



Course Specifications: Strength of Materials PDE181



1. Basic Information

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Production Engineering & Mechanical Design
Course Code	PDE181
Level	100
Specialization	Minor
Requirements	MTH011
Authorization date of course specification	

Teaching Hours	Credit hours	Lectures	Tutorial	Practical
	4	3	1	1.5

2. Course aims:

No.	Aim
1	Apply knowledge of physics to address strength of materials issues.
4	Apply basic knowledge of strength of materials experiments, and identify the material properties.

3. Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

No.	Knowledge and Understanding
A1	Apply Mathematical and computer models relevant to Mechanical properties of solids.
A ₃	List the characteristics of engineering materials and their behavior related to the biomedical engineering field
A5	Apply the strength of materials methodologies for solving biomedical engineering problems.
A13	Select the materials appropriate for biomedical instrumentation and technologies related to the material strength applications in biomedical engineering.

b. Intellectual Skills

No.	Intellectual Skills
B1	Evaluate the characteristics of Biomedical material.
B16	Solve strength of materials problems on the basis of developing creative solutions to practical clinical engineering problems and evaluate its performance.
B17	Distinguish the main characteristics of biomedical engineering systems and perform failure analysis to these systems.

c. Professional Skills

No.	Professional Skills
C13	Apply strength of material and design techniques for modeling and analyzing medical engineering problems.

d. General Skills

No.	General Skills
D2	Work in stressful environment and within constraints.

4. Course Contents:

No.	Topics	Week
1	Mechanical properties and Stress-strain relationships of different materials	1-2
2	Creep, fatigue and visco-elasticity	3
3	Mechanical properties testing	4-5
4	One dimensional model, beam, statically determinate and indeterminate structures	6
5	Normal and shear stress in beams	7,9
6	Bending and torsion of beams	10-11



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7	Deflection of beams and statically undetermined structures	12
8	Structural analysis using energy methods and Introduction to matrix structural analysis	13
9	Stability of columns and allowable loads	14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Lectures
2	Discussion Sessions
3	Information Collection from Different Sources
4	Practical
5	Research Assignment

6. Teaching and Learning Methods for disabled students

No.	Teaching Method	Reason
1	Special additional sessions	to help them cope with their difficulties

7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A1, A3,A5,A13,B1,B16
2	Practical Examination	B1, C13, D2
3	Semester work (quizzes, lab)	A1,A5,A13,B1,B16,B17,C13,D2
4	Final Term Examination	A1,A5,A13,B1,B16,B17

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Practical Examination	13
3	Semester work	Every week
4	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	25%
2	Practical Examination	10%
3	Semester work	15%
4	Final Term Examination	50%
Total		100%

8. List of References

No.	Reference List
1	A textbook of strength of materials, R.K. Bansal, Laxmi Press, 2010
2	Strength of materials, Subramanian, Osford University Press, 2010
3	Nash, William A. Schaum's outlines : strength of materials. New York: McGraw Hill Education, 2014.
4	Course notes

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board



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3	Data Show System
4	Sound System
5	Wireless Internet
6	Lab Facilities
7	Visualizer

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	Aim	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	Mechanical properties and Stress-strain relationships of different materials	1	A13, A3			
2	Creep, fatigue and visco-elasticity	1	A1,A5	B1,B16	C13	
3	Mechanical properties testing	1	A1,A13	B17	C13	
4	One dimensional model, beam, statically determinate and indeterminate structures	1,4	A1,A5	B1,B16	C13	D2
5	Normal and shear stress in beams	1	A1,A5	B17	C13	D2
6	Bending and torsion of beams	1,4	A1,A5,A13	B16,B17	C13	D2
7	Deflection of beams and statically indetermined structures	1,4	A1,A5,A13	B1,B16,B17	C13	D2
8	Structural analysis using energy methods and Introduction to matrix structural analysis	1,4	A1,A5,A13	B1,B16	C13	D2
9	Stability of columns and allowable loads	1,4	A1,A5,A13	B17	C13	D2

Course Coordinator: Prof.Dr.

Head of Department: Assoc. Prof. HossamEldeen Salah

Date of Approval