

DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech – Production Engineering – V Semester		
Course Title	Industrial Robotics		
Course Code	PRPE15	No. of Credits	03
Course Code of Pre-requisite subject(s)	Please Refer Curriculum		
Session	July 2018	Section (if, applicable)	A & B
Name of Faculty	Mr.V.Murugabalaji	Department	Production Engineering
Email	murugabalaji@nitt.edu	Telephone No.	
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	-	Telephone No.	-
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Fundamentals of Robotics: Definition - robot classification - robot arm geometry - power sources, application areas - control techniques - path control - robot controller operation - open loop and closed loop systems.</p> <p>End of arm tooling and sensors: characteristics - classification - special purpose tools - Typical designs, compliance in Wrists. End Effectors: types, mechanical and other types of griper - types of sensors and applications.</p> <p>Robot Programming And Languages: Language classification - program commands, arm motion, task point diagram - on line/off line programming, sample programs, program analysis - AI and experts systems.</p> <p>Robot Applications: Robot applications in manufacturing - material transfer and machine loading / unloading - Processing operations like welding and painting - Assembly operations - Inspection Automation. Robot cell layouts - multiple robots and machine interference.</p> <p>Recent developments: Recent developments in advanced Robotics –Modular concept - Special applications of robotics - micro robotics, Bio robotics - technologies and applications.</p>			

TEXTBOOKS:

1. Keramas, J.G. "Robot Technology Fundamentals", Delmer Publisher, 2002
2. Jain, K.C, and Aggarwal, L.N., "Robotics Principles and Practice", Khanna Publishers, 2001

REFERENCE BOOKS:

1. Groover, M.P., "Industrial Robotics", McGraw Hill International Editions, 2008.
2. Deb, S.R., "Robotics Technology and Flexible automation", Tata McGraw Hill Pub., New Delhi, 1994.

COURSE OBJECTIVES

- To understand the components of robot
- To understand the drives and programs used to actuate the robot
- To utilize robot technology in various applications

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Explain the basic concepts, parts of robots and types of robots	PO1 and PO3
2. Identify the various drive systems for robot, sensors and their applications in robots, programming of robots	PO1, PO3 and PO12
3. Discuss about the various applications of robots, justification, implementation and safety of robot	PO1, PO3, and PO12

COURSE PLAN – PART II**COURSE OVERVIEW**

This course is to teach the robotic concepts and the recent trends and applications of robots in various fields.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Definition - robot classification	PPT/Chalk and Talk
		Robot arm geometry	
		Power sources, application areas	
2	Week 2	Control techniques	PPT/Chalk and Talk
		Path control -	
		Robot controller operation	
3	Week 3	Open loop and closed loop systems.	PPT/Chalk and Talk
		End of arm tooling	
		Sensors: characteristics - classification	
Assignment - 1			
4	Week 4	Special purpose tools -	PPT/Chalk and Talk
		Typical designs, compliance in Wrists.	
		End Effectors: types	

5	Week 5	Mechanical and other types of griper	PPT/Chalk and Talk
		Types of sensors and applications	
		Assesment - 1	
6	Week 6	Robot Programming And Languages	PPT/Chalk and Talk
		Language classification	
		Program commands,	
Assignment - 2			
7	Week 7	Arm motion	PPT/Chalk and Talk
		Task point diagram	
		On line/off line programming,	
8	Week 8	Program analysis	PPT/Chalk and Talk
		AI and experts systems	
		Robot Applications: Robot applications in manufacturing	
9	Week 9	Material transfer and machine loading / unloading	PPT/Chalk and Talk
		Processing operations like welding and	
		Assembly operations - Inspection	
Assignment - 3			
10	Week 10	Robot cell layouts	PPT/Chalk and Talk
		Multiple robots and machine interference	
		Assesment - 2	
11	Week 11	Recent developments: Recent developments in advanced Robotics	PPT/Chalk and Talk
		Modular concept	
		Special applications of robotics	
12	Week 12	Micro robotics	PPT/Chalk and Talk
		Bio robotics	
		Technologies and applications	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assesment 1	End of 5 th Week	1Hr	20%
2	Assesment 2	End of 10 th Week	1Hr	20%
3	Assignment	Once in three weeks		10%
CPA	Compensation Assessment*	End of 12th Week	1Hr	20%
4	Final Exam	End of the semester	3 Hrs	50%
*mandatory; refer to guidelines on page 4				
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
Course exit survey will be collected after a few classes in the beginning of the semester and at the end of the semester through online. Students can login their MIS account to give their feedback. Mid-semester feedback shall be collected to improve teaching-learning process. Also, students may give their feedback during class committee meeting.				
COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)				
<u>MODE OF CORRESPONDENCE (email/phone etc.)</u>				
The mode of correspondence may be through mobile or email.				
Mobile No.: +91-9597675365 Email: murugabalaji@nitt.edu				
<u>COMPENSATION ASSESSMENT POLICY</u>				
As per norms				

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

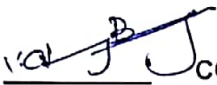


- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

FOR APPROVAL

Course Faculty  CC-Chairperson  HOD 

Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) Every course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.
- d) The passing minimum shall be as per the regulations.
- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.