



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. TECH – ELECTRONICS AND INSTRUMENTATION ENGINEERING

(Applicable for batches admitted from 2020-2021)



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COURSE STRUCTURE

I Year – I SEMESTER

| S. No | Course Code | Course Name | L | T | P | Credits |
|----------------------|-------------|---|---|---|---|-------------|
| 1 | | Mathematics – I | 3 | 0 | 0 | 3 |
| 2 | | Applied Chemistry | 3 | 0 | 0 | 3 |
| 3 | | Communicative English | 3 | 0 | 0 | 3 |
| 4 | | Programming for Problem Solving Using C | 3 | 0 | 0 | 3 |
| 5 | | Engineering Drawing | 2 | 0 | 2 | 3 |
| 6 | | English Communication Skills Laboratory | 0 | 0 | 3 | 1.5 |
| 7 | | Applied Chemistry Lab | 0 | 0 | 3 | 1.5 |
| 8 | | Programming for Problem Solving Using C Lab | 0 | 0 | 3 | 1.5 |
| Total Credits | | | | | | 19.5 |

I Year – II SEMESTER

| S. No | Course Code | Subjects | L | T | P | Credits |
|----------------------|-------------|--|---|---|---|-------------|
| 1 | | Mathematics – II | 3 | 0 | 0 | 3 |
| 2 | | Applied Physics | 3 | 0 | 0 | 3 |
| 3 | | Object Oriented Programming through Java | 2 | 0 | 2 | 3 |
| 4 | | Network Analysis | 3 | 0 | 0 | 3 |
| 5 | | Basic Electrical Engineering | 3 | 0 | 0 | 3 |
| 6 | | Electronic components & Measuring Instruments Workshop | 0 | 0 | 3 | 1.5 |
| 7 | | Basic Electrical Engineering Lab | 0 | 0 | 3 | 1.5 |
| 8 | | Applied Physics Lab | 0 | 0 | 3 | 1.5 |
| 9 | | Environmental Science | 3 | 0 | 0 | 0 |
| Total Credits | | | | | | 19.5 |



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II B.Tech - I Semester

| S. No. | Category | Subjects | L | T | P | Credits |
|----------------------|----------|---|---|---|---|-------------|
| 1 | PC | Electronic Devices and Circuits | 3 | 1 | 0 | 3 |
| 2 | PC | Signals and Systems | 3 | 1 | 0 | 3 |
| 3 | PC | Switching Theory and Logic Design | 3 | 1 | 0 | 3 |
| 4 | PC | Electronic Measurements and Instrumentation | 3 | 1 | 0 | 3 |
| 5 | BS | Mathematics-III | 3 | 1 | 0 | 3 |
| 6 | LC | Electronic Devices and Circuits Lab | 0 | 0 | 3 | 1.5 |
| 7 | LC | Electronic Measurements and Instrumentation Lab | 0 | 0 | 3 | 1.5 |
| 8 | LC | Digital System Design Lab | 0 | 0 | 3 | 1.5 |
| 9 | | Skill oriented course *(Computational Techniques using MATLAB and Lab VIEW) | 1 | 0 | 2 | 2 |
| Total Credits | | | | | | 21.5 |

II B.Tech - II Semester

| S. No. | Category | Subjects | L | T | P | Credits |
|----------------------|----------|---|---|---|---|-------------|
| 1 | PC | Electronic Circuits Analysis | 3 | 1 | 0 | 3 |
| 2 | ES | Linear Control Systems | 3 | 1 | 0 | 3 |
| 3 | PC | Microprocessor and Micro controllers | 3 | 1 | 0 | 3 |
| 4 | PC | Integrated Circuits and applications | 3 | 1 | 0 | 3 |
| 5 | HS | Managerial Economics and Financial Analysis | 3 | 0 | 0 | 3 |
| 6 | LC | Electronic Circuit Analysis LAB | 0 | 0 | 3 | 1.5 |
| 7 | LC | Microprocessor and Micro controllers Lab | 0 | 0 | 3 | 1.5 |
| 8 | LC | Integrated Circuits and applications Lab | 0 | 0 | 3 | 1.5 |
| 9 | | Skill Course (Python Programming) | 1 | 0 | 2 | 2 |
| Total Credits | | | | | | 21.5 |



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III B.Tech I Semester

| S. No. | Category | Subjects | L | T | P | Credits |
|--------|----------|--|---|---|---|-------------|
| 1 | | Digital Signal Processing | 3 | 0 | 0 | 3 |
| 2 | | Transducers and Sensors | 3 | 0 | 0 | 3 |
| 3 | | Industrial Instrumentation | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective courses (PE1) | 3 | 0 | 0 | 3 |
| 5 | | Open Elective (OE1) | 3 | 0 | 0 | 3 |
| 6 | | Transducers and Sensors Lab | 0 | 0 | 3 | 1.5 |
| 7 | | Digital Signal Processing Lab | 0 | 0 | 3 | 1.5 |
| 8 | | SCILAB | 1 | 0 | 2 | 2 |
| 9 | | Indian Traditional Knowledge | 2 | 0 | 0 | 0 |
| 10 | | Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester) | 0 | 0 | 0 | 1.5 |
| | | Total Credits | | | | 21.5 |
| 11 | | Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also) | 4 | 0 | 0 | 4 |

| PE1: | HONOR COURSES | MINOR COURSES |
|---|---|--|
| 1. Principles of Communication Engineering 2. PLCs and SCADA 3. IOT Sensor Technology 4. EMI/EMC | 1. Computer Networks 2. Artificial Intelligence 3. CMOS Analog IC Design 4. Advanced Sensors | 1. Signals and Systems 2. Analog and Digital Communications 3. Principles of Electronics 4. Principles of Instrumentation |



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III B. Tech II Semester

| S. No. | Category | Subjects | L | T | P | Credits |
|---|----------|---|---|---|---|-------------|
| 1 | PC | Process Control Instrumentation | 3 | 0 | 0 | 3 |
| 2 | PC | VLSI Design | 3 | 0 | 0 | 3 |
| 3 | PC | Analytical Instrumentation | 3 | 0 | 0 | 3 |
| 4 | PE | Professional Elective courses(PE2) | 3 | 0 | 0 | 3 |
| 5 | OE | Open Elective (OE2) | 3 | 0 | 0 | 3 |
| 6 | LC | Process Control Lab | 0 | 0 | 3 | 1.5 |
| 7 | LC | VLSI Design Lab | 0 | 0 | 3 | 1.5 |
| 8 | LC | Advanced Instrumentation Lab | 1 | 0 | 2 | 2 |
| 9 | | Machine learning using Scikit | 2 | 0 | 0 | 0 |
| 10 | MC | Research Methodology | 0 | 0 | 0 | 1.5 |
| | | Total Credits | | | | 21.5 |
| 11 | | Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also) | 4 | 0 | 0 | 4 |
| Industrial/Research Internship (Mandatory) 2 Months during summer vacation | | | | | | |

| | | |
|---|---|--|
| <p>PE2:</p> <ol style="list-style-type: none"> 1.Robotics and Automation 2.Computer Architecture and Organization 3.Soft computing techniques 4.MEMS and Micro Systems | <p>HONOR COURSES</p> <ol style="list-style-type: none"> 1.Machine Learning for Image Processing 2.Digital Control Systems 3.Data Converters 4.Biomedical Instrumentation | <p>MINOR COURSES</p> <ol style="list-style-type: none"> 1.Principles of Nano Sensors 2.Biomedical Engineering 3.Digital logic and Microcontrollers 4.Telemetry and Telemedicine |
|---|---|--|



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IV B.Tech I Semester

| S. No. | Category | Subjects | L | T | P | Credits |
|--------|----------|---|---|---|---|-----------|
| 1 | PE | Professional Elective courses(PE3) | 3 | 0 | 0 | 3 |
| 2 | PE | Professional Elective courses(PE4) | 3 | 0 | 0 | 3 |
| 3 | PE | Professional Elective courses(PE5) | 3 | 0 | 0 | 3 |
| 4 | OE | Open Elective (OE3) | 3 | 0 | 0 | 3 |
| 5 | OE | Open Elective (OE4) | 3 | 0 | 0 | 3 |
| 6 | MC | Universal Human Values 2: Understanding Harmony | 3 | 0 | 0 | 3 |
| 7 | | Introduction to Data Analytics /2.Interfacing with Arduino | 1 | 0 | 2 | 2 |
| 8 | | Industrial/Research Internship 2 Months (Mandatory) after third year (to be evaluated during VII semester | 0 | 0 | 0 | 3 |
| | | Total Credits | | | | 23 |
| 9 | | Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also) | 4 | 0 | 0 | 4 |

***There is a provision for the Universities/Institutions to implement AICTE mandatory course “Universal Human Values 2: Understanding Harmony” under Humanities and social science Elective in seventh semester for 3 credits.**

| | | |
|--|---|--|
| <u>PE3:</u> 1. Embedded Systems 2. Bio Signal Processing 3. Virtual Instrumentation 4. Nano Science | <u>HONOR COURSES</u> 1. Computer Control of Processes 2. Power Plant Instrumentation 3. Optimal Control Systems 4. CMOS Digital IC Design | <u>Minor Courses</u> 1. Digital Signal Processing 2. Machine learning 3. Fundamentals of Embedded Systems 4. Filter Design |
| <u>PE4:</u> 1. Non-Linear and Robust Control 2. Artificial Intelligence 3. Automotive Sensors 4. Artificial Neural Networks and Fuzzy Logic | | |
| <u>PE5:</u> 1. DSP processors & Architectures 2. Instrumentation in Petro Chemical Industries 3. Digital Control Systems 4. Adaptive Control Systems | | |



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IV B.Tech II Semester

| S.No. | Category | Code | Course Title | Hours per week | | | Credits |
|------------------------------|---------------|------|--|----------------|---|---|-----------|
| 1 | Major Project | PROJ | Project Project work, seminar and internship in industry | - | - | - | 12 |
| INTERNSHIP (6 MONTHS) | | | | | | | |
| Total credits | | | | | | | 12 |