits with

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Pollachi - 642 003, Coimbatore District, Tamilnadu.

primitive flow table, State Reduction and State Assignment- Races, Cycles and Hazards: Static, Dynamic, Essential, Hazards Elimination.

**Unit V Memory Devices, Shift registers and Logic Families 9 Hours**

Memories: RAM, ROM, PROM, EPROM – FPGA - Shift registers – Ripple counters –  
Logic families: TTL, ECL, CMOS.

**Laboratory Component 30 Hours**

1. Simplification of Boolean Expression using K map and its implementation.
2. Design of full adder/ full subtractor using logic gates
3. Design of encoder/ decoder using logic gates
4. Design of multiplexer using logic gates
5. Design of basic flip flops
6. Design of shift registers

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Illustrate the number systems, Boolean laws and simplification techniques used in digital design	Understand
CO2: Design and realize the combinational circuits using logic gates	Apply
CO3: Design and construct synchronous sequential circuits using basic flip flops	Apply
CO4: Design asynchronous sequential circuits eliminating hazards and races	Apply
CO5: Explain the various memory devices, shift registers and logic families	Understand

**Text Book(s):**

T1. Morris Mano. M. Michael D Ciletti, "Digital Design", Pearson Education, 5th Edition, 2012.

T2. John F. Wakerly, Digital Design Principles and Practice, Pearson Education, 5th edition, 2018


**Reference Book(s):**

R1. Malvino and Leach, "Digital Principles and Applications", Tata McGraw Hill, New Delhi,

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BOS Chairman   
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pulachi - 642 003, Coimbatore District, Tamilnadu.

8th edition, 2014,

R2. S.Salivahanan and S.Arivazhagan, "Digital Circuits and Design", Oxford University Press, 5th edition, 2018.

R3.A.Anandkumar, Fundamentals of digital circuits, 4<sup>th</sup>Edition, PHI Learning Pvt.Ltd, 2016

R4. John M.Yarbrough, "Digital Logic, Application & Design", Thomson, 2010

R5. Donald D. Givone, "Digital Principles and Design", McGraw Hill Education,2017

### Web References:

1. <https://nptel.ac.in/courses/117105080/>

2. <https://nptel.ac.in/courses/117106086/>

### 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	1	-	1	1	-	-	1	2	3	-	1	2	-
CO2	2	1	-	2	2	-	-	1	2	3	-	1	2	-
CO3	2	1	-	2	2	-	-	1	2	3	-	1	2	-
CO4	2	1	-	2	2	-	-	1	2	3	-	1	2	-
CO5	1	1	-	1	1	-	-	1	2	3	-	1	2	-

High-3; Medium-2; Low-1

### Assessment Types planned for the course Digital Electronics

CO	Assessment Types	Indicators	POs Associated	PO mapping
CO1	CCET	Questions in Tests	PO8,PO10	PO8-1(L-1) PO9-2(M-2) PO10-3(H-3) PO12-1L-1
	Quiz #	Questions in Tests	PO12	
	Lab	Record/Observation Viva	PO9(2),PO10(2),	
CO2	CCET	Questions in Tests	PO8,PO10	PO8-1(L-1) PO9-2(M-2) PO10-3(H-3) PO12-1L-1
	Quiz #	Questions in Tests	PO12	
	Lab	Record/Observation Viva	PO9(2),PO10(2),	
CO3	CCET	Questions in Tests	PO8,PO10	PO8-1(L-1) PO9-2(M-2) PO10-3(H-3) PO12-1L-1
	Quiz #	Questions in Tests	PO12	
	Lab	Record/Observation Viva	PO9(2),PO10(2),	
CO4	CCET	Questions in Tests	PO8,PO10	PO8-1(L-1) PO9-2(M-2) PO10-3(H-3)
	Lab	Record/Observation Viva	PO9(2),PO10(2),	

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	Quiz #	Questions in Tests	PO12	PO12-1(L-1)
CO5	CCET	Questions in Tests	PO8,PO10	PO8-1(L-1)
	Quiz #	Questions in Tests	PO12	PO9-2(M-2)
	Lab	Record/Observation Viva	PO9(2),PO10(2),	PO10-3(H-3) PO12-1L-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

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Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
O. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



Cell – Accelerometer – Seismic instrument. LVDT: Displacement – Accelerometer. Inductive Type: Accelerometer. Resistive and Capacitive type Humidity and Moisture Measurement

**List of Experiments**

**30 Hours**

1. Plot the hysteresis curve for Load cell and strain gauge.
2. Plot the Characteristics of LVD1 and Capacitive type transducers.
3. Plot the Characteristics curve and step response curve of RTD.
4. Plot the Characteristics of Piezo electric and Hall Effect transducers.
5. Plot the hysteresis curve for torque sensor.
6. Measurement of Speed using optical transducer

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1.Analyse the static and dynamic characteristics of transducers.	Apply
CO2.Explain the principle and application of resistance transducers.	Understand
CO3.Describe the principle and application of variable inductance and capacitance transducers.	Understand
CO4.Illustrate the concept of special and digital type transducers.	Understand
CO5. Analyse the characteristics experimentally for different transducers.	Apply

**Text Book(s):**

- T1.John P. Bentley, Principles of Measurement Systems, III Edition, Pearson Education, 2015.
- T2.Doebelin E.O. and Manik D.N., Measurement Systems – Applications and Design, Special Indian Edition, Tata McGraw Hill Education Pvt. Ltd., 2017.

**Reference Book(s):**

- R1.D. Patranabis, Sensors and Transducers, 2nd edition, Prentice Hall of India, 2013. E.A
- R2.Neubert H.K.P., Instrument Transducers – An Introduction to their Performance and Design, Oxford University Press, Cambridge, 2013
- R3.W.Bolton, Engineering Science, Elsevier Newnes, 5th Edition, 2006


**Web References:**

1. nptel.ac.in/courses/112103174
2. http://nptel.ac.in/courses/108105064
3. http://nptel.ac.in/courses/112106140

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pelluratti - 642 003, Coimbatore District, Tamilnadu.

### 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	2			2	2
CO2	1	1		1	1			1	1	2			1	1
CO3	1	1		1	1			1	1	2			1	1
CO4	1	1		1	1			1	1	2			1	1
CO5	2	1		2	2			1	1	2			2	2

High-3; Medium-2; Low-1


### Assessment pattern

	Assessment Component	CO .No.	Marks	Total
<b>Continuous Assessment</b>	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
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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BOS Convener

Approved in Academic Council meeting

  
BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mabalagan College of Engineering and Technology,  
Pottai - 642 003, Coimbatore District, Tamilnadu.



<b>Course Code: 19EICN3301</b>	<b>Course Title: Electron Devices and Circuits Laboratory</b>		
<b>Course Category: Professional Core</b>	<b>Course Level: Practice</b>		
<b>L:T:P(Hours/Week)</b> 0: 0: 3	<b>Credits:</b> 1.5	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

### Pre-requisites

- NIL

### Course Objectives

The course is intended to:

1. Analyze the characteristics of Transistors and Thyristors
2. Analyze the characteristics of transistor amplifiers.
3. Design transistor based voltage regulator and logic gates
4. Analyze different oscillators.
5. Analyze the characteristics of different wave shaping circuits and multivibrator

### List of Experiments

1. Analyze the VI Characteristics of BJT.
2. Analyze the VI Characteristics of FET.
3. Analyze the Characteristics of SCR and TRIAC.
4. Analyze the Frequency Response of CE amplifier.
5. Design and verify Series voltage regulator using transistor
6. Design and verify transistor based logic gates.
7. Design and verify Two stage RC coupled amplifier.
8. Design and verify RC Phase shift Oscillator.
9. Design and verify Wave shaping circuits - Clipper /Clamper.
10. Design and verify Astable Multivibrator

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Jeyarajam College of Engineering and Technology,  
Pondicherry - 605 009, Cuddalore District, Tamilnadu.

<b>Course Outcomes:</b>	<b>Cognitive/ Affective</b>
At the end of this course, students will be able to:	
CO1:Analyze the characteristics of Transistors and Thyristors using hardware / simulation.	Apply
CO2:Analyze the characteristics of transistor amplifiers using hardware / simulation.	Apply
CO3:Design transistor based voltage regulator and verify using hardware / simulation.	Apply
CO4:Analyze different oscillators using hardware / simulation.	Apply
CO5:Analyze the characteristics of different wave shaping circuits and multivibrator using hardware / simulation.	Apply

### 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			2	
CO2	2	1		2	2				2	2			2	
CO3	2	1		2	2				2	2			2	
CO4	2	1		2	2				2	2			2	
CO5	2	1		2	2				2	2			2	

High-3; Medium-2; Low-1

### Assessment pattern

	<b>Assessment Component</b>	<b>CO. No.</b>	<b>Marks</b>	<b>Scale To</b>
<b>Continuous Assessment</b>	Each Lab Experiment	1,2,3,4,5	75	75
	Cycle Test 1	1,2,3,4	50	25
	Cycle Test 2	1,2,3,4,5	50	
	<b>Total</b>			

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pottaschi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN3302</b>	<b>Course Title: Electrical Machines and Measurements Laboratory</b>		
<b>Course Category: Professional Core</b>		<b>Course Level: Introductory</b>	
<b>L:T:P(Hours/Week)</b> <b>0: 0: 3</b>	<b>Credits:1.5</b>	<b>Total Contact Hours: 45</b>	<b>Max Marks:100</b>

#### Pre-requisites

➤ NIL

#### Course Objectives

The course is intended to:

1. Facilitate the students to study the characteristics of DC shunt generator.
2. Obtain the various load characteristics of D.C motor.
3. Study the load characteristics of induction motor under various load condition
4. Provide practical knowledge on different measuring devices.
5. Measurement of power using different measurement devices.

#### List of Experiments

1. Open circuit and load characteristic of DC Shunt Generator
2. Load test on DC Shunt Motor and series motor
3. Speed control of DC motor
4. Load test on Single - phase Induction Motor
5. Load test on Three - phase Induction Motor
6. Wheatstone and Kelvin's bridge for measurement of resistance
7. Schering Bridge for capacitance measurement and Maxwell Bridge for inductance measurement.
8. Calibration of Energy meter by Phantom Loading
9. Measurement of power and energy in 3 phase circuits
10. Measurement of current and voltage using CT and PT

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Muthuignan College of Engineering and Technology,  
Pottachi - 612 005, Coimbatore District, Tamilnadu.

<b>Course Outcomes:</b>	<b>Cognitive/ Affective</b>
At the end of this course, students will be able to:	
CO1:Analyze the performance characteristics of DC shunt generators by conducting load tests	Apply
CO2:Implement the speed control techniques for DC motor	Apply
CO3:Determine the performance characteristics of induction machine by conducting direct load tests.	Apply
CO4:Design a bridge circuit to measure resistance, inductance and capacitance	Apply
CO5:Measure current, voltage, power and energy using different measurement devices.	Apply

### 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			2	
CO5	2	1		2	2				2	2			2	

High-3; Medium-2; Low-1

### Assessment pattern

	<b>Assessment Component</b>	<b>CO. No.</b>	<b>Marks</b>	<b>Scale To</b>
<b>Continuous Assessment</b>	Each Lab Experiment	1,2,3,4,5	75	75
	Cycle Test 1	1,2,3,4	50	25
	Cycle Test 2	1,2,3,4,5	50	
<b>Total</b>				100

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu, ..



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.Veerajan T, "Probability, Statistics and Random process", 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi, 2017.  
T2.Dr.J.Ravichandran, "Probability and Statistics for Engineers", 1<sup>st</sup> 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", 8<sup>th</sup> Edition Pearson Education, Asia, 2007.  
R2.M.R. Spiegel,J. Schiller and R.A. Srinivasan, "Schaum's Outlines Probability and Statistics", Tata McGraw Hill edition, 2004.  
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", 7th Edition,Pearson Education, Asia, 2007.

**Web References:**

1. <https://onlinecourses.nptel.ac.in/111105041/>
2. <https://nptel.ac.in/downloads/111105041/>
3. <https://nptel.ac.in/courses/111105090/>

**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

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

**Assessment pattern:**

	<b>Assessment Component</b>	<b>CO. No.</b>	<b>Marks</b>	<b>Total</b>
<b>Continuous Comprehensive Evaluation</b>	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		
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamil Nadu.

<b>Course Code : 19EICN1401</b>		<b>Course Title: Linear Integrated Circuits</b>	
<b>Course Category: Professional Core</b>		<b>Course Level: Practice</b>	
<b>L:T:P(Hours/Week)</b> <b>3: 0: 0</b>	<b>Credits:3</b>	<b>Total Contact hours:45</b>	<b>Max Marks:100</b>

**Prerequisites:** The student should have undergone the course(s):

- Electronic Devices and Circuits

### **Course Objectives**

**The course is intended to:**

1. Explain the IC packages and OPAMP Characteristics
2. Design an amplifier and filter circuits using OPAMP
3. Design a converter circuits using OPAMP
4. Illustrate the internal functional blocks and the applications of special ICs like Timers, VCO, PLL circuits, regulator Circuits.
5. Summarize the special features of analog ICs.

#### **Unit I Operational Amplifier and Characteristics**

**9 Hours**

Introduction to Integrated Circuits – Types of IC packages - Thermal Characterization of IC Packages - OPAMP Internal blocks, Ideal OPAMP characteristics, DC characteristics, AC characteristics, Frequency response of OPAMP, Open-loop and closed-loop configurations.

#### **Unit II Applications of OPAMP**

**9 Hours**

IC 741 - Inverting amplifier, Non-Inverting amplifier, Summer, Differential amplifier, Differentiator, Integrator, Instrumentation amplifier, Log and Antilog amplifier, Active Filters: First and Second order active Low and high Pass filters.

#### **Unit III Special Applications of OPAMP**

**9 Hours**

Comparators, Zero Crossing Detector - Schmitt Trigger- S/H circuit - I/V and V/I Converter – V/F and F/V Converter, D/A converter: R-2R ladder and Weighted resistor types - A/D converter: Successive approximation and Flash types.

#### **Unit IV Special Function ICs**

**9 Hours**


555 Timer circuit – Functional block, characteristics & applications – 566 voltage controlled oscillator circuit – 565 Phase lock loop and applications, IC voltage regulators: Fixed and Variable regulators – 78XX, 79XX, 317, 723 regulators, Switching regulator.

**9 Hours**

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamil Nadu.



## Unit V Application Specific ICs

Resistor chip – Rectifier ICs – LM35/AD590 Temperature sensor ICs – AD522  
Instrumentation Amplifier - TL594 PWM ICs – L293 DC motor driver ICs – ULN2003  
Stepper Motor Driver IC

Course Outcomes	Cognitive Level
<b>At the end of the course students will be able to:</b>	
<b>CO1:</b> Explain the structure of IC packages and frequency response of OPAMP	Understand
<b>CO2:</b> Design amplifier, differentiator, integrator and filters using IC741	Apply
<b>CO3:</b> Design a comparator and signal converter circuits using IC741	Apply
<b>CO4:</b> Describe the internal functional blocks and the applications of special ICs like Timers, PLL circuits and regulator Circuits.	Understand
<b>CO5:</b> Explain the functions of application specific ICs	Understand

### Text Books

- T1. Ramakant A. Gayakward, 'Op-amps and Linear Integrated Circuits', 4<sup>th</sup> Edition, Pearson Education, 2016.
- T2. Roy Choudhary.D., Sheil B. Jani, 'Linear Integrated Circuits', 4<sup>th</sup> Edition, New 2018.

### Reference Books

- R1. David A. Bell, 'Op-amp & Linear ICs', Prentice Hall of India, 2012.
- R2. Jacob Millman, Christos C.Halkias, 'Integrated Electronics - Analog and Digital circuits system', Tata McGraw Hill, 2015.
- R3. Robert F.Coughlin, Fredrick F.Driscoll, 'Op-amp and Linear ICs', Pearson Education, 4th edition, 2010.

### Web References

1. <https://onlinecourses.nptel.ac.in/explorer>

### 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				
CO2	2	1		2	2									
CO3	2	1		2	2									
CO4	1	1		1	1									
CO5	1	1		1	1									

Passed in Board of Studies meeting

  
BOS Convener

Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. MGR Government College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

High-3; Medium-2;Low-1

**Assessment pattern:**

	<b>Assessment Component</b>	<b>CO. No.</b>	<b>Marks</b>	<b>Total</b>
<b>Continuous Assessment</b>	CCET I	1,2	50	40
	CCET II	3,4	50	
	CCET III	5	50	
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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BOS Convener

Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Cr. Mahalingam College of Engineering and Technology,  
Poljuthi - 642 009, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN1402</b>	<b>Course Title: Signals and System</b>		
<b>Course Category: Professional Core</b>		<b>Course Level: Practice</b>	
<b>L:T:P(Hours/Week)</b> 3: 1 : 0	<b>Credits:4</b>	<b>Total Contact Hours:60</b>	<b>Max Marks:100</b>

### Pre-requisites

- Matrices and Calculus
- Ordinary Differential equation and complex Variables

### Course Objectives

The course is intended to:

1. Categorize various signals and systems and explain their mathematical representation.
2. Define sampling theorem and the need of signal reconstruction.
3. Realize the need of Fourier Series and Fourier Transform for continuous time signals.
4. Realize the need of Fourier Series and Fourier Transform for Discrete time signals.
5. Implement Z-Transform for discrete systems.

### Unit I Classification of Signals and Systems

**9 + 3 Hours**

Introduction to signals and system, Continuous time (CT) and Discrete Time (DT) signals - Elementary signals, operation on independent and dependent variables, classification of CT and DT signals - periodic and Aperiodic, Deterministic and Random, Energy and Power-Impulse Signals, Time Shifting, Scaling - CT & DT systems - classification of systems - static and dynamic, Linear and Nonlinear, Time variant and Time invariant, causal and Non causal, stable and Unstable.

### Unit II Signal Discretization and LTI Systems

**9 + 3 Hours**

Discretization of signals: Sample and Hold Circuits, Sampling: Sampling theorem, selection of sampling rate, Types of sampling, Aliasing and Quantization, Linear Time Invariant/Linear shift Invariant (LTI/LSI) systems, Linear and Circular Convolution, Overlap add and overlap save methods

### Unit III Fourier Representation of Continuous Time Signals

**9 + 3 Hours**

Fourier Transform – Properties - Fourier representation of continuous time periodic signals - CTFS, Properties, Fourier representation of continuous time Non-periodic signals - CTFT, Properties

### Unit IV Fourier Representation of Discrete Time Signals

**9 + 3 Hours**

Fourier representation of discrete time periodic signals - DTFS, Properties - Fourier representation of discrete time non - periodic signals- DTFT, properties.

### Unit V Applications of Z-Transform

**9 + 3 Hours**

Z-Transform, ROC, Properties, Inverse Z Transform, Applications of Z-Transform

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BOS Chairman

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Department of Electronics and Instrumentation Engineering,  
Dr. Muthulingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Classify signals and systems and familiarize their mathematical representation.	Understand
CO2: Describe sampling theorem and signal reconstruction	Understand
CO3: Apply Fourier series and Fourier Transform for continuous time signals	Apply
CO4: Apply Fourier series and Fourier Transform for discrete time signals	Apply
CO5: Apply Z Transform for discrete systems	Apply

#### Text Books:

- T1.Allan V.Oppenheim, S.Wilsky and S.H.Nawab "Signals and Systems", Pearson Education, 2015.  
T2.Simon Haykins and Barry Van Veen, "Signals and systems", John Wiley and sons, 2nd Edition Inc, 2018.

#### Reference Books:

- R1.H.P.Hsu, Rakesh Ranjan, "Signals and Systems", Schaum's Outlines, Tata McGraw Hill, Indian Reprint, 2013  
R2.Edward W Kamen & Bonnie's Heck,"Fundamentals of Signals and Systems", Pearson Education, 2014.  
R3.B.P.Lathi,"Principles of Linear Systems and Signals", 2nd Edition, Oxford, 2009.  
R4.R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals and Systems-Continuous and Discrete", Pearson, 2007.  
R5.John Alan Stuller,"An Introductionto signals and systems", Thomson, 2007.

#### Web References:

1. <http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011>
2. <http://nptel.ac.in/courses/117104074>
3. <http://www.nptel.ac.in/courses/117101055>
4. [https://www.tutorialspoint.com/signals\\_and\\_systems](https://www.tutorialspoint.com/signals_and_systems)

#### 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	2				
CO2	1	1		1	1			1	1	2				
CO3	2	1		2	2			1	1	2				
CO4	2	1		2	2			1	1	2				
CO5	2	1		2	2			1	1	2				

High-3; Medium-2;Low-1

#### Assessment pattern

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

	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
<b>Total</b>				<b>100</b>

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pulicat - 692 003, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN2401</b>		<b>Course Title: Industrial Instrumentation</b>	
<b>Course Category: Professional Core</b>		<b>Course Level: Practice</b>	
<b>L:T:P (Hours/Week)</b> <b>3: 0: 2</b>	<b>Credits:4</b>	<b>Total Contact Hours:75</b>	<b>Max Marks:100</b>

### Pre-requisites

- Sensors and Transducers
- Physics for Electrical Sciences

### Course Objectives

The course is intended to:

1. Explain the various techniques for pressure measurement.
2. Explain non-contact type temperature measuring instruments.
3. Explain various level measurement techniques.
5. Describe working of electrical type flow meters.
5. Explain the principle and working of force, torque and velocity measuring instruments.

### Unit I Pressure Measurement

**9 Hours**

Manometers, different types, Elastic type pressure gauges, Bourdon tube and diaphragms with strain gauge- Capacitive type pressure gauge - Measurement of vacuum - McLeod gauge- Thermal conductivity gauge - Ionization gauges - calibration of pressure gauges - Dead weight tester.

### Unit II Temperature Measurement

**9 Hours**

Definitions and standards - Primary and secondary fixed points - Bimetallic thermometers - Thermocouples - Laws of thermocouple – Cold Junction Compensation - Radiation fundamentals - Radiation methods of temperature measurement - Total radiation pyrometers - Optical pyrometers - Fiber optic sensor for temperature measurement. – Selection of temperature measuring instrument for given applications

### Unit III Level Measurement

**9 Hours**

Level measurement – Float gauges - Displacer type –D/P methods - Load cell – Electrical types: Conductivity sensors – Capacitive sensors – Nucleonic gauge - Ultrasonic gauge – Boiler drum level measurement: – Differential pressure and Hydrastep methods - Solid level measurement – RADAR measurement

### Unit IV Flow Measurement

**9 Hours**

Expression for flow rate through restriction (compressible and incompressible flow) - Orifice

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Pollachi - 642 003, Coimbatore District, Tamilnadu.

plate -Venturi tube – Flow nozzle – Pitot tube – Positive displacement flow meters – Nutatingdisc and Oval gear flow meters – Rotameter - Mass flow meters: Thermal and Coriolis type – Electromagnetic flow meter – Ultrasonic flow meters – Selection of flow meter for given applications

**Unit V Speed, Torque, Density, Force, Viscosity, Humidity and Moisture 9 Hours**

Speed& Torque Measurement: Magnetic and Optical Method – Density Measurement: Float, Ultrasonic and Bridge gas type – Viscosity Measurement: Saybolt Viscometer and Rotameter Type – Humidity Measurement: Psychrometer and Hygroscopic Method - Moisture Measurement in Granular, Penetrable and Web type material

**List of Experiments**

**30 Hours**

1. Determine the discharge coefficient of Orifice plate and venture meter.
2. Determine the liquid level in an open tank using DPT.
3. Determine the liquid flow measurement using turbine flowmeter.
4. Analyze the error present in the RTD.
5. Determine the air pressure inside the closed tank using piezo electric type measurement.
6. Calibrate the bourdon gauge using Dead weight tester

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1. Summarize the various techniques for pressure measurement.	Understand
CO2. Select a suitable temperature measuring instruments for the given application.	Apply
CO3.Review the various techniques for Level measurement.	Understand
CO4. Select a suitable flow measuring instruments for the given application.	Apply
CO5.Explain the different methods of measurement of speed, torque, viscosity measuring instruments.	Understand


**Text Book(s):**

T1.Doebellin, E.O.and ManikD.N., "Measurement systems Application and Design", 6<sup>th</sup> Edition, Tata McGraw Hill Education Pvt.Ltd,2007

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BOS Chairman  
Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pallathi - 642 053, Coimbatore District, Tamilnadu.

T2. D. Patranabis, "Principles of industrial instrumentation", 3<sup>rd</sup> edition, McGraw Hill Education, 2017.

**Reference Book(s):**

R1. John P. Bentley, "Principles of Measurement Systems", 3<sup>rd</sup> Edition, Pearson Education, 2015.

R2. W. Bolton, "Engineering Science", Elsevier Newnes, 5th Edition, 2006

R3. B.C. Nakra and K.K. Chaudhary, "Instrumentation, Measurement and Analysis", McGraw Hill Education India Private Limited, 4<sup>th</sup> edition, 2016

**Web References:**

1. [nptel.ac.in/courses/112103174](http://nptel.ac.in/courses/112103174)
2. <http://nptel.ac.in/courses/108105064>
3. <http://nptel.ac.in/courses/112106140>

**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	2			1	1
CO2	2	1		2	2			1	1	2			2	2
CO3	1	1		1	1			1	1	2			1	1
CO4	2	1		2	2			1	1	2			2	2
CO5	1	1		1	1			1	1	2			1	1

High-3; Medium-2; Low-1


**Assessment pattern**

	Assessment Component	CO .No.	Marks	Total
<b>Continuous Assessment</b>	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
<b>End Semester Examination</b>	ESE	1,2,3,4,5	100	60
<b>Total</b>				100

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.



Course Code: 19CSSC2401	Course Title: Data Structures and Algorithms (Common to EE and EI)		
Course Category; Engineering Science	Course Level: Practice		
L:T:P(Hours/Week) 2: 0: 2	Credits:3	Total Contact Hours:60	Max. Marks:100

### Pre-requisites

- C Programming

### Course Objectives

1. Design linear data structure
2. Implement Tree data structure
3. Implement Graph data structure
4. Demonstrate a familiarity with sorting in data structure
5. Apply suitable algorithm for searching and hashing techniques

### Unit I Pointers

6 Hours

Data Structures types - Abstract Data Types - List ADT: Array and Linked List Implementation - Stack ADT: Stack Model - Array Implementation of Stack - Queue ADT: Queue Model - Array Implementation of Queue

### Unit II Non Linear Data Structure: Tree

6 Hours

Tree - Preliminaries - Binary tree - Tree traversal - Applications - Expression tree - Binary search tree - 2-3 Tree

### Unit III Linear Data structure - List

6 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.

### Unit IV Sorting

6 Hours

Simple Sorting Algorithms - Insertion sort - Shell Sort - Merge Sort - Quick Sort External Sorting.

### Unit V Searching and Hashing

6 Hours

Linear Search - Binary Search - Hashing: Hash Functions - Separate Chaining - Open Addressing - Linear Probing - Quadratic Probing - Double Hashing.

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Pellur - 642 003, Coimbatore District, Tamilnadu.

## List of Exercises

30 Hours

1. Create a C program to implement Singly Linked list using Linked list implementation
2. Create a C program to implement Stack using array implementation
3. Create a C program to implement Queue using array implementation
4. Develop a C program to implement Binary search tree.
5. Develop a C program to implement Dijkstra's algorithm.
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: Design Linear data structure such as Linked List, Stack and Queue using C	Apply
CO2: Implement Tree data structure for the given Scenario	Apply
CO3: Implement Tree data structure for the given application	Apply
CO4: Demonstrate a familiarity with sorting in data structures for a real time scenario	Apply
CO5: Apply suitable algorithm for searching and hashing techniques for given application	Apply

### Text Book(s):

- T1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, New Delhi, 2011.

### Reference Book(s):

- R1. Sahni, "Data Structures Using C, The McGraw-Hill, New Delhi, 2006.
- R2. Michael.T.Goodrich, "Data Structures and Algorithm Analysis in C", Wiley student Edition, New Delhi, 2007
- R3. Thomas H.Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, "Introduction to Algorithms", MIT Press, England, 2009.

### 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>

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BOS Chairman

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Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 009, Coimbatore District, Tamilnadu.

### 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	-	-		
CO2	2	1	-	2	2	-	-	1	2	3	-	-		
CO3	2	1	-	2	2	-	-	1	2	3	-	-		
CO4	2	1	-	2	2	-	-	1	2	3	-	-		
CO5	2	1	-	2	2	-	-	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

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Approved in Academic Council meeting

  
BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pellachi - 642 001, Coimbatore District, Tamilnadu.

<b>Course Code: 19EICN3401</b>	<b>Course Title: Signal Conditioning Laboratory</b>		
<b>Course Category: Professional Core</b>	<b>Course Level: Practice</b>		
<b>L:T:P(Hours/Week)</b> <b>0: 0: 4</b>	<b>Credits: 2</b>	<b>Total Contact Hours:60</b>	<b>Max Marks:100</b>

**Pre-requisites**

➤ NIL

**Course Objectives**

The course is intended to:

1. Develop OPAMP based different amplifier circuits
2. Design an amplifier for sensors
3. Conversion of sensor signal in to voltage, current and digital format
4. Design a signal conditioning circuits for RTD and Thermocouple
5. Design a signal conditioning circuits for optical type sensors

**List of Experiments**

1. OPAMP based amplifier circuits – Inverting amplifier, Non- Inverting amplifier, Summing amplifier and Differential amplifier.
2. Design of Integrator and differentiator.
3. Design of Voltage to current and frequency to voltage convertor.
4. Design of Flash type ADC
5. Design of R-2R type DAC.
6. Phase Locked Loop using IC 566
7. Design and implement the signal conditioning circuit for RTD using Instrumentation Amplifier.
8. Design and implement the signal conditioning circuit for LDR.
9. Design and implement the signal conditioning circuit for Thermocouple.
10. Measurement of angular velocity using optical type transducer.

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Pellechi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Outcomes:</b>	<b>Cognitive/ Affective</b>
At the end of this course, students will be able to:	
CO1: Identify the suitable amplifier as per the application using IC741	Apply
CO2: Design of amplifier circuit depends on sensor using IC741	Apply
CO3: Develop OPAMP circuits for sensor signal conversion in to voltage, current and digital format	Apply
CO4: Design a signal conditioning circuits for PT100 and J type Thermocouple using IC741	Apply
CO5: Develop a signal conditioning circuits for LDR and IR sensor	Apply

### Course Articulation Matrix

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

High-3; Medium-2; Low-1

### Assessment pattern

	<b>Assessment Component</b>	<b>CO .No.</b>	<b>Marks</b>	<b>Scale To</b>
<b>Continuous Assessment</b>	Each Lab Experiment	1,2,3,4,5	75	75
	Cycle Test 1	1,2,3,4	50	25
	Cycle Test 2	1,2,3,4,5	50	
<b>Total</b>				100

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Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

<b>Course Code: 19PSHG6002</b>		<b>Course Title: Universal Human Values-2: Understanding Harmony (Common to All B.E/B.Tech Programme)</b>	
<b>Course Category: Professional Skills</b>		<b>Course Level: Practice</b>	
<b>L:T:P(Hours/Week) 2:1:0</b>	<b>Credits:3</b>	<b>Total Contact Hours:45</b>	<b>Max Marks:100</b>

### 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

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

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

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

### Unit IV Harmony in the Nature 6+3

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

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

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Polachi - 642 003, Coimbatore District, Tamilnadu.

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 wellbeing of self and practice techniques to promote wellbeing.	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/>

#### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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

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BOS Chairman

Head of the Department,  
Department of Electronics and Instrumentation Engineering,  
Dr. Mahalingam College of Engineering and Technology,  
Pollachi - 642 003, Coimbatore District, Tamilnadu.

## Assessment Pattern

As per AICTE guidelines, the following are the assessment pattern prescribed:

	Assessment component	CO No.	Marks	Total marks weightage
<b>Continuous assessment</b>	Socially relevant project/Group Activities/ Assignments a. One assignment per Module with 20 marks each b. Average of all assignments	1,2,3,4,5	20	75%
	Assessment by faculty mentor a. Based on attendance and engagement		10	
	Self-assessment a. Based on individual behavioral change: Case study of their own		10	
	Assessment by peers a. Based on 2 friends about their behavioral change		10	
<b>End Semester Examination</b>	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%
			<b>Total</b>	100%

The overall pass percentage is 50%. In case the student fails, he/she must repeat the course.

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Pollachi - 642 003, Coimbatore District, Tamilnadu.