



**BITT POLYTECHNIC**  
**Getlatu, Ranchi- 835217**

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BITT-P/NOTICE/2025 – 26/ 11097  
Date: 23-08-2025

**NOTICE**

**Subject: Submission of Assignment for diploma 2nd & 4th Semester**

This is to inform all students of diploma 2nd (Session: 2024–27) & 4th ( Session : 2023 – 26) semester that the Assignment must be submitted in the prescribed format to their respective departments.

- **Last Date of Assignment Submission: 29.08.2025**

**Note:** Non-submission of the assignment may result in degradation of internal marks. The prescribed format and assignment questions are attached below in this notice.

All students are strictly instructed to adhere to the given format and ensure timely submission. Delayed submission will not be entertained.

  
Principal  
BITT Polytechnic  
Getlatu, Ranchi

**BITT Polytechnic**

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## **BIRSA INSTITUTE OF TECHNOLOGY**

**BITT POLYTECHNIC, GETLATU, RANCHI – 835217**

### **ASSIGNMENT SUBMISSION**

Program: **Diploma in [Your Branch Name]**

Semester: **[e.g., 4th/6th]**

Session: **[e.g., 2023–2026]**

***Submitted by:***

Name: **[Your Full Name]**

Registration Number: **[Your JUT Registration Number]**

Roll Number: **[Your Roll Number]**

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# BITT POLYTECHNIC, Getlatu, Ranchi

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## Assignment Question Paper

### Project Management Skill (SEC201)

1. Explain the different phases of a project lifecycle with suitable examples. How do these phases ensure effective project completion?
2. Define Project Administration. Discuss the key roles and responsibilities of a project administrator in managing resources, communication, and documentation.
3. Write a detailed note on Project Planning. What are its objectives, and how does proper planning affect the success of a project?
4. Discuss the significance of Project Scheduling and Monitoring. How do Gantt Charts, CPM, and PERT help in tracking project progress?
5. "Project monitoring and control is essential for avoiding time and cost overruns." Justify this statement with suitable case examples.

### Statistics and Analytics (AEC201)

1. What are the different methods of statistical data collection? Explain their advantages and limitations with examples.
2. Differentiate between primary data and secondary data. How do we ensure the reliability and validity of collected data?
3. Explain various methods of data summarization (tabular, graphical, and diagrammatic). Give suitable examples.
4. Define measures of central tendency (mean, median, mode). Compare their merits and demerits with examples.
5. What are the measures of dispersion? Explain range, mean deviation, variance, and standard deviation with their applications.

### Environmental Sustainability (AUC201)

1. Define an ecosystem. Explain its structure, components, and functions with neat diagrams.
2. What are the major causes and effects of air pollution? Suggest effective measures for its prevention and control.
3. Write a detailed note on water pollution. Discuss its sources, harmful impacts on human health, and preventive strategies.
4. What is soil pollution? Explain its causes, consequences, and management techniques.

5. “Environmental sustainability is essential for the survival of future generations.” Explain this statement with reference to ecosystem balance and pollution control.

## **Fundamentals of Electrical & Electronics Engineering (BSC201)**

1. Explain in detail the safety precautions to be followed in electrical engineering practices. Why is safety training important for engineers?
2. Define Ohm’s Law, Kirchhoff’s Laws, and Basic Electrical Quantities (Voltage, Current, Power, Energy) with suitable examples.
3. What are protective devices? Explain the working and applications of fuses, MCBs, RCCBs, and circuit breakers.
4. Discuss the types of wiring systems used in residential and industrial installations. What are their advantages and disadvantages?
5. Explain the concept of earthing. Why is it necessary in electrical systems? Describe different methods of earthing.

## **Transformer & Alternators (EEE201)**

1. Explain the basic AC fundamentals including alternating voltage, current, RMS value, average value, frequency, and power factor with suitable equations and waveforms.
2. Define a Transformer. Explain the working principle of a transformer with the help of Faraday’s law of electromagnetic induction.
3. Classify the different types of transformers based on construction, application, and usage. Discuss any two in detail.
4. Draw and explain the main parts of a transformer. How does each part contribute to the efficient operation of the transformer?
5. Discuss the various losses in a transformer and the methods used to minimize them.

## **Python Programming (CSE201)**

1. Explain the fundamental concepts of Python programming. Why is Python considered a high-level, interpreted, and user-friendly language?
2. Write notes on Basic Input and Output operations in Python with examples of input() and print() functions.
3. Discuss different types of operators in Python: Arithmetic, Relational, Logical, Bitwise, and String operators with suitable examples.
4. Explain the concept of expressions and operator precedence in Python. How does operator precedence affect the evaluation of expressions?
5. Write a Python program to accept two numbers from the user and display the results of arithmetic, relational, and logical operations on them.

## **Materials for Engineering (MET201)**

1. What are engineering materials? Explain the classification of engineering materials with suitable examples.
2. Discuss the different types of steels based on carbon content. Explain their properties and engineering applications.
3. Define alloys. Explain the importance of alloying in steels and give examples of commonly used steel alloys.
4. Describe the properties, types, and applications of non-ferrous metals and alloys (such as aluminium, copper, brass, and bronze).
5. Explain the criteria for selecting materials for engineering applications with examples from the automobile and construction industries.

## **Construction Materials (CIV201)**

1. What are construction materials? Discuss the role of material selection in the strength, durability, and cost of structures.
2. Explain the properties and applications of natural construction materials like stone, timber, and clay.
3. Write a detailed note on artificial construction materials such as bricks, cement, glass, and tiles.
4. Compare natural vs. artificial construction materials in terms of availability, cost, strength, and environmental impact.
5. Discuss the importance of green and sustainable construction materials in modern civil engineering.

## **Basics of Electrical Power System (EEE203)**

1. Explain the working principle, layout, and advantages of a hydroelectric power plant.
2. Write a detailed note on thermal power plants. Discuss their operation, efficiency, and limitations.
3. Compare Nuclear, Diesel, and Gas Turbine power plants in terms of cost, efficiency, and environmental impact.
4. Explain the working principle of a Solar Photovoltaic (PV) system. Discuss its advantages and disadvantages.
5. Write a detailed explanation of a Wind Power Plant. How is wind energy converted into electrical energy?

# **ASSIGNMENT QUESTION**

## **Branch: Mechanical Engineering**

### **Subject: Operations Management (MEC401)**

1. Explain the role and functions of Operations Management in a modern business organization. Discuss with suitable examples.
  2. Trace the evolution of Operational Management highlighting key historical events. How did productivity concepts evolve over time?
  3. Define Productivity and Competitiveness. Explain how strategy and operations are linked to improve competitiveness.
  4. What is Demand Forecasting? Explain demand behavior (trend, cycle, seasonal variation) and steps in the forecasting process.
  5. Differentiate between qualitative and quantitative forecasting methods. Solve a problem using Moving Average and Exponential Smoothing techniques.
  6. Discuss the need for capacity planning. Explain capacity expansion strategies and aggregate planning methods with examples.
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### **Subject: CNC Programming and Machining (MEC402)**

1. What are CNC machines? Explain the advantages of CNC machines over conventional machines in detail.
  2. Describe the constructional features of a CNC machine with neat sketches. Explain bed, spindle motor, drive, axes motor, and ball screws.
  3. Explain guideways, LM guides, console, control switches, coolant system, and hydraulic system in CNC machines.
  4. Describe cutting tool materials, tool geometry, and ISO nomenclature for turning tool holders and inserts. Give suitable diagrams.
  5. Explain the working of Automatic Tool Exchanger (ATC). Also explain tool length compensation, tool nose radius compensation, and tool wear compensation.
  6. Write and explain part programs for Facing, Turning, Step Turning, and Taper Turning operations (write for any three models and execute one).
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**Subject: Product Design and Development (MEC403)**

1. Explain the stages of product development. Why is feasibility study important in product development?
  2. Discuss the selection criteria of materials and processes during product design and development.
  3. Explain prototype development, launching of the product, and stages of the Product Life Cycle with examples.
  4. What are the general considerations in design? Discuss functional requirements, life, safety, and environmental effects.
  5. Explain principles of standardization and assembly feasibility in product design. How do maintenance, cost, and quantity influence design decisions?
  6. Discuss legal issues and patents in product design. How do aesthetics and ergonomics affect product development?
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**Subject: Elements of Industrial Automation (MEC404)**

1. Define Industrial Automation. Discuss its need and benefits. Explain the automation hierarchy and basic components of an automation system.
2. Trace the key milestones in the history of automation technology. Discuss the effects of automation on employment and society.
3. Explain different types of automation systems. Compare Relay Logic Control with PLC Logic Control in detail.
4. With neat diagrams, explain input devices used in automation: mechanical switches, proximity switches, photoelectric sensors, and encoders.
5. Discuss output devices used in automation such as relays and directional control valves. Explain their working with examples.
6. Write ladder diagrams for logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR) using IEC 1131-3 symbols.

**Branch: Electrical Engineering****Subject: Electric Motors (EEE401)**

1. Explain the construction, working, and applications of a three-phase induction motor. Discuss torque-slip characteristics in detail.
2. Describe various methods of starting a three-phase induction motor. Compare DOL, Star-Delta, and Auto-transformer starters.
3. Discuss the principle of operation, construction, and characteristics of a universal motor.
4. Explain the speed control methods of DC motors with neat diagrams and applications.
5. Write short notes on single-phase induction motors: capacitor-start, capacitor-run, and shaded-pole motors.

6. Explain the construction, working principle, and applications of stepper motors and servo motors.
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**Subject: Power Electronics (EEE402)**

1. Draw the V-I characteristics of a power diode and explain reverse recovery characteristics.
  2. Explain the construction, working, and applications of an SCR. Derive its two-transistor analogy.
  3. Discuss the operation of a single-phase fully controlled rectifier with R and RL load.
  4. Compare BJT, MOSFET, and IGBT as power electronic switches with respect to operation, ratings, and applications.
  5. Explain the operation of a DC-DC buck and boost converter with neat diagrams.
  6. Discuss different types of inverters and their applications in power systems and industries.
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**Subject: Fundamentals of Automation Technology (EEE403)**

1. Define automation. Explain different levels of automation and their importance in industries.
  2. Describe various types of industrial automation systems: Fixed, Programmable, and Flexible automation.
  3. Explain the architecture of a Programmable Logic Controller (PLC). Discuss its input-output modules.
  4. Write short notes on different types of industrial sensors: proximity, photoelectric, temperature, and displacement sensors.
  5. Discuss the advantages, limitations, and applications of automation in the electrical and manufacturing sectors.
  6. Explain SCADA (Supervisory Control and Data Acquisition) system with block diagram and applications.
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**Subject: Computer Aided Electrical Drafting (EEE404)**

1. Explain the importance of computer-aided drafting in electrical engineering. List commonly used CAD software.
2. Discuss the steps involved in preparing a single-line diagram of a substation using CAD tools.
3. Explain the procedure to draft an electrical wiring layout of a residential building using CAD.

4. Write short notes on CAD symbols used for transformers, circuit breakers, isolators, and relays.
5. Prepare a control circuit diagram of a three-phase induction motor starter (DOL/Star-Delta) using CAD tools.
6. Discuss the role of CAD in preparing electrical layouts for power plants and industrial installations.

## **Branch: Computer Science Engineering**

### **Subject: Data Structures with Python (CSE401)**

1. Explain the concept of arrays and linked lists in Python. Compare their advantages and disadvantages with examples.
  2. Write detailed notes on stack operations (push, pop, peek) and their implementation in Python using lists.
  3. Explain queue and its types (simple queue, circular queue, priority queue, deque) with examples in Python.
  4. Discuss binary trees and binary search trees. Write Python functions for insertion and traversal operations.
  5. Explain searching (linear and binary) and sorting techniques (bubble, selection, merge sort) with Python implementations.
  6. Discuss the applications of graphs in computer science. Write Python code for BFS and DFS traversal.
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### **Subject: Operating System and Administration (CSE402)**

1. Explain the functions and architecture of an operating system with neat diagrams.
  2. Discuss process management. Explain process states, scheduling algorithms, and inter-process communication.
  3. Explain the concept of deadlocks. Discuss conditions for deadlock, prevention, and recovery techniques.
  4. Write detailed notes on memory management techniques: paging, segmentation, and virtual memory.
  5. Discuss Linux file system structure. Explain file permissions, users, and groups in Linux administration.
  6. Explain different types of virtualization. Discuss the advantages and challenges of virtual machines and containers.
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**Subject: Object Oriented Programming and Design with Java (CSE403)**

1. Explain the principles of Object-Oriented Programming (OOP). Discuss encapsulation, inheritance, and polymorphism with Java examples.
  2. Write a Java program to demonstrate method overloading and method overriding. Explain the differences between them.
  3. Explain exception handling in Java with try, catch, finally, throw, and throws keywords. Provide examples.
  4. Discuss the concept of interfaces and abstract classes in Java. Compare their use with suitable programs.
  5. Explain Java Collection Framework. Discuss ArrayList, HashMap, and LinkedList with programs.
  6. Discuss the basics of UML diagrams in object-oriented design. Explain class diagram, sequence diagram, and use case diagram with examples.
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**Subject: Software Engineering Principles and Practices (CSE404)**

1. Define Software Engineering. Explain its need, challenges, and characteristics of good software.
2. Discuss different software development life cycle (SDLC) models: waterfall, incremental, spiral, and agile models.
3. Explain software process and process models. Compare defined process and empirical process.
4. Discuss the importance of software project management. Explain effort estimation and risk management.
5. Write detailed notes on software testing techniques: black-box testing, white-box testing, and unit testing.
6. Explain software quality assurance. Discuss ISO standards, CMM levels, and factors influencing software quality.

## **Branch: Civil Engineering**

### **Subject: Concrete Technology (CIV401)**

1. Explain the manufacturing process of Ordinary Portland Cement. Discuss the physical and chemical properties of cement.
  2. Describe the workability of concrete. Explain factors affecting workability and different methods of measurement.
  3. Discuss the concept of mix design in concrete. Explain the IS method of mix proportioning in detail.
  4. Explain the concept of curing of concrete. Describe different methods of curing and their importance.
  5. Discuss the concept of special concretes: Ready Mix Concrete, High Performance Concrete, and Fiber Reinforced Concrete.
  6. Write short notes on durability of concrete. Explain how permeability, shrinkage, and creep affect durability.
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### **Subject: Building Estimation & Valuation (CIV402)**

1. Explain different methods of taking out quantities in estimation. Compare long wall-short wall method and center line method.
  2. Prepare a detailed estimate of a single-room building (assume data if necessary).
  3. Discuss the types of estimates – preliminary estimate, detailed estimate, revised estimate, and supplementary estimate.
  4. Explain methods of valuation. Discuss factors affecting the value of a property.
  5. Explain sinking fund, depreciation, and scrap value in valuation with numerical examples.
  6. Prepare a detailed estimate for the quantity of brickwork, plastering, and flooring in a two-room building.
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### **Subject: Site Management (CIV403)**

1. Define site management. Explain the duties and responsibilities of a site engineer.
2. Discuss the importance of site organization. Explain manpower planning and resource allocation at a construction site.
3. Explain safety management at construction sites. Discuss preventive measures for accidents.
4. Write detailed notes on quality control at site. How is testing of materials and work carried out?

5. Explain different types of construction equipment used in earthwork, concreting, and material handling.
  6. Discuss the role of planning and scheduling in site management. Explain bar chart and CPM/PERT techniques.
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**Subject: Design and Detailing RCC Structures (CIV404)**

1. Explain the fundamentals of the Limit State Method of RCC design. Compare it with Working Stress Method.
2. Derive the expression for moment of resistance of a singly reinforced beam. Solve a design problem using IS code provisions.
3. Discuss the concept of balanced, under-reinforced, and over-reinforced sections in RCC beams.
4. Design a short axially loaded RCC column using IS code provisions. Show reinforcement details with a neat sketch.
5. Explain different types of RCC slabs. Design a one-way slab and show reinforcement detailing.
6. Discuss the concept of shear reinforcement in RCC beams. Draw typical detailing for stirrups and bent-up bars.

**Branch: Electronics & Communication Engineering**

**Subject: PCB Design & Fabrication (ECE401)**

1. Explain the process of PCB design. Discuss schematic design, layout design, and routing techniques in detail.
  2. Describe different types of PCBs (single-sided, double-sided, and multilayer) with applications.
  3. Explain the steps involved in the fabrication of a PCB. Discuss etching and drilling processes.
  4. Discuss PCB materials and their electrical, thermal, and mechanical properties.
  5. Explain soldering techniques used in PCB fabrication (wave soldering, reflow soldering, hand soldering).
  6. Describe common PCB faults and troubleshooting methods. Discuss testing techniques used in industry.
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**Subject: Wireless Communication (ECE402)**

1. Explain the fundamental concepts of wireless communication. Discuss advantages and limitations.

2. Describe the principle of cellular communication. Explain frequency reuse, handoff, and cell splitting.
  3. Explain modulation techniques used in wireless communication (AM, FM, PM, ASK, FSK, PSK).
  4. Discuss different generations of mobile communication systems (1G to 5G).
  5. Explain satellite communication systems with block diagrams.
  6. Discuss wireless technologies such as Wi-Fi, Bluetooth, and ZigBee. Explain their applications.
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**Subject: Embedded C Programming (ECE403)**

1. Explain the structure of an Embedded C program. Discuss differences between C and Embedded C.
  2. Write a program in Embedded C to interface an LED with a microcontroller. Explain step by step.
  3. Explain the use of timers, counters, and interrupts in Embedded C with examples.
  4. Discuss memory types (ROM, RAM, Flash, EEPROM) used in embedded systems programming.
  5. Write Embedded C programs for controlling motors and sensors in automation systems.
  6. Explain the role of Embedded C in real-time operating systems (RTOS) and IoT applications.
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**Subject: Industrial Automation (ECE404)**

1. Define industrial automation. Explain its need, benefits, and levels of automation.
2. Describe different types of automation systems: Fixed automation, Programmable automation, and Flexible automation.
3. Explain the working of Programmable Logic Controllers (PLC) with block diagrams.
4. Discuss sensors and actuators used in industrial automation. Give suitable examples.
5. Explain the concept of SCADA systems. Discuss its architecture and applications in industries.
6. Describe recent trends in industrial automation such as IoT integration, smart factories, and robotics.