JSS Science and Technology University, Mysuru

(Formerly Sri Jayachamarajendra College of Engineering)

DEPARTMENT OF CIVIL ENGINEERING

Scheme of Teaching and Examination for B.E.

and

Syllabi of B.E. I and II Semesters

2016-17

Semester Wise Credits

Sl. No.	Semester	Credits
1.	I	25.00
2.	II	25.00
3.	III	27.00
4.	IV	27.00
5.	V	26.50
6.	VI	26.50
7.	VII	22.00
8.	VIII	21.00
TOTAL		**200.00**

Grading system

Marks	Grade
90 – 100	S
75 – 89	A
66 – 74	B
55 – 65	C
50 – 54	D
45 – 49	E
< 45	F

Notations in the Scheme

CIE	Continuous Internal Evaluation
SEE	Semester End Examination
L	Lecture
T	Tutorial
P	Practical

JSS Science and Technology University, Mysuru

(Formerly Sri Jayachamarajendra College of Engineering)

Scheme of Teaching and Examination for B.E.

I Semester B.E. (Civil, CT&M, Env., Biotech, Mech., IP and PST)

Sl. No	Subject code	Course title	Teaching department	Credits				Contact hours	Marks			Exam duration in hrs
				L	T	P	Total		CIE	SEE	Total	
1	MA110	Engineering Mathematics-I (Advanced Calculus)	Maths.	4	0	0	04	04	50	50	100	03
2	PH110	Engineering Physics	Physics	4	0	0	04	04	50	50	100	03
3	CV110	Engineering Mechanics	Civil	4	0	0	04	04	50	50	100	03
4	EE110	Basic Electrical and Electronics Engineering	E&EE	4	0	0	04	04	50	50	100	03
5	ME110	Mechanical Engineering Sciences	Mech/IP	4	0	0	04	04	50	50	100	03
6	PH12L	Engineering Physics Laboratory	Physics	0	0	1.5	1.5	03	50	-	50	-
7	ME12L	Basic Workshop Practice	Mech/IP	0	0	1.5	1.5	03	50	-	50	-
8	HU120/ HU220	Functional English	Humanities	2	0	0	02	02	50	-	50	-
				Total credits			**25**	**28**	**Total marks**		**650**	-

JSS Science and Technology University, Mysuru

(Formerly Sri Jayachamarajendra College of Engineering)

Scheme of Teaching and Examination for B.E.

II Semester B.E. (Civil, CT&M, Env., Biotech, Mech., IP and PST)

Sl. No	Subject code	Course title	Teaching department	CREDITS				Contact hours	Marks			Exam duration in hrs
				L	T	P	TOTAL		CIE	SEE	Total	
1	MA210	Engineering Mathematics–II (Multivariable Calculus)	Maths.	4	0	0	04	04	50	50	100	03
2	CH210	Engineering Chemistry	Chemistry	4	0	0	04	04	50	50	100	03
3	CV210	Strength of Materials	Civil	4	0	0	04	04	50	50	100	03
4	CS210	Computer Concepts and C Programming	CS&E / IS	4	0	0	04	04	50	50	100	03
5	ME210	Computer Aided Engineering Graphics	Mech.	2	0	2	04	06	50	50	100	03
6	CH22L	Engineering Chemistry Lab	Chemistry	0	0	1.5	1.5	03	50	-	50	-
7	CS22L	Computer Programming Lab	CS&E / IS	0	0	1.5	1.5	03	50	-	50	-
8	HU110/ HU210	Innovation	Humanities	2	0	0	02	02	50	-	50	-
9	HU130/ HU230	Kannada	Humanities	-	-	-	-	02	50	-	50	-
				Total marks			**25**	**32**	**Total marks**		**700**	-

Engineering Mechanics

I Semester B.E. (Civil, CT&M, Env., Biotech, Mech., IP and PST)

Sub Code : CV110 Contact Hrs : 4/week
Credits : 04: 0: 0

Course Objectives:

- To analyse problems in engineering subjected to a force system and to compute the net effect.
- To analyse the equilibrium of rigid bodies.
- To determine the geometric properties of plane sections.

---

1. Introduction to Engineering mechanics: Basic idealisations: Particle, Continuum, Rigid body and Point force; Newton's laws of motion, Definition of Force, Introduction to SI units, Elements of a force, Classification of force and force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Moment of a force, couple, moment of a couple, characteristics of a couple, Equivalent force: couple system; Resolution of a force, Composition of forces; Numerical problems on moment of forces and couples and on equivalent force – couple system.
2. Composition of forces: Definition of Resultant; Composition of coplanar - concurrent force system, Principle of resolved parts; Numerical problems on composition of coplanar–concurrent force systems.
3. Composition of Coplanar: non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force systems.
4. Centroid of Plane Figures and Simple Built up Sections: Numerical problems.
5. Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of inertia of composite areas; Numerical problems.
6. Equilibrium of forces: Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar – concurrent force system.
7. Types of supports, statically determinate beams, Numerical problems on equilibrium of coplanar – non-concurrent force system and support reactions for statically determinate beams; numerical problems.
8. Friction: Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes; Numerical problems.

Self-Learning:

- Vector method for resolution and composition of forces.
- Vector method for solving problems on equilibrium.
- Screw friction and belt friction.
- Centre of gravity and mass moment of inertia of solids.

Text Books:

- Beer, F.P. and Johnston Jr., E.R., Mechanics for Engineers, Vol. 1 – Statics, McGraw-Hill Book Company, New York.
- Rahman S.S. and Madhava Rao, V., Elements of Civil Engineering and Engineering Mechanics, Sanguine Technical Publishers, Bangalore.

Reference Books:

- Merium, J.L. and Kraige, L.G., Engineering Mechanics, Vol. 1 – Statics, 3rd Edition, John Wiley and Sons, New York.
- Kumar, K.L., Engineering Mechanics, Tata McGraw-Hill Publishing Company, New Delhi.
- Boresi, A.P. and Schmidt, R.J., Engineering Mechanics, Thomson Brookes Publishers, USA.

Course Outcome:

The student has the ability to

- analyse the given force system to compute its resultant (CO1).
- analyse the system of forces in equilibrium with or without frictional forces (CO2).
- determine the reactions at the supports of statically determinate systems (CO23).
- locate the centroid of plane figures and to compute the second moment of areas of standard sections (CO4).

Strength of Materials

II Semester B.E. (Civil, CT&M, Env., Biotech, Mech., IP and PST)

Sub Code : CV210 Contact Hrs : 4/week
Credits : 4:0:0

Course Objectives:

- To introduce the concept of stress and strain.
- To calculate the stresses and strains due to axial & shear loading and due to temperature variations.
- To analyse the two dimensional compound stress system.
- To study the variation of bending and shear force along the length of the loaded beam due to different types of loads and to study the resulting stresses.
- To analyse the circular shafts subjected to torsional moment.
- To analyse the long columns for their critical loads.

---

1. Simple Stresses and Strains: Concept of Stress and Strain; St. Venant's Principle; Hooke's Law; Stress–Strain Diagram for ferrous and non-ferrous materials, True stress and strain; Elastic Constants – Young's modulus, Rigidity modulus, Bulk modulus and Poisson's ratio; Relationships among elastic constants; Deformation of uniform bars; Bars of varying cross section; Deformation due to self weight; Volumetric strain; Generalized Hooke's law; Composite sections; Temperature stresses; Statically indeterminate problems.
2. Bending Moment and Shear Force in Beams: Definitions – Bending moment and Shear force, Relationship among Bending Moment, Shear Force and Load Intensity; Bending moment and Shear force diagrams for statistically determinate beams subjected to point force, UDL, UVL and couple.
3. Stresses in Homogeneous, Prismatic, Statically Determinate Beams: Simple Bending Theory; Moment of resistance; Section modulus of different cross sectional shapes; Variation of bending stresses across the cross section of a loaded beam; Shear stresses in beams and their distribution over the beam cross section; Beams of uniform strength.
4. Torsion of Shafts: Torsion equation for circular shafts; Strength and Stiffness of solid and Hallow circular shafts (Uniform cross sections); Transmission of power.
5. Compound Stresses: Analysis of generalized two dimensional stress system – Normal and shear stresses on any inclined plane; Principal stresses and Principal planes; Maximum shear stresses and maximum shear planes; Pure shear stresses and pure shear planes; Mohr's circle of stresses.
6. Thin and Thick Cylinders: Stresses in thin cylinders subjected to internal and external pressures; Hoop, Longitudinal and Volumetric strains in think cylinders; Lame's equations for stresses in thick cylinders.
7. Theory of Long Columns: Euler's formula for different end conditions; Effective length of column; Slenderness ratio; Rankine – Gordon Formula; Eccentrically loaded columns – Secant formula.

Self-Learning:

- Stresses in shells.
- Principal stresses in shafts.

Text Books:

- Mechanics of Materials, Ferdinand P. Beer and E. Russel Johnston (Jr.), Sl. Version Edn., McGraw-Hill Book Co., New York.
- Strength of Materials, B.S. Basavarajaiah and P. Mahadevappa, III Edition, 2010, Universities Press (India) Pvt. Ltd., Hyderabad.

References Books:

- Strength of Materials, R. Subramanian, Oxford University Press, New Delhi, 2007.
- Mechanics of Materials, E.P. Popov, Sl. Version, II Edition, Prentice Hall of India Pvt. Ltd., New Delhi.

Course Outcome:

The student has the

- ability to calculate the stresses and strains due to axial, shear, radial and longitudinal forces and also due to temperature variations (CO1).
- ability to analyse a two dimensional compound stress system (CO2).
- ability to draw bending moment and shear force diagrams for beams subjected to transverse loads and also to determine the bending and shearing stresses in beams (CO3).
- ability to determine the shear stress developed in shafts due to torsion and to design a shaft for the given conditions (CO4).
- ability to determine the critical and safe loads on long columns and also to determine the section of the long columns for the given conditions (CO5).

JSS Science and Technology University, Mysuru

(Formerly Sri Jayachamarajendra College of Engineering)

Scheme of Teaching and Examination for B.E.
II Semester B.E. (E&E, E&C, IT, CS&E, IS)

Sl. No	Subject code	Course title	Teaching department	Credits				Contact hours	Marks			Exam duration in hrs
				L	T	P	Total		CIE	SEE	Total	
3	CV220	Elements of Civil Engineering and Engineering Mechanics	Civil	4	0	0	04	04	50	50	100	03

Elements of Civil Engineering & Engineering Mechanics

II Semester B.E. (EE, EC, IT, CS and IS)

Sub Code	:	CV220	Contact Hrs	:	4/week
Credits	:	4 : 0 : 0	Total Hrs	:	52

Course Objectives:

- The students of circuit branches are introduced to the field of Civil Engineering.
- To students are introduced to the basic infrastructural facilities such as Roads, Bridges and Dams.
- To students are introduced to analyse the problems in engineering subjected to a force system and to compute the net effect.
- To students are introduced to analyse the equilibrium of rigid bodies.
- To students are introduced to the determination of the geometric properties of plane sections.

---

1. Introduction to Civil Engineering, Scope of different fields of Civil Engineering – Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.
   Infrastructure: Types of infrastructure, Role of a Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country.
2. Roads: Basic Definitions, Cross sectional elements of roads, Components of road, Types of roads, and their functions.
3. Bridges and Dams: Definitions, Functions and Classification.
4. Introduction to Engineering mechanics: Basic idealisations – Particle, Continuum, Rigid body and Point force; Newton's laws of motion, Definition of force, Introduction to SI units, Elements of a force, Classification of force and force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Moment of a force, couple, moment of a couple, characteristics of a couple, Equivalent force - couple system; Resolution of forces, Composition of forces; Numerical problems on moment of forces and couples, on equivalent force – couple system.
5. Composition of forces – Definition of Resultant; Composition of coplanar - concurrent force system, Principle of resolved parts; Numerical problems on composition of coplanar–concurrent force systems.
6. Composition of coplanar – non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force systems.
7. Centroid of plane figures; Locating the centroid of triangle, semi-circle, quadrant of a circle and sector of a circle using method of integration, Centroid of simple built up sections; Numerical problems.
8. Equilibrium of forces – Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar – concurrent force system.
9. Types of supports, statically determinate beams, Numerical problems on equilibrium of coplanar – non-concurrent force system and support reactions for statically determinate beams.
10. Friction – Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes; Wedge friction; Ladder friction; Numerical problems
11. Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, circular and triangular areas from method of integration; Moment of inertia of composite areas; Numerical problems.

Self-Learning:

- Fundamentals of railways and airways.

Text Books:

- Beer, F.P. and Johnston Jr., E.R., Mechanics for Engineers, Vol. 1 – Statics, McGraw-Hill Book Company, New York.
- Rahman S.S. and Madhava Rao, V., Elements of Civil Engineering and Engineering Mechanics, Sanguine Technical Publishers, Bangalore.

Reference Books:

- Merium, J.L. and Kraige, L.G., Engineering Mechanics, Vol. 1 – Statics, 3rd Edition, John Wiley and Sons, New York.
- Kumar, K.L., Engineering Mechanics, Tata McGraw-Hill Publishing Company, New Delhi.
- Boresi, A.P. and Schmidt, R.J., Engineering Mechanics, Thomson Brookes Publishers, USA.

Course Outcome:

The student has the

- knowledge of various streams of Civil Engineering, role of Civil Engineers in any constructional project and the ability to identify & classify the Civil Engineering infrastructural facilities (CO1).
- ability to analyse the given force system to compute its resultant (CO2).
- ability to analyse the system of forces in equilibrium with or without frictional forces (CO3).
- ability to determine the reactions at the supports of statically determinate systems (CO4).
- ability to locate the centroid of plane figures and to compute the second moment of areas of standard and built up sections (CO5).