

Course Title:	<b>Introduction to Electronics Engineering</b>		
Course Code:	<b>22ESC143/243</b>	CIE Marks	50
Course Type (Theory/Practical/Integrated )	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03
<p><b>Course objectives</b></p> <ol style="list-style-type: none"> <li>1. To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.</li> <li>2. To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.</li> <li>3. Professionalism &amp; Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.</li> </ol>			
<p><b>Teaching-Learning Process</b></p> <p>These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective</p> <ol style="list-style-type: none"> <li>1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.</li> <li>2. Arrange visits to nearby PSUs such as BHEL, BEL, ISRO, etc., and small-scale hardware Industries to give brief information about the electronics manufacturing industry.</li> <li>3. Show Video/animation films to explain the functioning of various analog and digital circuits.</li> <li>4. Encourage collaborative (Group) Learning in the class</li> <li>5. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking</li> <li>6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.</li> <li>7. Topics will be introduced in multiple representations.</li> <li>8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.</li> <li>9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.</li> </ol>			
<b>Module-1 (8 hours )</b>			
<p><b>Power Supplies</b> –Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.</p> <p><b>Amplifiers</b> – CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cut-off and saturation modes.(Text 1)</p>			
<b>Module-2(8 hours )</b>			

<p><b>Oscillators</b> – Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)</p> <p><b>Operational amplifiers</b> - Ideal op-amp; characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator.(Text 1)</p>
<b>Module-3 ( 8 hours)</b>
<p><b>Boolean Algebra and Logic Circuits:</b> Binary numbers, Number Base Conversion, octal &amp; Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates (Text 2: 1.2, 1.3, 1.4, 1.5,2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7)</p> <p><b>Combinational logic:</b> Introduction, Design procedure, Adders- Half adder, Full adder (Text 2:4.1, 4.2, 4.3)</p>
<b>Module-4 ( 8 hours)</b>
<p><b>Embedded Systems</b> – Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC</p> <p><b>Sensors and Interfacing</b> – Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display. (Text 1)</p>
<b>Module-5 ( 8 hours)</b>
<p><b>Analog Communication Schemes</b> – Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky)</p> <p><b>Digital Modulation Schemes:</b> Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques. ( Text 3)</p>

### **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

#### **Continuous Internal Evaluation(CIE):**

##### **Two Unit Tests each of 30 Marks (duration 01 hour)**

- First test after the completion of 30-40 % of the syllabus
- Second test after completion of 80-90% of the syllabus

One Improvement test before the closing of the academic term may be conducted if necessary. However best two tests out of three shall be taken into consideration

##### **Two assignments each of 20 Marks**

The teacher has to plan the assignments and get them completed by the students well before the closing of the term so that marks entry in the examination portal shall be done in time. Formative (Successive) Assessments include Assignments/Quizzes/Seminars/ Course projects/Field surveys/ Case studies/ Hands-on practice (experiments)/Group Discussions/ others. . The Teachers shall choose the types of assignments depending on the requirement of the course and plan to attain the Cos and POs. (to have a less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

**The sum of two tests, two assignments, will be out of 100 marks and will be scaled down to 50 marks**

#### **Semester End Examination(SEE):**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)

- The question paper shall be set for 100 marks. The medium of the question paper shall be English/Kannada). The duration of SEE is 03 hours.
- The question paper will have 10 questions. Two questions per module. Each question is set for 20 marks. The students have to answer 5 full questions, selecting one full question from each module. The student has to answer for 100 marks and **marks scored out of 100 shall be proportionally reduced to 50 marks.**
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

#### **Suggested Learning Resources:**

##### **Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4 th Edition, Elsevier, 2015.  
DOI <https://doi.org/10.4324/9781315737980>. eBook ISBN9781315737980

2<sup>nd</sup>

2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203-0417-84.

3. D P Kothari, I J Nagrath, 'Basic Electronics', 2<sup>nd</sup> edition, McGraw Hill Education (India), Private Limited, 2018.