



Jawaharlal Nehru Technological University Anantapur

(Established by Govt. of A.P., Act. No. 30 of 2008)

Ananthapuramu-515 002 (A.P) India

B.Tech - Course Structures and Syllabi under R20 Regulations



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
(Established by Govt. of A.P., ACT No.30 of 2008)
ANANTAPUR – 515 002 (A.P) INDIA

Semester-0

Induction Program: 3 weeks
(Common for All Branches of Engineering)

| S.No | Course No | Course Name | Category | L-T-P-C |
|-------------|------------------|---|-----------------|----------------|
| 1 | | Physical Activities -- Sports, Yoga and Meditation, Plantation | MC | 0-0-6-0 |
| 2 | | Career Counselling | MC | 2-0-2-0 |
| 3 | | Orientation to all branches -- career options, tools, etc. | MC | 3-0-0-0 |
| 4 | | Orientation on admitted Branch -- corresponding labs, tools and platforms | EC | 2-0-3-0 |
| 5 | | Proficiency Modules & Productivity Tools | ES | 2-1-2-0 |
| 6 | | Assessment on basic aptitude and mathematical skills | MC | 2-0-3-0 |
| 7 | | Remedial Training in Foundation Courses | MC | 2-1-2-0 |
| 8 | | Human Values & Professional Ethics | MC | 3-0-0-0 |
| 9 | | Communication Skills -- focus on Listening, Speaking, Reading, Writing skills | BS | 2-1-2-0 |
| 10 | | Concepts of Programming | ES | 2-0-2-0 |



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Mechanical Engineering

Semester - 1 (Theory - 5, Lab - 4)

| S.No | Course No | Course Name | Category | L-T-P | Credits |
|--------------|------------------|--|-----------------|--------------|----------------|
| 1. | 20A54101 | Linear Algebra and Calculus | BS | 3-0-0 | 3 |
| 2. | 20A51201T | Engineering Chemistry | BS | 3-0-0 | 3 |
| 3. | 20A05201T | C-Programming & Data Structures | ES | 3-0-0 | 3 |
| 4. | 20A02101T | Basic Electrical & Electronics Engineering | ES | 3-0-0 | 3 |
| 5. | 20A03202 | Engineering Workshop | ES | 0-0-3 | 1.5 |
| 6. | 20A05202 | IT Workshop | ES | 0-0-3 | 1.5 |
| 7. | 20A51201P | Engineering Chemistry Lab | BS | 0-0-3 | 1.5 |
| 8. | 20A05201P | C-Programming & Data Structures Lab | ES | 0-0-3 | 1.5 |
| 9. | 20A02101P | Basic Electrical & Electronics Engineering Lab | ES | 0-0-2 | 1.5 |
| Total | | | | | 19.5 |

Semester – 2 (Theory – 5, Lab – 5)

| S.No | Course No | Course Name | Category | L-T-P/D | Credits |
|--------------|------------------|--|-----------------|----------------|----------------|
| 1. | 20A54201 | Differential Equations and Vector Calculus | BS | 3-0-0 | 3 |
| 2. | 20A56101T | Engineering Physics | BS | 3-0-0 | 3 |
| 3. | 20A52101T | Communicative English | HS | 3-0-0 | 3 |
| 4. | 20A03201T | Material Science & Engineering | ES | 3-0-0 | 3 |
| 5. | 20A03101T | Engineering Drawing | ES | 1-0-0/2 | 2 |
| 6. | 20A03101P | Engineering Graphics Lab | ES | 0-0-2 | 1 |
| 7. | 20A52101P | Communicative English Lab | HS | 0-0-3 | 1.5 |
| 8. | 20A56101P | Engineering Physics Lab | BS | 0-0-3 | 1.5 |
| 9. | 20A03201P | Material Science Lab | ES | 0-0-3 | 1.5 |
| 10 | 20A52201 | Universal Human Values | MC | 3-0-0 | 0.0 |
| Total | | | | | 19.5 |



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MECHANICAL ENGINEERING

II B.TECH.

| Semester-III | | | | | | | |
|--------------|-------------|---|----------|----------------|---|---|-------------|
| S.No. | Course Code | Course Name | Category | Hours per week | | | Credits |
| | | | | L | T | P | |
| 1. | 20A54303 | Complex variables, Transforms and Application of PDE | BS | 3 | 0 | 0 | 3 |
| 2. | 20A01302T | Fluid Mechanics & Hydraulic Machines | PC | 3 | 0 | 0 | 3 |
| 3. | 20A03301T | Manufacturing Processes | PC | 3 | 0 | 0 | 3 |
| 4. | 20A03302 | Thermodynamics | PC | 3 | 0 | 0 | 3 |
| 5. | 20A01305T | Mechanics of Materials | ES | 3 | 0 | 0 | 3 |
| 6. | 20A01302P | Fluid Mechanics & Hydraulic Machines Lab | PC | 0 | 0 | 3 | 1.5 |
| 7. | 20A03301P | Manufacturing Processes Lab | PC | 0 | 0 | 3 | 1.5 |
| 8. | 20A01305P | Mechanics of Materials Lab | ES | 0 | 0 | 3 | 1.5 |
| 9. | 20A05305 | Skill oriented course – I Application Development with Python | SC | 1 | 0 | 2 | 2 |
| 10. | 20A99201 | Mandatory noncredit course – II Environmental Science | MC | 3 | 0 | 0 | 0 |
| Total | | | | | | | 21.5 |

| Semester-IV | | | | | | | |
|--|----------------------------------|---|----------|----------------|---|---|-------------|
| S.No. | Course Code | Course Name | Category | Hours per week | | | Credits |
| | | | | L | T | P | |
| 1. | 20A54402 | Numerical Methods & Probability Theory | BS | 3 | 0 | 0 | 3 |
| 2. | 20A03401T | Applied Thermodynamics | PC | 3 | 0 | 0 | 3 |
| 3. | 20A03402 | Kinematics of Machinery | PC | 3 | 0 | 0 | 3 |
| 4. | 20A03403T | Manufacturing Technology | PC | 3 | 0 | 0 | 3 |
| 5. | 20A52301 20A52302 20A52303 | Humanities Elective- I Managerial Economics & Financial Analysis Organizational Behavior Business Environment | HS | 3 | 0 | 0 | 3 |
| 6. | 20A03401P | Applied Thermodynamics Lab | PC | 0 | 0 | 3 | 1.5 |
| 7. | 20A03403P | Manufacturing Technology Lab | PC | 0 | 0 | 3 | 1.5 |
| 8. | 20A03404 | Computer Aided Machine Drawing | PC | 0 | 0 | 3 | 1.5 |
| 9. | 20A52401 | Skill oriented course – II Soft skills | SC | 1 | 0 | 2 | 2 |
| 10. | 20A99401 | Mandatory noncredit course – III Design Thinking for Innovation | MC | 2 | 1 | 0 | 0 |
| 11. | 20A99301 | NSS/NCC/NSO Activities | - | 0 | 0 | 2 | 0 |
| Total | | | | | | | 21.5 |
| Community Service Internship/Project (Mandatory) for 6 weeks duration during summer vacation | | | | | | | |



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B.TECH. - MECHANICAL ENGINEERING
Proposed Course Structure (R20) – III & IV Year

| Semester–V | | | | | | |
|-------------------|--------------------|--|----------|----------|----------|----------------|
| S.No. | Course Code | Course Name | L | T | P | Credits |
| 1. | 20A03501 | CAD/CAM | 3 | 0 | 0 | 3 |
| 2. | 20A03502 | Design of Machine Members | 3 | 0 | 0 | 3 |
| 3. | 20A03503T | Metrology and Measurements | 3 | 0 | 0 | 3 |
| 4. | | Professional Elective - I | 3 | 0 | 0 | 3 |
| | 20A03504a | a. Automation & Robotics | | | | |
| | 20A03504b | b. Tool Design | | | | |
| | 20A03504c | c. Power Plant Engineering | | | | |
| 5. | | Open Elective – I | 3 | 0 | 0 | 3 |
| 6. | 20A03503P | Metrology and Measurements Laboratory | 0 | 0 | 3 | 1.5 |
| 7. | 20A03506 | Computer Aided Modeling Laboratory | 0 | 0 | 3 | 1.5 |
| 8. | | Skill oriented course - III | | | | |
| | 20A03507 | Innovation through IoT | 1 | 0 | 2 | 2 |
| 9. | 20A03508 | Evaluation of Community Service Project/ Internship | | | | 1.5 |
| Total | | | | | | 21.5 |

Open Elective Course – I

| S.No | Course Code | Course Name | Offering Branch |
|-------------|--------------------|--|------------------------|
| 1 | 20A01505 | Building Technology | CE |
| 2 | 20A02505 | Electric Vehicles | EEE |
| 3 | 20A04505 | Digital Electronics | ECE |
| 4 | 20A05505a | Java Programming | CSE & Allied /IT |
| 5 | 20A05505b | Introduction to Machine Learning | |
| 6 | 20A12502 | Mobile Application Development using Android | |
| 7 | 20A27505 | Computer Applications in Food Processing | FT |
| 8 | 20A54501 | Optimization Techniques | Mathematics |
| 9 | 20A56501 | Materials Characterization Techniques | Physics |
| 10 | 20A51501 | Chemistry of Energy Materials | Chemistry |
| 11 | 20A52501 | Academic Writing and Public Speaking | HSMC |

Note:

1. A student is permitted to register for Honours or a Minor in IV semester after the results of III Semester are declared and students may be allowed to take maximum two subjects per semester pertaining to their Minor from V Semester onwards.
2. A student shall not be permitted to take courses as Open Electives/Minor/Honours with content substantially equivalent to the courses pursued in the student's primary major.
3. A student is permitted to select a Minor program only if the institution is already offering a Major degree program in that discipline



| Semester-VI | | | | | | |
|---|--------------------|---|----------|----------|----------|----------------|
| S.No | Course Code | Course Name | L | T | P | Credits |
| 1. | 20A03601 | Dynamics of Machinery | 3 | 0 | 0 | 3 |
| 2. | 20A03602 | Finite Element Methods (FEM) | 3 | 0 | 0 | 3 |
| 3. | 20A03603 | Heat Transfer | 3 | 0 | 0 | 3 |
| 4. | | Professional Elective – II | 3 | 0 | 0 | 3 |
| | 20A03604a | a. Non-Destructive Testing (NDT) | | | | |
| | 20A03604b | b. Production and operations management | | | | |
| | 20A03604c | c. Total Quality Management (TQM) | | | | |
| 5. | | Open Elective Course – II | 3 | 0 | 0 | 3 |
| 6. | 20A03606 | Computer Aided Design Laboratory | 0 | 0 | 3 | 1.5 |
| 7. | 20A03607 | Computer Aided Manufacturing Laboratory | 0 | 0 | 3 | 1.5 |
| 8. | 20A03608 | Heat Transfer Laboratory | 0 | 0 | 3 | 1.5 |
| 9. | | Skill oriented course - IV | 1 | 0 | 2 | 2 |
| | 20A03609 | 3D Printing practice | | | | |
| 10. | | Mandatory Non-credit Course | 2 | 0 | 0 | 0 |
| | 20A99601 | Intellectual Property Rights & Patents | | | | |
| Total | | | | | | 21.5 |
| Industry Internship (Mandatory) for 6 - 8 weeks duration during summer vacation | | | | | | |

Open Elective Course – II

| S.No | Course Code | Course Name | Offering Branch |
|-------------|--------------------|--|------------------------|
| 1 | 20A01704 | Environmental Economics | CE |
| 2 | 20A02605 | Smart Electric Grid | EEE |
| 3 | 20A04704 | Signal Processing | ECE |
| 4 | 20A04701b | Introduction to Internet of Things | ECE/CSE |
| 5 | 20A05605a | Principles of Operating Systems | CSE & Allied /IT |
| 6 | 20A05605b | Artificial Intelligence | |
| 7 | 20A12603 | Data Analytics Using R | |
| 8 | 20A27605 | Food Refrigeration and Cold Chain Management | FT |
| 9 | 20A54701 | Wavelet Transforms & its applications | Mathematics |
| 10 | 20A56701 | Physics Of Electronic Materials and Devices | Physics |
| 11 | 20A51701 | Chemistry of Polymers and its Applications | Chemistry |
| 12 | 20A52702 | English Literary Spectrum | HSMC |



| Semester–VII | | | | | | |
|---------------------|-------------------------------------|--|----------|----------|----------|----------------|
| S.No. | Course Code | Course Name | L | T | P | Credits |
| 1. | 20A03701a 20A03701b 20A03701c | Professional Elective Course– III 1. Modern manufacturing Methods 2. Design for Manufacturing (DFM) 3. Operations Research | 3 | 0 | 0 | 3 |
| 2. | 20A03702a 20A03702b 20A03702c | Professional Elective Course– IV 1. Automobile Engineering 2. Mechanical Vibrations 3. Refrigeration & Air Conditioning | 3 | 0 | 0 | 3 |
| 3. | 20A03703a 20A03703b 20A03703c | Professional Elective Course– V 1. Mechatronics & MEMS 2. Design of Oil Hydraulics and Pneumatics 3. Geometric dimensioning and tolerances | 3 | 0 | 0 | 3 |
| 4. | 20A52701a 20A52701b 20A52701c | Humanities Elective – II 1. Entrepreneurship and Incubation 2. Management Science 3. Enterprise Resource Planning | 3 | 0 | 0 | 3 |
| 5. | | Open Elective Course – III | 3 | 0 | 0 | 3 |
| 6. | | Open Elective Course – IV | 3 | 0 | 0 | 3 |
| 7. | 20A03706 | Skill oriented course - V Industrial Automation | 1 | 0 | 2 | 2 |
| 8. | 20A03707 | Evaluation of Industry Internship | | | | 3 |
| Total | | | | | | 23 |

Open Elective Course – III

| S.No | Course Code | Course Name | Offering Branch |
|-------------|--------------------|---|------------------------|
| 1 | 20A01705 | Cost Effective Housing Techniques | CE |
| 2 | 20A02704 | IOT Applications in Electrical Engineering | EEE |
| 3 | 20A04705 | Electronic Sensors | ECE |
| 4 | 20A05704a | Web Technologies | CSE & Allied /IT |
| 5 | 20A05704b | VR & AR for Engineers | |
| 6 | 20A05704c | Agile Methodologies | |
| 7 | 20A27704 | Human Nutrition | FT |
| 8 | 20A54702 | Numerical Methods for Engineers | Mathematics |
| 9 | 20A56702 | Sensors And Actuators for Engineering | Physics |
| 10 | 20A51702 | Chemistry of Nanomaterials and Applications | Chemistry |
| 11 | 20A52703 | Indian Constitution | HSMC |



Open Elective Course – IV

| S.No | CourseCode | Course Name | Offering Branch |
|------|------------|-----------------------------------|------------------|
| 1 | 20A01706 | Health, Safety & Environmental | CE |
| 2 | 20A02705 | Renewable Energy Systems | EEE |
| 3 | 20A04706 | Microcontrollers and Applications | ECE |
| 4 | 20A05705a | Cyber Security | CSE & Allied /IT |
| 5 | 20A05705b | Full Stack Development | |
| 6 | 20A12705 | Industrial IoT | |
| 7 | 20A27705 | Waste and Effluent Management | FT |
| 8 | 20A54703 | Number theory & its Applications | Mathematics |
| 9 | 20A56703 | Smart Materials and Devices | Physics |
| 10 | 20A51703 | Green Chemistry and Catalysis for | Chemistry |
| 11 | 20A52704 | Gender Studies | HSMC |

| Semester-VIII | | | | | | | |
|---------------|-------------|--------------------------------|----------|---|---|---|-----------|
| S.No. | Course Code | Course Name | Category | L | T | P | Credits |
| 1. | 20A03801 | Full Internship & Project work | PR | - | - | - | 12 |
| Total | | | | | | | 12 |

COURSES OFFERED FOR HONOURS DEGREE IN MECHANICAL ENGINEERING

| S.No. | Course Code | Course Title | Contact Hours per week | | Credits |
|-------|-------------|--|------------------------|---|---------|
| | | | L | T | |
| 1 | 20A03H01 | Mechanics and manufacturing of Composite materials | 3 | 1 | 4 |
| 2 | 20A03H02 | Application of Computational Fluid Dynamics | 3 | 1 | 4 |
| 3 | 20A03H03 | Advanced Automotive Electronics | 3 | 1 | 4 |
| 4 | 20A03H04 | Applications of Optimization Techniques | 3 | 1 | 4 |
| 5 | 20A03H05 | MOOC Course | | | 2 |
| 6 | 20A03H06 | MOOC Course | | | 2 |

LIST OF MINORS OFFERED TO MECHANICAL ENGINEERING

| S.No. | Minor Title | Department offering the Minor |
|-------|--|-------------------------------|
| 1. | Construction Technology | Civil Engineering |
| 2. | Environmental Geotechnology | Civil Engineering |
| 3. | Energy Systems | EEE |
| 4. | Internet of Things | ECE |
| 5. | Food Science | Food Technology |
| 6. | Artificial Intelligence & Data Science | CSE& Allied/IT |
| 7. | Virtual & Augmented Reality | |
| 8. | Blockchain | |