

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

COURSE OUTLINE			
Course Title	KINEMATICS AND DYNAMICS OF MACHINES		
Course Code	PRPC16	No. of Credits	04
Department	Production Engineering	Faculty	Mr. K. Rajesh Kumar
Pre-requisites Course Code	PRPC10		
E-Mail	rkumar@nitt.edu	Contact No.	8190059029
Course Type	Core course	✓	Elective course
Course overview			
<p>Kinematics and kinetics of motion. Simple mechanisms and velocity & acceleration in mechanisms. Cam profile synthesis and Gear dynamic force analysis. Functions of flywheel and Governors.</p> <p>Balancing of rotating parts and reciprocating parts. Hydrodynamic and journal bearings. Transverse and longitudinal Vibration.</p>			
Course objectives			
<ul style="list-style-type: none"> ➤ To design various machines and to perform kinematic and dynamic analysis. 			
Course Outcomes			
<ul style="list-style-type: none"> ➤ Understand the basic concepts of machines and machinery ➤ Understand law of gearing. ➤ Understand the laws of dry friction. ➤ Understand all mechanisms of machines. ➤ Design various mechanisms of machines. ➤ Evaluate various mechanisms of machines 			

S. No	Week	Topic	Mode of Delivery
1	1 st Week	Introduction to Kinematics	Lecture C&T/ PPT
2		Kinematic pair, link, chain	
3		Types of link, pair, joints, & Number of degrees of freedom	
4		Inversion of Mechanisms	
5	2 nd Week	Displacement, Velocity & Acceleration analysis of planar linkages	Video
6		Tutorial	
7		Static and Dynamic of a simple mechanisms	
8		Tutorial	
9	3 rd Week	Classifications of cam and follower	Lecture C&T/ PPT
10		Terminology of Cam, Motion of follower	
11		Construction of Cam profile	
12		Tutorial	
13	4 th Week	Gear introduction & classification	Lecture C&T/ PPT Video
14		Terminology of gear	
15		Tutorial	
16		Gear trains	
17	5 th Week	Introduction to flywheel	Lecture C&T/ PPT Video
18		Turning moment diagram for a four stroke cycle engine	
19		Fluctuation of energy and coefficient of fluctuation of energy	
20		Tutorial	
21	6 th Week	Introduction to governors & Types	Lecture C&T/ PPT Video
22		Working principle and Terms used in governor	
23		Tutorial	
24		Tutorial	
25	7 th Week	Friction in journal bearing	Lecture C&T/ PPT Video
26		Friction in pivot and collar bearing	

27		Friction in trapezoidal or truncated bearing		
28		Tutorial		
29	8 th Week	Introduction balancing in rotating masses	Lecture C&T/ PPT Video	
30		Single rotating mass in same plane		
31		Tutorial		
32		double rotating masses in same plane		
33	9 th Week	double rotating masses in same plane		
34		Tutorial		
35		Several mass rotating in same plane		
36		Tutorial		
37	10 th Week	Introduction to Vibrations		Lecture C&T/ PPT Video
38		Types of vibratory motion		
39		Types of vibrations		
40		Natural frequency of free longitudinal vibrations		
41	11 th Week	Natural frequency of free Transverse vibration		
42		Critical or whirling speed of shaft		
43		Tutorial		
44		Tutorial		

COURSE ASSESSMENT METHODS					
S.No	Mode of Assessment	Syllabus	Date	Duration	% Weightage
1	Cycle Test 1	Unit – 1,2 (upto 4 th week)	-	60 Minutes	20
2	Cycle Test 2	Unit – 3,4 (upto 9 th week)	-	60 Minutes	20
3	Assignment	-	-	-	10
4	Re - test	-	-	60 Minutes	Refer course policy
5	Descriptive Type Examination(End	-	-	180 Minutes	50

	Semester)				
Total Assessment			6 Hrs	100	
ESSENTIAL READINGS: Textbooks, Reference Books Website addresses etc.					
Text Books					
1. Shigley, J.E. and Uicker, J.J., Theory of Machines and Mechanisms, Oxford University Press, 3rd Edition, 2008. 2. Thomas Bevan, Theory of Machines, CBS Publishers. 3rd edition, 2008. 3. Rattan S.S., Theory of Machines, Tata McGraw Hill Pub Co, 2nd Edition, 2008.					
Reference Books					
1. Rao, J.S., and Dukkupati, R.V., Mechanism and Machine Theory, Wiley Eastern Ltd., Second Edition. 1992. 2. Ghosh A and Mallik A.K., Theory of Mechanisms and Machines, Affiliated EWPPvt. Ltd, Third Edition, 2003.					

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- Feedback from the students during class committee meetings
- Anonymous feedback through questionnaire

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

EXAMINATION:

1. Students must attend all the examinations (cycle tests and end semester examination). If a student fails to attend any of the cycle tests 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.
2. Students should submit assignments as per the instructions given in the class. Late submission is not permitted.

ATTENDANCE

1. The minimum attendance for appearing for the semester examination is 75%.
2. 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.

3. 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).
4. 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.

ACADEMIC HONESTY & PLAGIARISM

1. All the students are expected to be genuine during the course work. Taking of information by means of copying simulations, assignments, looking or attempting to look at another student's paper or bringing and using study material in any form for copying during any assessments is considered dishonest.
2. Tendering of information such as giving one's program, simulation work, assignments to another student to use or copy is also considered dishonest.
3. Preventing or hampering other students from pursuing their academic activities is also considered as academic dishonesty.
4. Any evidence of such academic dishonesty will result in the loss of marks on that assessment. Additionally, the names of those students so penalized will be reported to the class committee chairperson and HoD of the concerned department.
5. Students who honestly producing ORIGINAL and OUTSTANDING WORK will be REWARDED.

CORRESPONDENCE

1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ any other information regarding this course) will be done through their webmail only.
2. Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher.

ADDITIONAL COURSE INFORMATION
The faculty is available for consultation at times as per the intimation given by the faculty.
FOR APPROVAL
Course Faculty _____ CC-Chairperson _____ HOD _____