

DEPARTMENT OF MECHANICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Course Title	MECHANICS OF MACHINES – I		
Course Code	MEPC17	No. of Credits	03
Course Code of Pre-requisite subject(s)	MEPC10		
Session	July/ Jan. 2018	Section (if, applicable)	MECH-B
Name of Faculty	YR KISHORE	Department	MECHANICAL
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	kishore@nitt.edu	Telephone No.	9963298129
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus			
<p>Kinematics Fundamentals: Types of links, Degrees of freedom- Kinematic chains, mechanisms, Mechines- lower pairs and higher pairs- Mobility-Number Synthesis-isomers-Linkage Transformation-inversions-Grashof conditions- Barker’s classification-Rotatability and revolvability of N bar linkages-Compliant Mechanism-MEMS</p> <p>Velocity analysis: definition of velocity-graphical velocity analysis-instant centers of velocity-Kennedy’s rule-velocity analysis using instant centers-mechanical advantage-centrodes-analytical velocity analysis of a 4 bar linkage</p> <p>Acceleration analysis: definition of acceleration-graphical acceleration analysis- analytical acceleration analysis-coriolis acceleration-human tolerance to acceleration</p> <p>Cams: types of cams and followers-types of motion program-pressure angle and radius of curvature</p> <p>Gears: fundamental law of gearing-involute tooth form-pressure angle –changing center distance-interference and under cutting- contact ratio-types of gears-simple gear trains-compound gear trains-epicyclic gear trains-Ferguson’s paradox.</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To impart knowledge on various types of Mechanisms and synthesis 2. To impart skills to analyse the position, velocity and acceleration of mechanisms 3. To familiarize higher pairs like cams and gears 			
COURSE OUTCOMES (CO)			
Course Outcomes	Aligned Programme Outcomes (PO)		
At the end of the course student will			
1. Synthesize and analyze 4 bar mechanisms	1,2,3,5,6,10		
2. Use computers for mechanism animation and analysis	1,2,3,5		
3. Understand cams and gears	1,2,3,5,6,12		

COURSE PLAN – PART II

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	1 Week	Kinematics Fundamentals: Types of links, Degrees of freedom- Kinematic chains, mechanisms, Mechines- lower pairs and higher pairs	Chalk and Talk/ PPT/Video
2	2 Week	Four bar chain-inversions-Grashof conditions-Barker’s classification	Chalk and Talk/ PPT/ Video
3	3 Week	Mobility-Number Synthesis-isomers-Linkage Transformation-single slider mechanism	Chalk and Talk/ PPT/ Video
4	4 Week	Rotatability and revolvability -Compliant Mechanism-MEMS	Chalk and Talk/ PPT
5	5 Week	Velocity analysis: definition of velocity-graphical velocity analysis-instant centers of velocity-Kennedy’s rule-velocity analysis using instant centers-mechanical advantage-centrodes	Chalk and Talk/ PPT
6	6 Week	Velocity analysis- relative velocity method	Chalk and Talk/ PPT
7	7 Week	Acceleration analysis: definition of acceleration-graphical acceleration analysis	Chalk and Talk/ PPT
8	8 Week	Analytical acceleration analysis-coriolis acceleration	Chalk and Talk/ PPT
9	9 Week	Analytical velocity and acceleration of four bar chain	Chalk and Talk/ PPT
10	10 Week	Cams,types of cams and followers-types of motion – cam design	Chalk and Talk/ PPT
11	11 Week	Gears: fundamental law of gearing-involute tooth form-pressure angle –changing center distance-interference and under cutting- contact ratio	Chalk and Talk/ PPT
12	12 Week	Types of gears-simple gear trains- compound gear trains	Chalk and Talk/ PPT
13	13 Week	Epicyclic gear trains	Chalk and Talk/ PPT

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle test-I	5 th Week	1 hour	20
2	Cycle test-II	11 th Week	1 hour	20
3	Google classroom-Assignments/Home work problems	-	-	10
4	Compensation Assessment (Retest)	13 th Week	1 hour	-
5	Final Assessment	14 th Week	3 hours	50

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc.

1. Robert L. Norton.,” Design of Machinery: an introduction to synthesis and analysis of mechanisms and machines” 5th ed.,McGraw-Hill 2012
2. Uicker,J.J., Jr., Pennock,G.R., and Shigley, J.E., Theory of Machines and Mechanisms ,3rd ed., Oxford Univeristy Press,2003.
3. Robert Norton., “Kinematic s and Dynamics of machinery” 1st ed.,McGraw Hill India., 2009

COURSE EXIT

Feedback from the students during class committee meetings.
Anonymous feedback through questionnaire and unknown formats.

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, , academic honesty and plagiarism etc.)

MODE OF CORRESPONDENCE (email/ phone etc)

All the students are advised to come to the class regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/any other information regarding this course) will be intimated in the Class only.

ATTENDANCE

Attendance will be taken by the faculty in all the contact hours. Every student should maintain minimum of 75 % physical attendance in these contact hours along with assessment criteria to attend the end semester examination.

COMPENSATION ASSESSMENT

Retest will be conducted for 20 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 as dishonest.
2. Tendering of information such as giving one’s program, assignments to another student to use or copy is also considered as dishonest.
3. Preventing or hampering other students from pursuing their academic activities are 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.

ADDITIONAL INFORMATION

- The faculty is available for consultation at times as per the intimation given by the faculty.
- Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher(kishore@nitt.edu)

FOR APPROVAL

Course Faculty Y.R. Kishore CC-Chairperson Dr. R. K. Srinivasan HOD Dr. P. S. Srinivasan