IV B.TECH II SEMESTER Professional Elective–5	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	2	1	0	40	60	100	3
Code: 19BME8PE07	PRODUCTION PLANNING AND CONTROL						

COURSE OBJECTIVES:

The course content enables students to:

- Understand the various components and functions of production planning and control such as work study, product planning, process planning, production scheduling, Inventory Control.

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

CO1	Apply the systems concept for the design of production and service systems.
CO2	Make use of forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.
CO3	Understand the principles and techniques of inventory management
CO4	Choose routing procedure and able to prepare bill of material.
CO5	Understand the importance and function of scheduling &Identify dispatching procedure and make use of computer in production planning and control

UNIT-I

INTRODUCTION: Definition, objectives and functions of production planning and control, elements of production control, types of production, organization of production planning and control department, internal organization of department.

UNIT-II

FORECASTING: Forecasting, importance of forecasting, types of forecasting, their uses general principles of forecasting, forecasting techniques, qualitative methods and quantitative methods.

UNIT-III

INVENTORY MANAGEMENT: Inventory control, Purpose of holding stock-Effect of demand on inventories-Ordering procedures. Two bin system, Determination of Economic order quantity and economic lot size-ABC analysis-Recorder procedure.

UNIT–IV

ROUTING : Routing, definition, routing procedure, route sheets, bill of material, factors affecting routing procedure, schedule, definition, difference with loading.

UNIT-V

PRODUCTION SCHEDULING: Production Control Systems-Loading and scheduling, Master Scheduling-Scheduling rules, Gantt charts-Basic scheduling problems, Line of balance, Flow production scheduling.

DISPATCHING: Dispatching, activities of dispatcher, dispatching procedure, follow up, applications of computer in production planning and control.

TEXT BOOKS:

1. Elements of Production Planning and Control, Samuel Eilon.
2. Production Planning and Control, Mukhopadyay, PHL

REFERENCE BOOKS:

1. Production Planning Control and Industrial Management, K.C.Jain& L.N. Aggarwal, Khanna Publishers, 6th Edition, 2008.
2. Theory and Problems in Production & Operations Management, S.N.Chary, Tata McGrawHill, 2003.
3. Production and Operations Management, N.G. Nair,Tata McGraw-Hill, 2004

WEB LINKS:

1. http://www.ddegjust.ac.in/2017/Uploads/11/POM-326.pdf
2. https://mrcet.com/downloads/digital_notes/ME/IV%20year/PPC%20NOTES.pdf
3. https://getmyuni.azureedge.net/assets/main/study-material/notes/mechanical_engineering_industrial-engineering-operation-research_production-planning-and-control_notes.pdf
4. http://www.velhightech.com/wp-content/uploads/2019/04/IE6605-Production-Planning-and-Control-IV-YEAR-VIII-SEM-converted.pdf

IV B.TECH II SEMESTER Professional Elective - 4	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	2	1	-	40	60	100	3
Code: 19BME8PE04	ROBOTICS AND APPLICATIONS						

COURSE OBJECTIVES

The course content enables students to:

- Introduce the concepts of Robotic system, its components and control related to robotics.
- Learn about analyzing robot kinematics.

COURSE OUTCOMES

After successful completion of this course, the students will be able to:

CO1 **Distinguish** between automation and robotics and **identify** various components of robot.
CO2 **Select** appropriate type of actuators and sensors for different applications.
CO3 **Analyze** kinematics of a robot
CO4 **Analyze** Dynamics of a robot
CO5 **Illustrate** present and future applications of robots

UNIT 1: FUNDAMENTALS OF ROBOTICS

INTRODUCTION TO ROBOTICS: what is a robot, components of robot, Robot history, robotic controls and systems, classification, challenges and opportunities, The scenarios of industrial robotics and advanced robotics
HOMOGENOUS COORDINATES AND TRANSFORM REPRESENTATIONS: Vector spaces, inner products, vector norms, orthogonality, Linear transformations, matrix multiplication, matrix groups, Coordinate transformations, rigid transformations, rotation matrices

UNIT 2: ACTUATORS AND SENSORS

SENSORS: Basic Elements, General Classification of Sensors, types and working, use of sensors in robotics.
ACTUATORS: Types, working principles, applications and advancements (hydraulic devices, Electric motors such as DC servomotors and stepper motors, Pneumatic devices, as well as other novel actuators)

UNIT 3: ROBOT KINEMATICS

The fundamentals of kinematics, differential kinematics and statics- Kinematic chains, Forward kinematics, The Jacobian and its properties, Inverse kinematics- analytical methods

UNIT 4: ROBOT DYNAMICS

Differential kinematics- Jacobian computation, singular configurations, Configuration space operation, Dynamics- Lagrange, Euler and Newton, Euler formations, Problems.

UNIT 5: ROBOT APPLICATIONS IN MANUFACTURING

Material Transfer, Material handling, loading and unloading, Processing, spot and continuous arc welding & spray painting, Assembly and Inspection. Future applications of robots. Path planning in robotics.

TEXT BOOKS:

1. Industrial Robotics, Groover M P, Pearson Education.
2. Robotics and Control, Mittal R K & Nagrath I J, Tata McGraw Hill.

REFERENCES:

1. Robotics: Fundamental Concepts and Analysis, Ashitava Ghosal, Oxford Publications.
2. Robotic Systems: Applications, Control and Programming; Edited by Ashish Dutta, Intech Open.
3. Robotics, Fu K S, McGraw Hill.
4. Robotic Engineering, Richard D. Klafter, Prentice Hall.

WEB RESOURCES:

1. https://www.intechopen.com/books/robotic-systems-applications-control-and-programming.
2. http://planning.cs.uiuc.edu/node659.html
3. https://www.edx.org/course/robot-mechanics-and-control-part-i
4. https://www.edx.org/course/robotics-foundation-ii-robot-control