Educational Objectives

Bachelor of Electronics and Instrumentation Engineering curriculum is designed to prepare the graduates having attitude and knowledge to

1. Have successful technical and professional careers in their chosen fields such as Process Control, Electronics & Information Technology.
2. Engross in life long process of learning to keep themselves abreast of new developments in the field of Electronics & Instrumentation

Programme Outcomes

The graduates will have the ability to

a. Apply the Mathematical knowledge and the basics of Science and Engineering to solve the problems pertaining to Electronics and Instrumentation Engineering.

b. Identify and formulate Instrumentation Engineering problems from research literature and be able to analyze the problem using first principles of Mathematics and Engineering Sciences.

c. Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.

d. Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.

e. Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems/processes and also being conscious of the limitations.

f. Understand the role and responsibility of the Professional Instrumentation Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.

g. Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for sustainable Development.

h. Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.

i. Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.

j. Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.

k. Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.

l. Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense.

PEO \ PO	a	b	c	d	e	f	g	h	i	j	k	l
1	✓	✓	✓	✓	✓			✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓				✓	✓

20.	EI8691	Computer Control of Processes	PC	3	3	0	0	3
21.	EI8692	Electronic Instrumentation	PC	3	3	0	0	3
22.	EI8661	Process Control Laboratory	PC	4	0	0	4	2
23.	EI8751	Industrial Data Networks	PC	3	3	0	0	3
24.	EE8691	Embedded Systems	PC	3	3	0	0	3
25.	EC8093	Digital Image Processing	PC	3	3	0	0	3
26.	EI8761	Industrial Automation Laboratory	PC	4	0	0	4	2
27.	EI8762	Instrumentation System Design Laboratory	PC	4	0	0	4	2

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS8581	Professional Communication	EEC	2	0	0	2	1
2.	EI8811	Project work	EEC	20	0	0	20	10

6. Temperature process station with all accessories
7. Pressure process station with all accessories
7. Personal computer-15 nos
8. MATLAB software
9. Two tank system with following accessories.

PROFESSIONAL COMMUNICATION   **L T P C**
                                                                                                   0 0 2 1

OBJECTIVES: The course aims to:
- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

UNIT I
Introduction to Soft Skills-- Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II
Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III
Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic -– questioning and clarifying –GD strategies- activities to improve GD skills

UNIT IV
Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

UNIT V
Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes.

                                                                                        TOTAL : 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

•   Make effective presentations
•   Participate confidently in Group Discussions.
•   Attend job interviews and be successful in them.
•   Develop adequate Soft Skills required for the workplace

 Recommended Software

 1. **Globearena**

2. **Win English**

REFERENCES:

1. Butterfield, Jeff   **Soft Skills for Everyone.** Cengage Learning: New Delhi, 2015
2. **Interact** English Lab Manual for Undergraduate Students,. OrientBalckSwan: Hyderabad, 2016.
3. E. Suresh Kumar et al. **Communication for Professional Success.** Orient Blackswan: Hyderabad, 2015
4. Raman, Meenakshi and Sangeeta Sharma. **Professional Communication**. Oxford University Press: Oxford, 2014
5. S. Hariharanetal. **Soft Skills**. MJP Publishers: Chennai, 2010.

EI8751	INDUSTRIAL DATA NETWORKS	LT P C

3 0 0 3

OBJECTIVES:

- To educate on the basic concepts of data networks
- To introduce the basics of internetworking and serial communications
- To provide details on HART and Field buses
- To educate on MODBUS, PROFIBUS and other communication protocol
- To introduce industrial Ethernet and wireless communication

UNIT I   DATA NETWORK FUNDAMENTALS   9
Networks hierarchy and switching – Open System Interconnection model of ISO - Data link control protocol - Media access protocol - Command / response - Token passing -CSMA/CD, TCP/IP

UNIT II   INTERNET WORKING and RS 232, RS485   9
Bridges - Routers - Gateways - Standard ETHERNET and ARCNET configuration special requirement for networks used for control - RS 232, RS 485 configuration Actuator Sensor (AS) – interface, Devicenet

UNIT III   HART AND FIELD BUS   9
Introduction - Evolution of signal standard - HART communication protocol - HART networks - HART commands - HART applications - Fieldbus - Introduction - General Fieldbus architecture - Basic requirements of Fieldbus standard - Fieldbus topology - Interoperability - Interchangeability - Introduction to OLE for process control (OPC).

UNIT IV   MODBUS AND PROFIBUS PA/DP/FMS AND FF   9

MODBUS protocol structure - function codes – troubleshooting Profibus, Introduction, Profibus protocol stack, Profibus communication model - communication objects - system operation - troubleshooting - review of foundation fieldbus - Data Highway

UNIT V   INDUSTRIAL ETHERNET AND WIRELESS COMMUNICATION   9
Industrial Ethernet, Introduction, 10 Mbps Ethernet, 100 Mbps Ethernet - Radio and wireless

OBJECTIVES:
- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 300 PERIODS

OUTCOMES:
- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

EE8072   **MEMS AND NANO SCIENCE**   **LT P C**
                                                                                        3 0 0 3

COURSE OBJECTIVES

- To provide wide knowledge of semiconductors and solid mechanics to fabricate MEMS devices
- To educate on the rudiments of Micro fabrication techniques
- To educate on applications of MEMS
- To provide wide information dealing with nano material and its necessity
- To analyze methods involving preparation of nano scale devices

UNIT I   OVERVIEW OF MEMS AND MICROSYSTEMS   9
Introduction to MEMS and Microsystems, Need for Miniaturization, MEMS and Microsystem products: Micro gears - Micro turbines – Micromotors - Micro optical devices. Microsystems and Microelectronics, Application of Microsystems in Automotive Industries: Safety - Engine and power trains - Comfort and convenience, Microactuation: Actuation using thermal forces - actuation using shape memory alloys - Actuation using piezoelectric effect - Actuation using Electrostatic forces.

UNIT II   MICROSYSTEM FABRICATION PROCESS   9
Photolithography, Ion Implantation, Diffusion, Oxidation: Thermal oxidation-Oxidation by color, Chemical Vapour Depostion, Physical Vapour Deposition: Sputtering, Etching: Chemical-Plasma, Micromaching: Bulk Micromachining - Surface Micromachining.

UNIT III   POLYMERS AND OPTICAL MEMS   9
Polymers in MEMS : Polimide - SU-8 - Liquid Crystal Polymer (LCP) – PDMS – PMMA –

(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI**)**

S.P.G.Chidambara Nadar - C.Nagammal Campus

S.P.G.C.Nagar, K.Vellakulam - 625 701, (Near Virudhunagar), Madurai District.

B.E.ELECTRONICS AND INSTRUMENTATION ENGINEERING

Regulation - 2020

AUTONOMOUS SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABI

(III & IV)

SEMESTER III

SI. No	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	MA1372	Transforms and Linear Algebra	FC	3	1	0	4	4
2	EE1371	Electronic Devices and Circuits	PC	3	0	0	3	3
3	EI1301	Digital Logic Circuits	PC	3	0	0	3	3
4	EI1302	Electrical Machines	PC	3	0	0	3	3
5	EI1303	Sensors and Transducers	PC	3	0	0	3	3
PRACTICALS								
6	EI1311	Devices and Machines Laboratory	PC	0	0	4	4	2
7	EI1312	Sensors and Transducers Laboratory	PC	0	0	4	4	2
8	HS1321	Interpersonal Skills - Listening and Speaking	EEC	0	0	2	2	1
			TOTAL	18	1	10	29	21

6. Hall effect characteristics trainer – 1 No.
7. Speed control trainer kit – 1 No.
8. Multimeter – 2 No.
9. Photo conductive trainer kit – 1 No.
10. Thermistor Trainer kit – 1 No.
11. Heater – 1 No.
12. Thermistor – 1 No.
13. Thermometer – 1 No.
14. Thermocouple trainer kit – 1 No.
15. Thermocouple and RTD trainer kit – 1 No
16. Thermocouple and RTD sensors – 1 No.
17. Bread board – 5 No.
18. Decade resistance box – 5 No.
19. Multimeter – 3 No.
20. Fixed resistance – 1 No.
21. Unknown resistors – 1 No.
22. Decade Capacitance box – 1 No.
23. CRO – 3 No.
24. Function Generator – 1 No.
25. Decade Inductance box – 1 No.
26. OptoCoupler- 1
27. Crompton potentiometer- 1
28. Microaccelerometer-1

COURSE OUTCOMES:

Upon Successful Completion of this course, the students will be able to

CO1   Analyze the characteristics of different sensors

CO2   Incorporate the measurement of different parameters for the given conditions

CO3   Analyze the effects of load and Calibrate the equipment

CO4   Design opto-coupler using electric transducer

HS1321   INTERPERSONAL SKILLS - LISTENING AND SPEAKING

L	T	P	C
0	0	2	1

OBJECTIVES:

The Course will enable learners to:

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.

- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.

- improve general and academic listening skills

- Make effective presentations.

Unit I   LISTENING AS A KEY SKILL   6

Listening as a key skill- its importance- speaking – give personal information – ask for personal information – express ability – enquire about ability – ask for clarification - Improving pronunciation– pronunciation basics —– stressing syllables and speaking clearly – intonation patterns – conversation starters: small talk

Unit II   LISTEN TO A PROCESS INFORMATION   6

Listen to a process information- give information, as part of a simple explanation —– taking lecture notes – preparing to listen to a lecture – articulate a complete idea as opposed to producing fragmented utterances - compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.

Unit III   LEXICAL CHUNKING   6

Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk – greet – respond to greetings – describe health and symptoms – invite and offer –accept – decline – take leave – listen for and follow the gist- listen for detail

Unit IV   GROUP DISCUSSION   6

Being an active listener: giving verbal and non-verbal feedback – participating in a group discussion – summarizing academic readings and lectures conversational speech listening to and participating in conversations – persuade- negotiate disagreement in group work.

Unit V   GROUP & PAIR PRESENTATIONS   6

Formal and informal talk – listen to follow and respond to explanations, directions and instructions in academic and business contexts – strategies for presentations and interactive communication – group/pair presentations –

TOTAL : 30 PERIODS

COURSE OUTCOMES:

Upon Successful Completion of this course, the students will be able to

CO1   Develop their communicative competence in English with specific reference to listening

CO2   Prepare conversation with reasonable accuracy

CO3   Apply lexical Chunking for accuracy in speaking

CO4   Demonstrate their ability to communicate effectively in GDs

CO5   Explain directions and instructions in academic and business contexts

TEXTBOOKS:

1. Brooks, Margret, 2011 , *Skills for Success. Listening and Speaking. Level 4,* Oxford University Press, Oxford.
2. Richards, C, Jack& David Bholke, 2010, *Speak Now Level 3,*Oxford University Press, Oxford.

REFERENCES:

1. Bhatnagar, Nitin & Mamta Bhatnagar,2010, *Communicative English for Engineers and Professionals,* Pearson, New Delhi.
2. Hughes, Glyn & Josephine Moate,2014, *Practical English Classroom,* Oxford University Press, Oxford.
3. Vargo, Mari,2013, *Speak Now Level 4*, Oxford University Press, Oxford.
4. Richards, C, Jack,2006,*Person to Person (Starter)*, Oxford University Press, Oxford.
5. Ladousse, Gillian Porter,2014, *Role Play*. Oxford University Press, Oxford.

WEB RESOURCES:

1. https://www.cambridge.org/elt/blog/wp-content/uploads/2019/10/Learning-Language-in-Chunks.pdf
2. https://english.eagetutor.com/english/628-how-to-greet-your-boss-people-in-office.html
3. https://www.groupdiscussionideas.com/group-discussion-topics-with-answers/
4. https://www.bbc.co.uk/worldservice/learningenglish/business/talkingbusiness/unit3presentations/1opening.shtml

SEMESTER IV

	L	T	P	C
MA1472 **NUMERICAL METHODS AND PROBABILITY**	3	1	0	4

OBJECTIVES:

- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals in real life situations.
- To make the students to understand the knowledge of various techniques of

B.E.ELECTRONICS AND INSTRUMENTATION ENGINEERING

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CURRICULUM AND SYLLABI

(V TO VI)

SEMESTER V

S.No	Course Code	Course Title	Category	Periods / Week			Contact Period	Credit
				L	T	P		
THEORY								
1	EE1571	Control Systems	PC	3	1	0	4	4
2	EE1572	Microprocessors and Microcontrollers	PC	3	0	0	3	3
3	EI1501	Process Control	PC	3	0	0	3	3
4		Professional Elective-I	PE	3	0	0	3	3
5		Professional Elective-II	PE	3	0	0	3	3
6		Open Elective I*	OE	3	0	0	3	3
PRACTICALS								
7	EE1581	Microprocessors and Microcontrollers Laboratory	PC	0	0	4	4	2
8	EI1511	Process Control Laboratory	PC	0	0	4	4	2
9	HS1521	Professional Communication	EEC	0	0	2	2	1
			TOTAL	18	1	10	29	24

identification methods.

15. Design of a multi-channel data acquisition system.

TOTAL: 60PERIODS

OUTCOMES:

Upon Successful Completion of this course, the students will be able to

CO1: Understand and analyze process control engineering problems.

CO2: Build dynamic models using input – output data of a process.

CO3: Work with real time control loops (flow/level/temperature/pressure).

CO4: Implement control algorithms for tuning of controllers.

CO5: Utilize simulation tools such as MATLAB and /LABVIEW.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

CO	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	H	M						M	L		L	H	H
CO2	H	H	M	L					M	L		L	H	H
CO3	H	H	M	L					M	L		L	H	H
CO4	H	H	M	L					M	L		L	H	H
CO5	H	H	M						M	L		L	H	H

H- High   M-Medium   L-Low

HS1521   PROFESSIONAL COMMUNICATION

L	T	P	C
0	0	2	1

OBJECTIVES:

The course aims to:

- Enhance the Employability and Career Skills of students

- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

UNIT I

Introduction to Soft Skills– Hard skills & soft skills – employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II

Self-Introduction-organizing the material – Introducing oneself to the audience – introducing the topic – answering questions with clarity and appropriate pharases – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III

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UNIT IV

Interview etiquette – dress code – body language – attending job interviews–telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

UNIT V

Recognizing differences between groups and teams- managing time-managing stress-networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

TOTAL: 30 PERIODS

OUTCOMES:

At the end of the course Learners will be able to:

• Make effective presentations

• Participate confidently in Group Discussions.

• Attend job interviews and be successful in them.

• Develop adequate Soft Skills required for the workplace

Available Software:

1. Odyll

REFERENCES:

1. Butterfield, 2015, *Jeff Soft Skills for Everyone*., Cengage Learning: New Delhi.

2. E. Suresh Kumar et al. 2015, *Communication for Professional Success*, Orient Blackswan: Hyderabad.

3. *Interact English Lab Manual for Undergraduate Students*,.OrientBalckSwan: 2016, Hyderabad.

4. Raman, 2014, Meenakshi and Sangeeta Sharma. *Professional Communication*.Oxford University Press: Oxford.

5. S. Hariharanet al. 2010, *Soft Skills*. MJP Publishers: Chennai.

MAPPING OF COURSE OUTCOMES WITH PROGRAM OUTCOMES

CO	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										M				
CO2										M				
CO3										M				
CO4										M				

H- High   M-Medium   L-Low

SEMESTER IV

SI. No	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	MA1472	Numerical Methods and Probability	FC	3	1	0	4	4
2	IT1471	Object Oriented Programming using JAVA (Theory Cum Lab)	FC	3	0	2	5	4
3	EI1401	Electrical and Electronics Measurements	PC	3	0	0	3	3
4	EI1402	Industrial Instrumentation	PC	3	0	0	3	3
5	EI1403	Linear Integrated Circuits and its Applications	PC	3	0	0	3	3
PRACTICALS								
6	EI1411	Industrial Instrumentation Laboratory	PC	0	0	4	4	2
7	EE1481	Linear and Digital Integrated Circuits Laboratory	PC	0	0	4	4	2
8	HS1421	An Introduction to Advanced Reading and Writing	EEC	0	0	2	2	1
			TOTAL	18	2	10	30	22

COURSE OUTCOMES:

Upon Successful Completion of this course, the students will be able to

CO1   Design and demonstrate analog electronic circuits using operational amplifier

CO2   Design and demonstrate analog electronic circuits using timer 555.

CO3   Design and demonstrate digital circuits involving Boolean functions using basic logic gates.

CO4   Design and demonstrate combinational circuits such as adder, subtractor, code converters, encoders and decoders.

CO5   Design and demonstrate sequential logic circuits such as Flip-Flops, Counters (synchronous and asynchronous), and Shift Registers.

	L	T	P	C
HS1421 AN INTRODUCTION TO ADVANCED READING AND WRITING	0	0	2	1

OBJECTIVES:

- To strengthen the reading skills of students of engineering.
- To enhance their writing skills with specific reference to technical writing
- To develop their critical thinking skills.
- To provide more opportunities to develop their project and proposal writing skills

UNIT I   EFFECTIVE READING   6

Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title Writing-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence.-Write a descriptive paragraph

UNIT II   CRITICAL READING   6

Reading-Read for details-Use of graphic organizers to review and aid comprehension Writing-State reasons and examples to support ideas in writing– Write a paragraph with reasons and examples- Write an opinion paragraph

UNIT III   PARAGRAPH WRITING   6

Reading– Understanding pronoun reference and use of connectors in a passage- speed