Organizational Behaviour			Semester	5
Course Code	**BVU501**		CIE Marks	100
Teaching Hours/Week (L: T:P:S)	1:0:0:2		SEE Marks	0
Total Hours of Pedagogy	25 (each module 05 hours)		Total Marks	100
Credits	02		Exam Hours	01 Hour
Examination type (SEE)	**Theory**			

Course Learning Objectives:

CLO1: Define organizational behaviour and its importance in contemporary organizations.
CLO2: Explain the foundations of individual behaviour, including personality, perception, attitudes, and values.
CLO3: Understand the concept of motivation and various theories explaining it.
CLO4: Describe the dynamics of group behaviour, including team development, decision-making, and conflict management.
CLO5: Explain the concepts of leadership, power, and politics within organizations.
CLO6: Understand the impact of organizational culture and structure on employee behaviour.
CLO7: Analyse the challenges and opportunities presented by diversity and inclusion in the workplace.
CLO8: Explain the process of organizational change and its impact on employees.
CLO9: Apply OB concepts to analyse and diagnose organizational problems.

Module-1

Introduction to Organizational Behaviour

- Definition and scope of Organizational Behaviour (OB)
- Importance of OB
- Historical development of OB
- Challenges and opportunities in OB
- The role of OB for effective management

Module-2

Individual Behaviour

- Personality and its impact on organizational behaviour
- Perception and its role in organizational life
- Attitudes, values, and job satisfaction
- Motivation theories (Maslow, Herzberg, McClelland, etc.)
- Job design and work stress

Module-3

Interpersonal Behaviour

- Communication process and barriers
- Interpersonal skills (listening, feedback, negotiation)
- Conflict management styles and strategies
- Power and politics in organizations
- Leadership theories and styles

Module-4

Group Behaviour

- Group dynamics and stages of group development
- Group structure and processes
- Group decision-making
- Teamwork and collaboration
- Organizational culture and its impact on behaviour

Module-5

Organizational Structure and Design

- Organizational structure concepts (departmentalization, centralization, etc.)
- Organizational design (functional, divisional, matrix, etc.)
- Organizational change and development
- Organizational culture and climate

Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

CO 1: Explain the impact of individual factors (personality, perception, attitudes, values) on behaviour.

CO 2: Apply concepts of motivation, learning, and job satisfaction to enhance employee performance.

CO 3: Analyse the role of emotions and stress in the workplace and develop strategies for management.

CO 4: Explain the concept of organizational culture and its impact on employee behaviour.

CO 5: Analyse the relationship between organizational structure, design, and effectiveness.

CO 6: Evaluate the role of change management in organizations.

CO 7: Demonstrate an understanding of the key concepts and theories in organizational behaviour.

CO 8: Analyse the impact of individual differences, group dynamics, and organizational culture on behaviour.

CO 9: Apply OB knowledge to improve organizational effectiveness and employee well-being.

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) and for the SEE minimum passing mark is 35% of the maximum marks(18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 100 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks
4. The test after completion of 100% syllabus is conducted for 100 marks.
   Two questions are to be set for each module, there are 10 questions with 20 marks each. Each question may or may not have a sub-question. The students have to answer for 100 marks(05 full questions).
5. The sum of the two assignments is scaled down to 50.
6. The marks scored in the test shall be scaled down to 50.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks

(Teacher may conduct the quiz or presentation or other suitable method of assignment in place of two or one assignment mentioned)

Semester-End Examination:

SEE is Not Applicable

Web links and Video Lectures (e-Resources):

https://nptel.ac.in/courses/109104030

Suggested Learning Resources:

Books

1. Luthans, F. (1989). Organizational Behaviour. London: McGraw Hill.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Role-playing and simulations
- Case studies and discussions
- Group projects and presentations
- Experiential learning

	Basics of Legal and HR Policies		Semester	5
	Course Code	**BVU502**	CIE Marks	100
	Teaching Hours/Week (L: T:P:S)	1:0:0:2	SEE Marks	0
	Total Hours of Pedagogy	25 (each module 05 hours)	Total Marks	100
	Credits	02	Exam Hours	01 Hour
	Examination type (SEE)	**Theory**		

Course Learning Objectives:

CLO1: Understand the legal environment of employment.
CLO2: Analyse the impact of labour laws on HR practices.
CLO3: Develop and implement effective HR policies.
CLO4: Manage employee relations within legal and ethical boundaries.
CLO5: Identify potential legal risks and develop mitigation strategies.

Module-1

Introduction to Labor Laws

- Overview of labour laws and their significance
- Historical development of labour legislation
- Key labour laws (vary by jurisdiction, but typically include):
- Employment Standards Act
- Industrial Disputes Act
- Minimum Wages Act
- Equal Remuneration Act
- Sexual Harassment Prevention Act
- Maternity Benefits Act
- Child Labor Act
- Social Security Acts

Module-2

Employment Contracts

- Types of employment contracts (permanent, temporary, contractual)
- Essential terms of an employment contract
- Contractual clauses (confidentiality, non-compete, intellectual property)
- Contractual violations and remedies

Module-3

Employee Rights and Responsibilities

- Fundamental rights of employees
- Employee duties and obligations
- Discrimination and harassment
- Whistleblower protection
- Workplace safety and health

Module-4

HR Policy Development and Implementation

- Principles of policy development
- Types of HR policies (employee handbook, code of conduct, disciplinary procedures, etc.)
- Policy communication and dissemination
- Policy review and update

Module-5

Legal Compliance and Risk Management

- Compliance audits and assessments
- Legal risks in HR (termination, discrimination, harassment, etc.)
- Developing risk mitigation strategies
- Role of HR in managing legal issues

Course outcome (Course Skill Set)

At the end of the course, the student will be able to :

CO 1: Identify key labour laws and regulations relevant to employment.
CO 2: Explain the implications of labour laws on HR practices.
CO 3: Recognize potential legal risks and liabilities associated with employment decisions.
CO 4: Understand the basic principles of employment contracts and their legal enforceability.
CO 5: Define the purpose and importance of HR policies.
CO 6: Develop HR policies aligned with legal requirements and organizational goals.
CO 7: Communicate HR policies effectively to employees at all levels.
CO 8: Implement HR policies consistently and fairly.
CO 9: Handle policy-related inquiries and grievances.
CO 10: Manage employee relations issues in accordance with HR policies and legal standards.
CO 11: Ensure compliance with equal employment opportunity (EEO) laws and regulations.
CO 12: Understand the basics of workplace safety and health regulations.
CO 13: Implement effective disciplinary procedures.
CO 14: Manage employee performance and conduct issues within legal and policy frameworks.

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) and for the SEE minimum passing mark is 35% of the maximum marks(18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 100 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks
4. The test after completion of 100% syllabus is conducted for 100 marks.
   Two questions are to be set for each module, there are 10 questions with 20 marks each. Each question may or may not have a sub-question. The students have to answer for 100 marks(05 full questions).
5. The sum of the two assignments is scaled down to 50.
6. The marks scored in the test shall be scaled down to 50.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks

(Teacher may conduct the quiz or presentation or other suitable method of assignment in place of two or one assignment mentioned)

Semester-End Examination:

SEE is Not Applicable

Web links and Video Lectures (e-Resources):

Suggested Learning Resources:

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Contents-related activities (Activity-based discussions)
- For active participation of students instruct the students to prepare Flowcharts.
- Organising group-wise discussions on topics.
- Quizzes and Discussions, Seminars and assignments.

	Production Technology		Semester	5
	Course Code	**BVU503**	CIE Marks	50
	Teaching Hours/Week (L: T:P:S)	1:0:2:2	SEE Marks	50
	Total Hours of Pedagogy	40(Each Module 10 hours)	Total Marks	100
	Credits	03	Exam Hours	03 Hours
	Examination type (SEE)	**Theory**		

Course Learning Objectives:

CLO1: Understand and perform various operations on a center lathe, including turning, taper turning, screw cutting, and other related processes, and maintain the machine effectively.

CLO2: Operate and analyze shaping, planing, slotting, drilling, and boring machines, understanding their working principles, tooling, and maintenance requirements.

CLO3: Utilize and understand different types of milling machines, milling cutters, and indexing methods for various milling operations, including gear and rack milling.

CLO4: Apply knowledge of grinding machines, abrasives, and grinding techniques, along with an understanding of broaching machines and broaching processes.

CLO5: Design and implement jigs and fixtures for various machining operations, and understand the principles of cooling and cutting fluids in machining processes

Module-1

CENTRE LATHE:

The centre lathe and its principle of working, Types of lathes, Lathe specification and size, Features of lathe bed, Head stock and tail stock, Feed mechanism and change-gears. Lathe operations-plane and step turning, Taper turning, Screw cutting, Drilling, Boring, reaming, Knurling, Parting off, Under cutting, Relieving,

Module-2

SHAPING, PLANING & SLOTTING MACHINES

Working principles of planer, shaper and Slotter, Differences and similarities among them, quick return mechanism applied to the machines. types of work done on them, types of tools used, their geometry, General and periodic maintenance of a shaper.

DRILLING & BORING MACHINES: Types of tools used in drilling and boring. Classification of drilling and boring machines.

Module-3

MILLING MACHINES

Types of milling machines, constructional features of horizontal milling M/C. general maintenance of the machine, milling operations like plane milling, space milling, angular milling , cutting speed .

Module-4

GRINDING MACHINES

	Grain structure and shapes of common wheels, various speeds and feeds, Use of coolants, Methods of grinding, Types of grinding machines, BROACHING MACHINES: Types of work done on broaching machine. Simple types of broaches and their uses, Types of broaching machines.
	Module-5
	JIGS AND FIXTURES Object of Jigs and Fixture, Difference between jigs and fixtures, Principle of location, Principle of clamping, Locating and clamping devices. Types of jigs - Simple open and closed (or box) jigs. Drill jigs- bushes (Fixed, Liner, Renewal, Slip). Template, Plate jigs. Channel jigs, Leaf jigs, Simple example of milling, turning, grinding, horizontal boring fixtures and broaching fixtures. Welding fixtures

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO 1: Operate and maintain center lathes, performing various operations like turning, taper turning, screw cutting, and other related tasks, and understand the features and functions of semi-automatic lathes.

CO 2: Explain and utilize the working principles of shaping, planing, slotting, drilling, and boring machines, including their tooling, operations, and maintenance procedures.

CO 3: Perform and analyze milling operations on different milling machines, understanding indexing methods, cutter types, and appropriate speeds and feeds for various materials.

CO 4: Describe and apply grinding and broaching processes, including the selection of abrasives, grinding wheels, and broach types for specific applications.

CO5: Design and implement jigs and fixtures for various machining operations, applying principles of location and clamping, and understand the importance of cooling and cutting fluids in machining processes.

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) and for the SEE minimum passing mark is 35% of the maximum marks(18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 50 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks(May be quiz or other method of assignments)
4. The test after completion of 90 % syllabus is conducted for 100 marks.
5. The sum of the two assignments is scaled down to 25.
6. The marks scored in the test shall be scaled down to 25.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks

(The class teacher may conduct the quiz/presentations/other suitable methods of assignment in place of two or one test)

Semester-End Examination: 50 Marks

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub-questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Marks scored will be scaled down to 50 marks

Web links and Video Lectures (e-Resources):

Suggested Learning Resources:

Books

1. P C Sharma, Production Engineering, S Chand Publication
2. Donaldson, Tool Design, Tata McGrow Hill

Activity-Based Learning (Suggested Activities in Class)/Practical-Based learning

- Industrial Visits: Exposure to actual production environments to understand industry practices.
- Collaborative projects with industries to solve real-world production challenges.
- Practical training in industrial settings to gain hands-on experience.

	Soft Skills Development		Semester	5
	Course Code	**BVU504**	CIE Marks	100
	Teaching Hours/Week (L:T:P:S)	1:0:0:0	SEE Marks	0
	Total Hours of Pedagogy	12 hours (2.5 hours per module)	Total Marks	100
	Credits	01	Exam Hours	01 Hours
	Examination type (SEE)	**Theory**		

Course Learning Objectives:

CLO1: Develop personal and professional effectiveness
CLO1: Increase self-awareness and emotional intelligence.
CLO1: Enhance time management and organizational skills.
CLO1: Build resilience and adaptability.
CLO1: Develop critical thinking and problem-solving abilities.
CLO1: Foster a positive attitude and work ethic.
CLO1: Master public speaking and presentation skills.
CLO1: Build strong relationships and networks.
CLO1: Develop conflict resolution and negotiation skills.
CLO1: Enhance professional etiquette and business communication.
CLO1: Build confidence and assertiveness.
CLO1: Deliver effective presentations to diverse audiences.
CLO1: Conduct successful meetings and facilitate group discussions.

Module-1

Interpersonal Skills

- Building relationships
  - Networking
  - Empathy
  - Conflict resolution
  - Negotiation
- Teamwork
  - Collaboration
  - Team roles
  - Team dynamics

Module-2

Problem-Solving and Decision Making

- Problem identification and analysis
- Creative thinking
- Decision-making techniques
- Critical thinking

Module-3

Professional Ethics and Etiquette

- Ethical behaviour
- Workplace ethics
- Business ethics
- Professional etiquette
- Business etiquette
- Social etiquette

Module-4

Leadership and Management Development

- **Strategic Leadership:**
  - Visionary leadership and organizational change
  - Developing a strategic mindset
  - Coaching and mentoring skills
- **Emotional Intelligence and Resilience:**
  - Building emotional intelligence for leadership
  - Developing resilience and adaptability
  - Managing stress and burnout
- **Team Building and Collaboration:**
  - High-performance team dynamics
  - Conflict resolution and mediation
  - Building trust and collaboration

Module-5

Problem-Solving and Decision Making

- **Critical Thinking and Analysis:**
  - Advanced problem-solving techniques
  - Decision-making frameworks
  - Risk assessment and mitigation
- **Innovation and Creativity:**
  - Fostering a culture of innovation
  - Design thinking and problem-solving
  - Generating creative solutions

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO 1: Developed leadership abilities: Ability to inspire, motivate, and guide teams towards achieving common goals.

CO 2: Improved problem-solving and decision-making: Critical thinking skills to analyse complex situations and make informed choices.

CO 3: Stronger interpersonal skills: Building and maintaining positive relationships with colleagues, clients, and stakeholders.

CO 4: Increased emotional intelligence: Understanding and managing emotions effectively for personal and professional growth.

CO 5: Effective negotiation and conflict resolution: Resolving disputes and reaching mutually beneficial agreements.

CO 6: Advanced presentation skills: Delivering compelling and persuasive presentations to diverse audiences.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for the Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE, the minimum passing mark is 35% of the maximum marks (18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 100 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks
4. The test after completion of 100% syllabus is conducted for 100 marks.
   Two questions are to be set for each module, there are 10 questions with 20 marks each. Each question may or may not have a sub-question. The students have to answer for 100 marks(05 full questions).
5. The sum of the two assignments is scaled down to 50.
6. The marks scored in the test shall be scaled down to 50.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks

(Teacher may conduct the quiz or presentation or other suitable method of assignment in place of two or one assignment mentioned)

Semester-End Examination:

SEE is Not Applicable

Web links and Video Lectures (e-Resources):

https://archive.nptel.ac.in/courses/109/104/109104107/

Suggested Learning Resources:
Books

1. Soft Skills by Ajay R. Tengse,
2. Negotiation: Getting to Yes, Beyond Reason
3. Conflict Resolution: The Art of Conflict Resolution
4. Change Management: Leading Change
5. Time Management: Eat That Frog!

Activity-Based Learning (Suggested Activities in Class)/Practical-Based learning

- Contents-related activities (Activity-based discussions)
- For active participation of students instruct the students to prepare Flowcharts.
- Organising group-wise discussions on topics.
- Quizzes and Discussions, Seminars and assignments.

	Industry 4.0		Semester	5
	Course Code	**BVU505**	CIE Marks	100
	Teaching Hours/Week (L: T:P:S)	1:0:0:2	SEE Marks	0
	Total Hours of Pedagogy	25 (each module 05 hours)	Total Marks	100
	Credits	02	Exam Hours	01 Hour
	Examination type (SEE)	**Theory**		

Course Learning Objectives:

CLO1: Understand the concept of Industry 4.0: Define and explain the key characteristics, drivers, and potential impacts of Industry 4.0.
CLO2: Identify core technologies: Describe the role of key technologies such as IoT, AI, Big Data, cloud computing, and cyber-physical systems in Industry 4.0.
CLO3: To provide an overview of Additive Manufacturing processes, systems and applications.
CLO4: Understand the basic ideas and techniques in the design of intelligent systems.
CLO5: Explain the historical context of industrial revolutions leading to Industry 4.0.
CLO6: Identify the key components of a smart factory.

Module-1

Introduction to Industry 4.0

- Introduction to Industry 4.0
- What is Industry 4.0?
- The history of Industry 4.0
- The key technologies of Industry 4.0
- The benefits of Industry 4.0
- The challenges of Industry 4.0

Cyber-Physical Systems

- What are cyber-physical systems?
- The components of cyber-physical systems
- The applications of cyber-physical systems
- The challenges of cyber-physical systems

Module-2

The Internet of Things (IoT)

- What is the Internet of Things?
- The components of the Internet of Things
- The applications of the Internet of Things
- The challenges of the Internet of Things

Big Data and Analytics

- What is big data?
- The characteristics of big data
- The applications of big data
- The challenges of big data
- Big data analytics tools and techniques

Data Analytics in Manufacturing: Introduction, Power Consumption in manufacturing, Anomaly Detection in Air Conditioning, Smart Remote Machinery Maintenance Systems with Komatsu, Quality Prediction in Steel Manufacturing.

Module-3

Advances Robotics

- What is robotics?
- The types of robots
- The applications of robots
- The challenges of robots

Cloud Computing

- What is cloud computing?
- The types of cloud computing
- The applications of cloud computing
- The challenges of cloud computing

Module-4

Additive Manufacturing

- What is additive manufacturing?
- The types of additive manufacturing
- The applications of additive manufacturing
- The challenges of additive manufacturing

Advances in Virtual Factory Research and Applications, The State of Art, The Virtual Factory Software , Limitations of the Commercial Software

Module-5

Augmented Reality: The Role of Augmented Reality in the Age of Industry 4.0, Introduction, AR Hardware and Software Technology, Industrial Applications of AR, Maintenance , Assembly, Collaborative Operations , Training.

Smart Factories: Introduction, Smart factories in action, Importance, Real world smart factories, The way forward.

A Roadmap: Digital Transformation, Transforming Operational Processes, Business Models, Increase Operational Efficiency, Develop New Business Models.

Industry 4.0 Case Studies

- Case studies of successful Industry 4.0 implementations
- Case studies of failed Industry 4.0 implementations
- Lessons learned from Industry 4.0 case studies

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO1: Understand the opportunities, challenges brought about by Industry 4.0 for benefits of organizations and individuals

CO2: Analyze the effectiveness of Smart Factories, Smart cities, Smart products and Smart services

CO3: Apply the Industrial 4.0 concepts in a manufacturing plant to improve productivity and profits

CO4: Evaluate the effectiveness of Cloud Computing in a networked economy

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) and for the SEE minimum passing mark is 35% of the maximum marks(18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 100 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks
4. The test after completion of 100% syllabus is conducted for 100 marks.

Two questions are to be set for each module, there are 10 questions with 20 marks each. Each question may or may not have a sub-question. The students have to answer for 100 marks(05 full questions).

5. The sum of the two assignments is scaled down to 50.
6. The marks scored in the test shall be scaled down to 50.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks

(Teacher may conduct the quiz or presentation or other suitable method of assignment in place of two or one assignment mentioned)

Semester-End Examination:

SEE is Not Applicable

Web links and Video Lectures (e-Resources):

https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs31/

https://onlinecourses.nptel.ac.in/noc20_cs69/preview

https://onlinecourses.nptel.ac.in/noc21_me115/preview https://onlinecourses.nptel.ac.in/noc20_mg70/preview

Suggested Learning Resources:

Books

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things"

2. Sabrie Soloman, 3D Printing & Design, Khanna Book Publishing Company, New Delhi, 2020

Activity-Based Learning (Suggested Activities in Class)/Practical-Based learning

- Demonstrate a sensor based application
- IoT and Sensor Networks: Building and deploying IoT devices, collecting and analyzing sensor data.
- Robotics and Automation: Programming and operating industrial robots, integrating automation systems.
- Additive Manufacturing (3D Printing): Designing and producing prototypes, understanding material properties.
- Augmented and Virtual Reality: Developing AR/VR applications for training, maintenance, and design.
- Cybersecurity: Implementing cybersecurity measures, responding to cyber threats.

	Manufacturing Technology – Advanced		Semester	5
	Course Code	**BVU506**	CIE Marks	50
	Teaching Hours/Week (L: T:P:S)	1:0:2:2	SEE Marks	50
	Total Hours of Pedagogy	40(Each module 08 hours)	Total Marks	100
	Credits	03	Exam Hours	03 Hours
	Examination type (SEE)	**Theory**		

Course Learning Objectives:

CLO1: Understand and classify various metal forming and metal cutting processes, including their underlying principles and the machines used.

CLO2: Perform and analyze different welding processes, including weld edge preparation, welding procedures, equipment usage, and the characteristics of welding arcs and metal transfer.

CLO3: Evaluate and apply destructive and non-destructive testing methods for welds, adhering to relevant welding codes and standards.

CLO4: Create and utilize patterns and molds for casting processes, understanding material selection, allowances, layout, core types, and addressing potential defects.

CLO5: Explain and apply advanced manufacturing technologies like CNC machining, additive manufacturing, rapid prototyping, and automation/robotics, as well as understand different manufacturing systems and their automation aspects.

Module-1

Foundry Work:
Elementary idea of patterns, green sand moulds and moulding, tools and equipment used in green sand moulding.
safety of Personnel, Equipment & Tools to be observed.

Module-2

WELDING: (a) Weld edge preparation, Introduction to various welding processes with procedure equipment and applications such as
(i) Electric arc welding. (ii) Resistance welding. (iii) Metal-Inert-Gas welding (MIG) (iv) Tungsten Inert Gas welding (TIG) (v) Laser Beam, Electron Beam welding,
(b) Welding Arcs:

Definition, arc initiation, arc structures, types of arc,

Module-3

PATTERN & MOULDING: The pattern materials used, Types of pattern allowances and pattern layout, Colour scheme patterns defects, Types of cores and their utility. Moulding and Pouring: Classification of mould materials according to characteristics, Types of sands and their importance test, parting powders and liquids, Sand mixing preparation, Moulding defects.

(Learning with Practical)

	Module-4
	Advanced Manufacturing Technologies: • CNC machining and programming • Additive manufacturing (3D printing) • Rapid prototyping and tooling • Automation and robotics in manufacturing
	Module-5
	Manufacturing Systems and Automation • Manufacturing systems (e.g., job shop, flow shop, mass production) • Automation technologies (e.g., robotics, programmable logic controllers (PLCs)) • Flexible manufacturing systems (FMS) • Computer-integrated manufacturing (CIM)

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO 1: Understand and classify various metal forming, joining, and cutting processes, including their underlying principles and the machines involved.
CO 2: Apply and analyze different welding processes, including weld edge preparation, welding procedures, equipment usage, and testing methods (both destructive and non-destructive), while adhering to relevant welding codes.
CO 3: Create and evaluate patterns and molds used in casting processes, understanding material selection, allowances, layouts, and addressing common defects.
CO 4: Explain and apply advanced manufacturing technologies, including CNC machining and programming, additive manufacturing (3D printing), rapid prototyping, and the role of automation and robotics.
CO 5: Describe and differentiate various manufacturing systems and automation technologies, including FMS and CIM, and their impact on modern production environments.

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) and for the SEE minimum passing mark is 35% of the maximum marks(18 out of 50 marks). The student is declared as a pass in the course if he/she secures 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: 50 Marks

1. Two assignments tests;
2. First assignment after 30% completion of the syllabus for 50 marks
3. Second assignment after completion of 70% of the syllabus for 50 marks(May be quiz or other method of assignments)
4. The test after completion of 90 % syllabus is conducted for 100 marks.
5. The sum of the two assignments is scaled down to 25.
6. The marks scored in the test shall be scaled down to 25.
7. The final marks of the course/subject is the sum of the Assignment marks and test marks **(The class teacher may conduct the quiz/presentations/other suitable methods of assignment in place of two or one test)**

Semester-End Examination: 50 Marks

Question paper pattern:

• The question paper will have ten full questions carrying equal marks.
• Each full question will be for 20 marks.
• There will be two full questions (with a maximum of four sub-questions) from each module.
• Each full question will have sub- question covering all the topics under a module.
• The students will have to answer five full questions, selecting one full question from each module.
Marks scored will be scaled down to 50 marks

Web links and Video Lectures (e-Resources):

https://archive.nptel.ac.in/courses/112/107/112107078/

Suggested Learning Resources:
Books

1. Workshop Technology, Vol. I: BS Raghuvanshi
2. Production Technology, Vol. I: Hazra & Chaudhry

Activity-Based Learning (Suggested Activities in Class)/Practical-Based learning

- Contents-related activities (Activity-based discussions)
- For active participation of students instruct the students to prepare Flowcharts.
- Organising group-wise discussions on topics.
- Quizzes and Discussions, Seminars and assignments.