DEPARTMENT OF PRODUCTION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-620015.

COURSE OUTLINE				
Course Title	**INDUSTRIAL ROBOTICS**			
Course Code	**PRPE15**	No. of Credits	03	
Department	Production Engineering	Faculty	Jafrey Daniel James D	
Pre-requisites Course Code				
E-mail	jafrey.daniel@gmail.com	Contact No.	9894314390	
Course Type	Core course		Elective course	√

Course overview

- To study about the fundamental of robotics and their types
- To study about arms and wrists in the robots
- To study about the end effector types, sensors and robotics language
- To study about various types of gripper and several sensors
- To study about various applications of the robotics in painting and welding
- To study about multi robots and machine interference

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	Aligned Programme Outcomes
➢ Explain the basic concepts, parts of robots and types of robots ➢ Identify the various drive systems for robot, sensors and their applications in robots, programming of robots ➢ Discuss about the various applications of robots, justification, implementation and safety of robot	P01, P03, P07, P11, P12

S. No	Week	Topic	Mode of Delivery
1.	1st Week	Fundamentals of Robotics:Definition	Lecture C&T/ PPT Video
		Robot classification	
		Robot arm geometry	
2.	2nd Week	Power sources for robotics	
		Application areas for robotics	
		Control techniques	
3.	3rd Week	Path control in robotics	
		Robot controller operation	
		Open loop and closed loop systems	
4.	4th Week	End of arm tooling and sensors: characteristics	
		End of arm tooling and sensors: classification-special purpose tools	
		Typical designs, compliance in wrists.	
5	5th Week	End Effectors :types, mechanical and other types of griper	Lecture C&T/ PPT Video
		Types of sensors and applications	
		Robot Programming and Languages	
Cycle Test-1			

6	6th Week	Robot Language classification - program commands	Lecture C&T/ PPT Video
		Arm motion, task point diagram	
		On line/off line programming	
7	7th Week	Sample programs in robotics	
		Program analysis in robotics	
		AI and experts systems	
ASSIGNMENT			
8	8th Week	Robot Applications	Lecture C&T/ PPT Video
		Robot applications in manufacturing	
		Robot applications in material transfer and machine loading/unloading	
9	9th Week	Robot applications in material transfer and machine loading/unloading	
		Robotic applications in welding	
		Robotic applications in painting	
Cycle Test-II			
10	10th Week	Assembly operations-Inspection	Lecture C&T/ PPT Video
		Automation. Robot cell layouts	
		Multiple robots and machine interference	

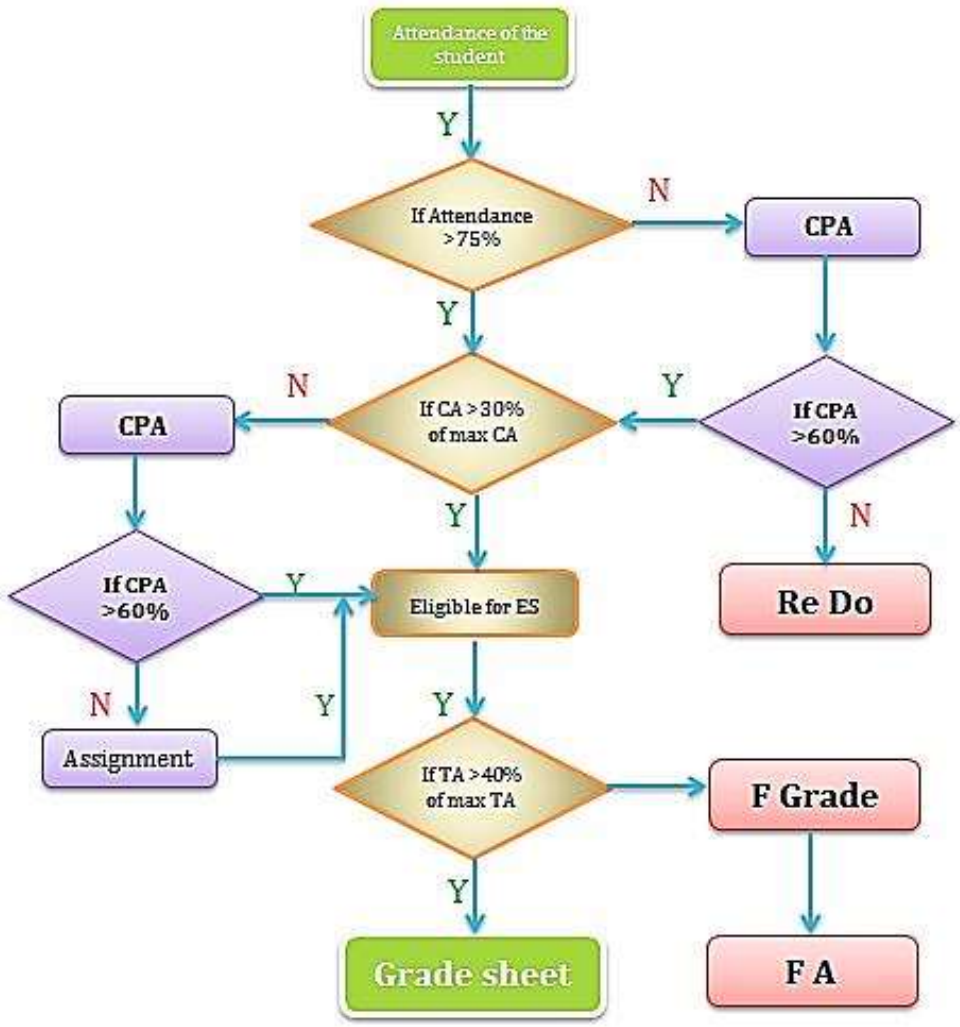
COURSE ASSESSMENT METHODS

S.No	Mode of Assessment	Week	Duration	% Weightage
1	Cycle test-1	4th week	60 Minutes	20
2	Cycle Test 2	8th week	60 Minutes	20
3	Assignment-I	7thweek		10
4	Descriptive Type Examination	10th week	180 Minutes	50

ASSESSMENT

1. Attending all the assessments is MANDATORY for every student.
2. If any student is not able to attend any of the continuous assessments (CAs: Cycle test, Assignment) due to genuine reason, student is permitted to attend the compensation assessment (CPA) with 20 % weightage. If any student missed one cycle test of 10 % weightage then CPA will be considered for 10 % weightage. (This is not valid for students who have attendance lag also. Refer Pt. 3 under Attendance)
3. At any case, CPA will not be considered as an improvement test.
4. Students are expected to score minimum 30% of the maximum mark of the class in the CAs to attend the end semester examination in addition to the attendance requirement. Otherwise the student is permitted to attend CPA and is expected to score more than 60% marks to get eligibility to appear for end semester examination. However, the score in CPA WILL NOT be considered for computing marks for CA. Student who fails to score 60% in CPA will take up additional assignments to get eligibility for writing End Semester examination.
5. Finally, every student is expected to score minimum 40% of the maximum mark of the class in the total assessment (1, 2, 3, 4 and 5) to pass the course. Otherwise the student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT.

Refer the following flow chart for more clarity:



CA: Continuous Assessment Mark of a student TA: Total Assessment Mark of a student Max. CA : Maximum Continuous Assessment Mark of the class Max. TA : Maximum Total Assessment Mark of the class FA : Formative Assessment ES: End Semester CPA: Compensation Assessment

ESSENTIAL READINGS: Textbooks, Reference Books Website addresses, journals, etc.
Text Books
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 InternationalEditions, 2008. *2. Deb, S.R., "Robotics Technology and Flexibleautomation", Tata McGraw HillPub., New Delhi, 1994.*

COURSE EXIT SURVEY

1. Students can meet the faculty at any stage in the course duration in case he/she findsdifficulty in understanding the concept.
2. Feedback form issued to students to express their comments during mid of the semester and after completing the syllabus. Students are requested to give genuine feedback about the course.
3. Student knowledge about the topic covered in this course will be judged based on marks obtained in the written examinations and during surprise test.

Course Policy (including plagiarism, academic honesty, attendance, etc.)

Examination:

- Students must attend all the examinations (cycle tests, surprise test and end semester examination). If a student fails to attend any of the cycle test due to genuine reason he/she will be permitted to write re-test and the portion will be the combined portion of cycle test 1 and 2.
- Students should submit assignments as per the instructions given in the class. Late submission is not permitted.

Attendance:

- The minimum attendance for appearing for the semester examination is 75%.
- Those students, whose attendance falls below 75% but above 50% in the course, shall attend mandatory classes before the semester examinations to qualify to write semester exam.
- The students who are having attendance less than 50% has to redo the course in the next semester or academic year (at the time of offering the course).
- The Institute follows relative grading with flexibility given to teachers to decide the mark ranges for grades. The assessment of the course will be done on the basis of marks.

Correspondence

- All the correspondence (schedule of classes/schedule of assessment course material/ any other information regarding this course) will be done through their class representative.

ADDITIONAL COURSE INFORMATION
Students can reach course coordinator by fixing appointment through E-mail jafrey.daniel@gmail.com or phone 9894314390
FOR APPROVAL
D Jafrey **Course Faculty** _____ **CC-Chairperson** _____ **HOD** _____ 13/7/17