Department of Mechanical Engineering
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

MEPC12: Strength of Materials			
Course Title	Strength of Materials		
Course Code	MEPC12	No. of Credits	03
Department	Mechanical Engineering	Faculty	Dr. N.SIVASHANMUGAM
Pre-requisites Course Code	Nil		
Course Coordinator(s) (if, applicable)			
E-mail	nsiva@nitt.edu	Telephone No.	9443649278
Course Type	■ Core course	☐ Elective course	

COURSE OVERVIEW

This integrated course involves the basic understanding of fundamental engineering principles in-line with analysis of forces and the effects of forces on the engineering components. The course famililiarises the students with the vast areas of applciations of engineering mechanicsm types of mechanical stresses and strains, elastic coefficients of materials and design of any physical system in a very precise and interesting manner and therby opens an a platform to design of mechanical components.

COURSE OBJECTIVE

1. To explain the importance of mechanics and fundamental concepts in the context of stress and strain calculations.
2. To explain the significance of centroid, centre of gravity and moment of inertia in-line with bending of beams, evaluation of deflection of beams, struts and columns.
3. To introduce the failure theories of design of mechanical components like shafts, springs and thin vessels.
4. To apply the different principles that connected with principal stresses and strain.

COURSE OUTCOMES (CO)

After taking this course students would be able to:		Aligned Programme Outcomes (PO)
1.	Appreciate complexity of various design procedures that connected with mechanical components, materials selection, etc.	1, 2, 3, 5
2.	Demonstrate the evaluation of stresses and strain in terms of simple bending and thin & thick vessels (cylindrical and spherical).	1, 2, 3, 5, 6, 8
3.	Apply shear force and bending moment diagrams to analyze the resistance offered by the beam and able to solve practical problems in real world scenario	1, 2, 3, 5, 6, 8

COURSE TEACHING AND LEARNING ACTIVITIES

Sl. No.	Week	Topic	Mode of Delivery
01	1st week	Fundamentals: simple stresses and strain, stress and strain diagram for ductile and brittle materials, description and interrelation of elastic coefficients. Numerical on simple stresses and strain	Lecture C & T
02	2nd week	Temperature (Thermal) stress, Numerical on thermal stress, mechanical components with simple load and complex load.	Lecture C & T

03	3rd week	Theory of simple bending (Assumptions and evaluation of stresses), concept of principal stresses and strain (Analytical and Mohr's circle approach)	Lecture C & T
04	4th week	Thin and thick pressure vessels, evaluation of wire wounded thin vessels, derivation - stresses and deformation in thin vessels.	Lecture C & T
05	5th week	Numerical on simple thin vessels, calculation on internal pressure induced stresses and deformation.	Lecture C & T
06	6th week	Numerical on simple thick vessels, calculation on internal pressure induced stresses and deformation.	Lecture C & T
07		**Cycle Test - 1**	
08	7th week	Theory of simple bending, mathematical expressions for slope and deflection in various types of beams.	Lecture C & T
09	8th week	Numerical of bending of beams.	Lecture C & T
10	9th week	Shear force and bending moment diagrams.	Lecture C & T
11	10th week	Numerical on SF and BM diagrams, description of interrelation between point of contra flexure, SF and BM.	Lecture C & T
12	11th week	Torsion of shafts – derivation and numerical	Lecture C & T
13		**Cycle Test - 2**	
14	12th week	Design of shafts – Shafts in parallel and series, comparison between solid and hollow shafts, load and deflection calculation in coil and leaf springs.	Lecture C & T
15	13th week	Numerical on entire course syllabus with practical applications.	Lecture C & T

COURSE ASSESSMENT METHODS

Sl. No.	Mode of Assessment	Week / Date	Duration	% Weightage
1.	Cycle Test - 1	After 6th week	75 Minutes	25
2.	Cycle Test – 2	After 11th week	75 Minutes	25
3.	End Examination	----	150 Minutes	50

Textbooks, reference books Website addresses, journals, etc.

1. Sadhu Singh, Strength of Materials, Pub.: Khanna Publishers.
2. Prasad, I. B., A Text Book of Strength of Materials, Pub.: Khanna Publishers
3. Timoshenko, S. Elements of Strength of Materials, Pub.: East West Press.
4. Lehri, A. S. and Lehri, R. S. Lehri, Strength of Materials, Pub.: S. K. Kataria & Sons.
5. Nash, W. A., Strength of Materials, Schaum's Outlines (Adapted by Nilanjan Mallick), Pub.: McGraw Hill.

COURSE EXIT SURVEY

1. Feedback from the students during class committee meeting.
2. End semester feedback on Course Outcomes.

COURSE POLICY (Attendance, Assessment, academic honesty, etc.)

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.

ATTENDANCE

1. Attendance will be taken by the faculty in all contact hours. Students not having 75 % attendance at the end of the semester and also fail in CPA (scoring less than 60 %) will have to REDO the course.
2. Any student, who fails to maintain 75 % attendance and achieved more than 60 % attendance need to appear for the compensation assessment and classes.

ASSESSMENT

1. If any student is not able to attend any of the Continuous Assessments due to genuine reason, student is permitted to attend the Compensation Assessment (CPA) with % weightage equal to maximum of the CAs. However, the maximum of % weightage among the assessments for which the student was absent will be considered for computing marks for CA. (This is not valid for students who have attendance lag. Refer Pt. 2 under attendance). At any case, CPA will not be considered as an improvement test.
2. 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.
3. Finally, every student is expected to score minimum 35 % of the maximum mark of the class in the total assessment to pass the course. Otherwise the student would be declared as fail and F grade will be awarded.

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 students 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 pursing their academic activities is also considered as academic dishonesty.

ADDITIONAL COURSE INFORMATION

The Course Coordinator is available for consultation at times those are displayed on the coordinator's office notice board. Queries may also be emailed to the Course Coordinator directly at **nsiva@nitt.edu**

FOR SENATE'S CONSIDERATION

Course Faculty N. Siva 20/7/17 CC-Chairperson _____ HOD 21/7/2017