

Manipal University Jaipur

Specialization Wise B.Tech Lateral Entry Syllabus

- **B.Tech in Automobile Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Engineering Economics ● Management of Technology ● Materials Science & Metallurgy ● Thermal Engineering ● Strength of Materials ● Flexi Core 1 ● Computer Aided Drawing Lab ● Automotive Engines Lab ● Project-Based Learning 1 	<ul style="list-style-type: none"> ● Statistics and Probability ● Vehicle Architecture ● Vehicle Control System ● Flexi Core 2 ● Program Elective 1 ● Open Elective 1 ● Vehicle Control System Lab ● Automotive Data Analytics Lab ● Project-Based Learning 2
Semester V	Semester VI
<ul style="list-style-type: none"> ● Automotive Design ● Vehicle Drive Line Systems ● Flexi Core 3 ● Program Elective 2 ● Program Elective 3 ● Open Elective 2 ● Automotive Design Lab ● Vehicle Drive Line Systems Lab ● Project-Based Learning 3 ● Research Methodology 	<ul style="list-style-type: none"> ● Quality Engineering ● Program Elective 4 ● Program Elective 5 ● Program Elective 6 ● Open Elective 3 ● Professional Practice ● Vehicle Electronics System Lab ● Modeling and Simulation Lab ● Project-Based Learning 4 ● Honors Elective 1
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective 7 ● Program Elective 8 ● Open Elective 4 ● Open Elective 5 ● Internship (Industry or Research) ● Honors Elective 2 ● Honors Elective 3 	<ul style="list-style-type: none"> ● Major Project ● Honors Project

- **B.Tech in Biotechnology**

Semester III	Semester IV
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<ul style="list-style-type: none"> ● Engineering Economics ● Management of Technology ● Cell and Microbiology ● Biochemistry ● Transport Processing Biological Systems ● Flexi Core 1 ● Simulation Lab 1/Data Structures and Algorithms Lab ● Cell and Microbiology Lab ● Project-Based Learning 1 	<ul style="list-style-type: none"> ● Statistics and Probability ● Genetics and Molecular Biology ● Bioreaction Engineering and Bioenergetics ● Flexi Core 2 ● Program Elective 1 ● Open Elective 1 ● Simulation Lab 2/Relational Database Management System Lab ● Genetics and Molecular Biology Lab ● Project-Based Learning 2
Semester V	Semester VI
<ul style="list-style-type: none"> ● Bioinformatics ● Bio-Separation Processes ● Flexi-Core 3 ● Program Elective 2 ● Program Elective 3 ● Open Elective 2 ● Simulation Lab 3/Object Oriented Programming Lab ● Bio-Separation Processes Lab ● Project-Based Learning 3 	<ul style="list-style-type: none"> ● Immunology and Immunotechnology ● Program Elective 4 ● Program Elective 5 ● Program Elective 6 ● Open Elective 3 ● Professional Practice ● Immunology and Immunotechnology Lab ● Project-Based Learning 4
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective 7 ● Program Elective 8 ● Open Elective 4 ● Open Elective 5 ● Internship (Industry or Research) 	<ul style="list-style-type: none"> ● Major Project

- **B.Tech in Chemical Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Engineering Economics ● Management of Technology ● Process Calculations ● Fluid Mechanics ● Chemical Engg Thermodynamics ● Flexi Core - 1 ● Fluid Mechanics Lab ● Simulation Lab 1/Data Structures and Algorithms Lab ● Project-Based Learning 1 	<ul style="list-style-type: none"> ● Statistics and Probability ● Reaction Engineering ● Heat and Mass Transfer ● Flexi Core - 2 ● Program elective 1 ● Open Elective 1 ● Reaction Engineering Lab ● Heat and Mass Transfer Lab ● Project-Based Learning 2
Semester V	Semester VI

<ul style="list-style-type: none"> ● Process Plant Design ● Design of Separation Processes ● Flexi Core-3 ● Program Elective 2 ● Program Elective 3 ● Open Elective 2 ● Separation processes Lab ● Simulation Lab 2/Object Oriented Programming Lab ● Project-Based Learning 3 	<ul style="list-style-type: none"> ● Process Dynamics and Control ● Program Elective 4 ● Program Elective 5 ● Program Elective 6 ● Open Elective 3 ● Professional Practice ● Process Dynamics and Control Lab ● Project-Based Learning 4
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective 7 ● Program Elective 8 ● Open Elective 4 ● Open Elective 5 ● Internship (Industry/research) 	<ul style="list-style-type: none"> ● Major Project

- **B.Tech in Civil Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Value, Ethics, and Governance ● Engineering Mathematics - III ● Fluid Mechanics ● Building Materials & Construction ● Technology Surveying ● Structural Analysis ● Material Testing Lab ● Surveying Practice 	<ul style="list-style-type: none"> ● Economics ● Engineering Mathematics - IV ● Engineering Geology ● Water Supply Engineering ● Analysis of Indeterminate Structures ● Open Elective - I ● Geology Lab ● Fluid Mechanics Lab ● Building Drawing and Design
Semester V	Semester VI
<ul style="list-style-type: none"> ● Organization and Management ● Geotechnical Engineering ● Highway Engineering ● Design of Reinforcement Concrete Structures ● Waste Water management ● Open Elective - II ● Geotechnical Engineering Lab ● Environmental Engineering Lab 	<ul style="list-style-type: none"> ● Applied Geotechnical Engineering ● Design of Steel Structures ● Water Resources Engineering ● Program Elective - I ● Program Elective - II ● Open Elective - III ● Computer-Aided Design Lab ● Highway Engineering Lab ● Estimation and Costing Practice ● Project Based Learning
Semester VII	Semester VIII

<ul style="list-style-type: none"> ● Program Elective - III ● Program Elective - IV ● Program Elective V ● Program Elective - VI ● Minor Project ● Industrial Training ● Survey Camp 	<ul style="list-style-type: none"> ● Major Project
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- **B.Tech in Electrical and Electronics Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Value, Ethics and Governance ● Engineering Mathematics - III ● Analog & Digital System Design ● Electromagnetic Field Theory ● Electrical Circuit Analysis ● Electrical Machines - I ● Analog System Design Lab ● Digital System Design lab ● Electrical Machinery Lab - I 	<ul style="list-style-type: none"> ● Economics ● Engineering Mathematics - IV ● Electrical Machinery - II ● Generation Transmission & Distribution ● Microcontrollers ● Open Elective - I ● Electrical Machinery Lab - II ● Microcontroller Lab ● MATLAB & System Simulation Lab ● Project Based Learning Lab
Semester V	Semester VI
<ul style="list-style-type: none"> ● Organization & Management ● Communication Systems ● Digital Signal Processing ● Measurements & instrumentation ● Power System Analysis ● Open Elective - I ● DSP Lab ● Measurements & Instrumentation Lab ● Project Based Learning Lab 	<ul style="list-style-type: none"> ● Linear Control theory ● Power Electronics ● Switch Gear & Protection ● Program Elective I ● Program Elective II ● Open Elective - III ● Power Electronics Lab ● Power Systems Lab ● Control & Automation Lab ● Minor Project - I
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective - III ● Program Elective - IV ● Program Elective - V ● Program Elective - VI ● Program Elective - VII ● Minor Project - II ● Seminar/Industrial Training 	<ul style="list-style-type: none"> ● Project Work/Practice School

- **B.Tech in Electronics and Communication Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Statistics and Probability ● Network, Signals & Systems ● Electromagnetics & Microwave ● Analog Circuits & Systems ● Digital System Design ● Economics ● Program Elective 1 ● University Elective 1 ● Analog Circuits & Systems Lab ● Digital System Design Lab ● Self-Study or Project 	<ul style="list-style-type: none"> ● Management ● Electromagnetics & Microwave ● Computer Architecture ● Flexi Core 1 ● Program Elective 1 ● University Elective 2 ● Microwave & RF Lab ● Computer System Design Lab ● Project Based Learning
Semester V	Semester VI
<ul style="list-style-type: none"> ● MOS VLSI Design ● Modern Communications System ● Flexi Core 2 ● Program Elective 1 ● Program Elective 2 ● Program Elective 3 ● University Elective 3 ● VLSI & Embedded System Lab ● Communication System Lab ● Project Based Learning 2 	<ul style="list-style-type: none"> ● Optical Communication (MT, Asa, AR) ● Flexi Core 3 ● Program Elective 4 ● Program Elective 5 ● University Elective 4 ● Technical Writing Clinic 2 ● Optical Communication Lab ● Advanced System Design Lab ● Research, Innovation & Entrepreneurship
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● University Elective 5 ● Program Elective 6 ● Program Elective 7 ● Program Elective 8/University Elective 6 ● Internship (Industry/Research) 	<ul style="list-style-type: none"> ● Major Project

● **B.Tech in Information Technology**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Value, Ethics and Governance ● Engineering Mathematics - III ● Computer System Architecture ● Data Structures and Algorithms ● Object Oriented Programming ● Data Communications ● Object-oriented Programming Lab ● Data Structures and Algorithms Lab 	<ul style="list-style-type: none"> ● Economics ● Engineering Mathematics - IV ● Web Technologies ● Operating Systems ● Relational Database Management Systems ● Open Elective - I ● Operating Systems Lab ● Relational Database Management

	Systems Lab <ul style="list-style-type: none"> • Web Technologies Lab
Semester V	Semester VI
<ul style="list-style-type: none"> • Program Elective - 1 • Foundations of Data Science • Software Engineering • Design and Analysis of Algorithms • Computer Networks • Open Elective - II • Design and Analysis of Algorithms • Computer Networks • Open Elective - II • Design and Analysis of Algorithms Lab • Computer Networks Lab • Software Engineering Lab 	<ul style="list-style-type: none"> • Organization and Management • Program Elective - 2 • Minor Project • Open Elective - III • Artificial Intelligence and Machine Learning • Automata Theory and Compiler Design • Cryptography and Information Security • Compiler Design Lab • Artificial Intelligence and Machine Learning Lab
Semester VII	Semester VIII
<ul style="list-style-type: none"> • Program Elective - 3 • Program Elective - 4 • Program Elective - 5 • Program Elective - 6 • Program Elective - 7 • Industrial Training 	<ul style="list-style-type: none"> • Major Project

- **B.Tech in Mechanical Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> • Value, Ethics and Governance • Engineering Mathematics - III • Materials Science and Engineering • Kinematics of Machines • Thermodynamics • Strength of Materials • Computer-Aided Drafting and Design Lab • Strength of Materials Lab • Seminar 	<ul style="list-style-type: none"> • Economics • Engineering Mathematics - IV • Metrology • Fluid Mechanics • Dynamics of Machines • Open Elective - I • Metrology Lab • Fluid Mechanics Lab • Computer-Aided Numerical Methods • Project-based learning - I
Semester V	Semester VI
<ul style="list-style-type: none"> • Organization and Management • Production Technology - I • Design of Machine Transfer • Internal Combustion Engine 	<ul style="list-style-type: none"> • Production Technology - II • Introduction to Finite Element Methods • Refrigeration and Air Conditioning

<ul style="list-style-type: none"> ● Open Elective - II ● Production Technology - I Lab ● Heat & Mass Transfer Lab ● Internal Combustion Engine lab ● Project-Based Learning - II 	<ul style="list-style-type: none"> ● Computer Integrated Manufacturing ● Program Elective - I ● Open Elective - III ● Production Technology - II Lab ● Refrigeration and Air Conditioning Lab ● Computer Aided Engineering Lab ● Project Based Learning - III
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective II ● Program Elective III ● Program Elective IV ● Program Elective V ● Program Elective VI ● Program Elective VII ● Mini Project ● Industrial Training 	<ul style="list-style-type: none"> ● Major Project

- **B.Tech in Mechatronics Engineering**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Value, Ethics and Governance ● Engineering Mathematics - III ● Strength of Materials ● Linear Integrated Circuits ● Theory of Machines ● Sensor and Instrumentation ● Simulation and Modelling Lab ● Sensor & Instrumentation Lab ● Seminar 	<ul style="list-style-type: none"> ● Economics ● Engineering Mathematics - IV ● Design of Machine Elements ● Digital System Design ● Fluid Mechanics ● Open Elective - I ● Programmable Logic Controller Lab ● Integrated Electronics Lab ● Project-Based Learning - I
Semester V	Semester VI
<ul style="list-style-type: none"> ● Organization and Management ● Signal and Systems ● Microcontroller-Based System Design ● Pneumatic and Hydraulic Systems ● Linear Control Theory ● Open Elective - II ● Microcontroller Lab ● CAD and Kinematics Lab ● Pneumatics and Hydraulics Lab ● Project-Based Learning - II 	<ul style="list-style-type: none"> ● Robotics ● Computer Integrated Manufacturing ● Power Electronics and Electrical Drives ● Program Elective - I ● Program Elective - II ● Open Elective - II ● Industrial Automation lab ● Robotics Lab ● Drives, Control and Simulation Lab ● Project Based Learning - III
Semester VII	Semester VIII

<ul style="list-style-type: none"> ● Program Elective - III ● Program Elective - IV ● Program Elective - V ● Program Elective - VI ● Minor Project ● Industrial Training 	<ul style="list-style-type: none"> ● Major Project
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- **B.Tech in Robotics and Artificial Intelligence**

Semester III	Semester IV
<ul style="list-style-type: none"> ● Statistics and Probability ● Digital Systems and Integrated Circuits ● Robot Kinematics and Dynamics ● Sensors and Actuators for Robots ● Technology Management ● Flexi Core 1 ● Modeling and Simulation Lab ● Sensors and Actuators Lab ● Self-Study or Project-Based Learning 1 	<ul style="list-style-type: none"> ● Engineering Economics ● Robotics Control System ● Basics of AI and ML ● Program Elective 1 ● Flexi Core 2 ● Open Elective 1 ● Control Lab ● AI and ML Lab ● Project Based Learning 2
Semester V	Semester VI
<ul style="list-style-type: none"> ● AI in Robotics ● Drives in Robotics ● Flexi Core 3 ● Program Elective 2 ● Program Elective 3 ● Open Elective 2 ● Robotics Lab ● Drives Lab ● Project Based Learning 3 	<ul style="list-style-type: none"> ● Deep Neural Network ● Program Elective 4 ● Program Elective 5 ● Program Elective 6 ● Open Elective 3 ● Professional Practice ● Advance Robotics Lab ● Microcontroller Lab ● Project-Based Learning 4
Semester VII	Semester VIII
<ul style="list-style-type: none"> ● Program Elective 7 ● Program Elective 8 ● Open Elective 4 ● Open Elective 5 ● Internship (Industry/Research) 	<ul style="list-style-type: none"> ● Major Project