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Table of Contents

Note : Remove “Table of Content” before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

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18CIV14 : ELEMENTS OF CIVIL ENGINEERING AND MECHANICS

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	CIVIL
Year / Semester :	2018/1st	Academic Year:	2018-19
Course Title:	Elements of civil engineering and mechanics	Course Code:	18CIV14
Credit / L-T-P:	03	SEE Duration:	180 Minutes
Total Contact Hours:	40	SEE Marks:	60 Marks
CIA Marks:	40	Assignment	1 / Module
Course Plan Author:		Sign	Dt:
Checked By:		Sign	Dt:

2. Course Content

Module	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	Introduction to Civil Engineering Scope of different fields of Civil Engineering – Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, WaterResources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.1Infrastructure: Types of infrastructure, Role of Civil Engineer in theInfrastructural Development, Effect of the infrastructural facilities onsocio-economic development of a country. Introduction to Engineering Mechanics: Basic idealizations – Particle, Continuum and Rigid body; Newton's lawsBForce and its characteristics, types of forces-Gravity, Lateral and its distribution on surfaces, Classification of force systems, Principle of physical independence, superposition, transmissibility of forces, , Introduction to SI units.Couple, Moment of a couple, Characteristics of couple, Moment of a force, Equivalent force – Couple system; Numerical problems on moment of forces and couples, on equivalent force – couple system.	8	Scope of civil engineering, Resolution of Forces	L3
2	Concepts: Resultants and Equilibrium Composition of forces – Definition of Resultant; Composition of coplanar -concurrent force system, Parallelogram Law of forces, Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems. Equilibrium of forces – Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar – concurrent and non-concurrent force systems.Application- Static Friction in rigid bodies in contact Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes;Numerical Problems on single and two blocks on inclined planes	8	Resultant of Concurrent forces, Friction and Equilibrium	L3
3	Support Reaction in beams Types of Loads and Supports, statically determinate beams, Numerical problems onsupport reactions for statically determinate beams with Point load (Normal and inclined) and uniformly distributed and uniformly varying loads and Moments. Types of trusses, analysis of statically determinate trusses using method of joints and method of section	8	Resolving of Support Reaction, Analysis of trusses	L3
4	Introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroid for– T, L, I, Z and full/quadrant circular sections and their built up sections. Numerical problems	8	Location of Centroid, Determination of Moment of	L3

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	Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I, Z and full/quadrant circular sections and their built up sections. Numerical problems		Inertia	
5	Concepts and Applications Definitions – Displacement – Average velocity – Instantaneous velocity – Speed – Acceleration – Average acceleration – Variable acceleration – Acceleration due to gravity – Newton's Laws of Motion. D' Alembert's principle and its application in plane motion and connected bodies including pulleys	8	Kinematics, kinetics	L3

3. Course Material

Module	Details	Available
1	Text books	
	Elements of civil engineering and mechanics by M.N.Shesha Prakash and Ganesh, 3rd Revised edition	In Lib
	Elements of civil engineering and mechanics by S,S, Bhavikatti , New Age Internqtional Publisher,New Delhi,4th edition	In dept
2	Reference books	
	Elements of civil engineering and mechanics by B.K.Kholapuri and Ganesh, 3rd Revised edition	In Lib
3	Others (Web, Video, Simulation, Notes etc.)	
		Not Available

4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	18CIV14	Elements of civil engineering and mechanics	1.Knowledge of Mathematics 2.Knowledge of Physics	1		L3

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
CO1	Students should be able to describe the scope of various fields of civil engineering	2	Scope of civil engineering	BB,ppt	C.I.E,Unit test,Assign ment	L2 Understand
CO2	Students should be able to illustrate forces on couple system and moment of forces	6	Resolution of Forces	BB	C.I.E,Unit test,Assign ment	L3 Apply
CO3	Students should be able to Calculate the resultant of force system subjected to various load	4	Resultant of Concurrent forces	BB,Tutori al	C.I.E,Unit test,Assign ment	L3 Apply
CO4	Students should be able to Apply laws	3	Friction and	BB	C.I.E,Unit	L3

	of friction and types of friction		Equilibrium		test,Assignment	Apply
CO5	Students should be able to compute the reactive force that develop as result of external load	3	Resolving of Support Reaction	BB,Tutorial	C.I.E,Unit test,Assignment	L3 Apply
CO6	Students should be able to calculate the trusses by method of joints and section	5	Analysis of trusses	BB	C.I.E,Unit test,Assignment	L3 Apply
CO7	Students should be able to determine centroid of built up section	4	Location of Centroid	BB,Tutorial	C.I.E,Unit test,Assignment	L3 Apply
CO8	Students should be able to calculate M.I of full/quadrant circular section	4	Determination of Moment of Inertia	BB,Tutorial	C.I.E,Unit test,Assignment	L3 Apply
CO9	Students should be able to illustrate relationship between motion of bodies	6	kinematics	BB	C.I.E,Unit test,Assignment	L3 Apply
CO10	Students should be able to describe relationship between plane motion and connected bodies	2	kinetics	BB	C.I.E,Unit test,Assignment	L3 Apply
-	**Total**	**50**	-	-	-	-

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	Basic fields of civil engineering	CO1	L2
2	Resolve the forces acting on body	CO2	L3
3	Concurrent forces	CO3	L3
4	Equilibrium and friction	CO4	L3
5	Support reaction	CO5	L3
6	Analyzing the forces acting on trusses	CO6	L3
7	Calculating the area and center of gravity of geometric figures	CO7	L3
8	computing the radius of gyration of geometric figures	CO8	L3
9	Kinematics	CO9	L3
10	Kinetics	CO10	L3

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-	Course Outcomes	Program Outcomes												
#	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	Level
CO1	Students should be able to describe the scope of various fields of civil engineering	1	-	-	-	-	-	-	-	-	-	-	-	L2
CO2	Students should be able to illustrate forces on couple system and moment of forces	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO3	Students should be able to Calculate the resultant of force system subjected to various load	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO4	Students should be able to Apply laws of friction and types of friction	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO5	Students should be able to	2	-	-	-	-	-	-	-	-	-	-	-	L3

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	compute the reactive force that develop as result of external load													
CO6	Students should be able to calculate the trusses by method of joints and section	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO7	Students should be able to determine centroid of built up section	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO8	Students should be able to calculate M.I of full/quadrant circular section	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO9	Students should be able to illustrate relationship between motion of bodies	2	-	-	-	-	-	-	-	-	-	-	-	L3
CO10	Students should be able to describe relationship between plane motion and connected bodies	2	-	-	-	-	-	-	-	-	-	-	-	L3
Note: Mention the mapping strength as 1, 2, or 3														

4. Mapping Justification

Mapping		Justification	Mapping Level
CO	**PO**	**-**	**-**
CO1	PO1	Know basics of Civil Engineering, its scope of study	L1
CO2	PO1	Understand the fundamental principles of Mechanics	L3
CO3	PO1	Apply mechanics concepts for computing the resultant of Coplanar Force systems.	L3
CO4	PO1	Formulate and apply the conditions of static equilibrium to problems involving Coplanar Force systems	L3
CO5	PO1	Apply the concept and theory of Dry friction to simple problems involving static friction.	L3
CO6	PO1	Apply the concept and theory of reaction to simple problems of trusses	L3
CO7	PO1	Locate the centroidal distances of composite laminas	L3
CO8	PO1	Compute the moment of Inertia of different laminas	L3
CO9	PO1	Understand the basics of kinematics	L3
CO10	PO1	Express the relationship between motion of bodies	L3

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping

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1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Module #	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction to Civil Engineering &Engineering Mechanics	08	2	-	-	1	1	2	CO1, CO2	L3
2	Analysis of Concurrent Force Systems	08	2	-	-	1	1	2	CO3, CO4	L3
3	Analysis of Non-Concurrent Force Systems	08	-	2	-	1	1	2	CO5, CO6	L3
4	Centroids and Moments of Inertia of Engineering Sections:	08	-	2	-	1	1	2	CO7, Co8	L3
5	Kinematics and Kinetics	08	-	-	4	1	1	2	CO9, CO10	L3
-	**Total**	**40**	**4**	**4**	**4**	**5**	**5**	**10**	**-**	**-**

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	30	CO1, CO2, CO3, CO4	L2, l3, l3, L3
CIA Exam – 2	30	CO5, CO6, CO7, Co8	L3, L3, L3, L3
CIA Exam – 3	30	CO9, CO10	L3, L3
Assignment - 1	05	CO1, CO2, CO3, CO4	L2, l3, l3, L3
Assignment - 2	05	CO5, CO6, CO7, CO8	L3, L3, L3, L3
Assignment - 3	05	CO9, CO10	L3, L3
Seminar - 1	05	CO1, CO2, CO3, CO4	L2, l3, l3, L3
Seminar - 2	05	CO5, CO6,CO7,CO8	L3, L3, L3, L3
Seminar - 3	05	CO9, CO10	L3, L3
Other Activities – define – Unit tests		CO1 to Co9	L2, L3,. ..
Final CIA Marks	**40**	**-**	**-**

Note : Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction to Civil Engineering &Engineering Mechanics	Appr Time:	16 Hrs

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a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	describe the scope of various fields of civil engineering	CO1	L2
2	illustrate forces on couple system and moment of forces	CO2	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
1	Introduction to Civil Engineering Scope of different fields of Civil Engineering – Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, WaterResources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.	C01	L2
2	Infrastructure: Types of infrastructure, Role of Civil Engineer in theInfrastructural Development, Effect of the infrastructural facilities onsocio-economic development of a country.	C01	L2
3	Introduction to Engineering Mechanics: Basic idealizations – Particle, Continuum and Rigid body; Newton's lawsBForce and its characteristics, types of forces-Gravity, Lateral and its distribution on surfaces,	C01	L2
4	Classification of force systems, Principle of physical independence, superposition, transmissibility of forces, , Introduction to SI units	C01	L2
5	Couple, Moment of a couple, Characteristics of couple, Moment of a force, Equivalent force – Couple system	C01	L3
6	Numerical problems on moment of forces and couples, on equivalent force – couple system.	C01	L3
7	Numerical problems on moment of forces and couples, on equivalent force – couple system.	C01	L3
8	Numerical problems on moment of forces and couples, on equivalent force – couple system.	C01	L3
c	**Application Areas**	**CO**	**Level**
1	Basic fields of civil engineering	CO1	L3
2	Resolve the forces acting on body	CO2	L4
d	**Review Questions**	-	-
1	Discuss briefly the role of Civil Engineers in the infrastructure development of a country	CO1	L1
2	Differentiate between flexible and rigid pavement	CO1	L3
3	Bring out briefly scope of following specialization of civil engineering i) Environmental Engineering ii) Geotechnical Engineering	CO2	L2
4	Explain briefly the classification of roads.	CO2	L4
5	Define force. Explain the classification of force system	CO2	L2
6	Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces	CO2	L5
7	Define couple. Explain characteristics of couple	CO2	L2
8	Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	CO2	L3
9	A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	CO2	L4
10	Replace 1000N force at point A, which is acting at point B as shown in the **fig-2.** Also find the moment at A.	CO1	L1
11	A square A B C D as forces acting at along its sides as shown in the **fig-3.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.	CO1	L4
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3

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Module – 2

Title:	Analysis of Concurrent Force Systems	Appr Time:	10 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	Calculate the resultant of force system subjected to various load	CO3	L3
2	Apply laws of friction and types of friction	CO4	L3
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
9	Resultants and Equilibrium Composition of forces – Definition of Resultant; Composition of coplanar -concurrent force system,	CO3	L3
10	Parallelogram Law of forces, Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems.	CO3	L3
11	Equilibrium of forces – Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem	CO3	L3
12	Numerical problems on equilibrium of coplanar – concurrent and non-concurrent force systems	CO4	L3
13	Application- Static Friction in rigid bodies in contact Types of friction, Laws of static friction,	CO4	L3
14	Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes	CO4	L3
15	Numerical Problems on single and two blocks on inclined planes	CO4	L3
16	Numerical Problems on single and two blocks on inclined planes	CO4	L3
c	**Application Areas**	**CO**	**Level**
1	Concurrent forces	CO3	L3
2	Equilibrium and friction	CO4	L4
d	**Review Questions**	-	-
12	State and prove Parallelogram law of forces	CO3	L3
13	Explain different types of friction	CO4	L3
14	State and prove Lami'stheorem	CO3	L3
15	Define i) Angle of friction ii) Angle of Repose	CO4	L3
16	Define i) Equilibrant ii) Resultant force	CO4	L3
17	Define friction & Explain laws of static friction	CO3	L3
18	Explain with sketch Cone friction	CO3	L3
19	Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm	CO3	L3
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	CS501PC	Sem:	I	Marks:	30	Time:	75 minutes
Course:							

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-	-	Note: Answer any 2 questions, each carry equal marks.	Marks	CO	Level
1	a	Define couple. Explain characteristics of couple	5	CO1	L2
	b	Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	5	CO1	L2
	c	A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	5	CO2	L3
2	a	Define force. Explain the classification of force system	5	CO1	L3
	b	Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces	5	CO1	L3
	c	Replace 1000N force at point A, which is acting at point B as shown in the **fig-2.** Also find the moment at A	5	CO1	L3
3	a	State and prove Parallelogram law of forces	5	CO2	L3
	b	Define i) Angle of friction ii) Angle of Repose	5	CO2	L3
	c	A square A B C D as forces acting at along its sides as shown in the **fig-3.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.	5	CO1	L3
4	a	Explain with sketch Cone friction	5	CO2	L3
	b	State and prove Lami'stheorem	5	CO2	L3
	c	Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm	5	CO2	L3

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	CS501PC	Sem:	I	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Elements of civil engineering and mechanics						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Discuss briefly the role of Civil Engineers in the infrastructure development of a country	5	CO1	L3
2		Differentiate between flexible and rigid pavement	5	CO1	L3
3		Bring out briefly scope of following specialization of civil engineering i) Environmental Engineering ii) Geotechnical Engineering		CO1	L3
4		Explain briefly the classification of roads.	5	CO1	L3
5		Define force. Explain the classification of force system	5	CO2	L3
6		Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces	5	CO2	L3
7		Define couple. Explain characteristics of couple		CO2	L3
8		Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	5	CO2	L3
9		A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	5	CO2	L3
10		Replace 1000N force at point A, which is acting at point B as shown in the **fig-2.** Also find the moment at A.	5	CO2	L3
11		A square A B C D as forces acting at along its sides as shown in the **fig-3.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.		CO2	L3
12		State and prove Parallelogram law of forces	5	CO2	L3
13		Explain different types of friction	5	CO1	L3
14		State and prove Lami'stheorem	5	CO1	L3
15		Define i) Angle of friction ii) Angle of Repose		CO1	L3
16		Define i) Equilibrant ii) Resultant force	5	CO1	L3

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17		Define friction & Explain laws of static friction	5	CO1	L3
18		Explain with sketch Cone friction	5	CO1	L3
19		Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm		CO1	L3
20		State and prove Parallelogram law of forces	5	CO2	L3
21		Explain different types of friction	5	CO2	L3
22		State and prove Lami'stheorem	5	CO2	L3
23		Define i) Angle of friction ii) Angle of Repose		CO2	L3
24		Define i) Equilibrant ii) Resultant force	5	CO1	L3
25		Define friction & Explain laws of static friction	5	CO1	L3
26		Explain with sketch Cone friction	5	CO1	L3
27		Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm	5	CO1	L3
28		Discuss briefly the role of Civil Engineers in the infrastructure development of a country	5	CO1	L3
29		Differentiate between flexible and rigid pavement		CO1	L3
30		Bring out briefly scope of following specialization of civil engineering i) Environmental Engineering ii) Geotechnical Engineering	5	CO1	L3
31		Explain briefly the classification of roads.	5	CO2	L3
32		Define force. Explain the classification of force system	5	CO2	L3
33		Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces		CO2	L3
34		Define couple. Explain characteristics of couple	5	CO2	L3
35		Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	5	CO2	L3
36		A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	5	CO2	L3
37		Replace 1000N force at point A, which is acting at point B as shown in the **fig-2.** Also find the moment at A.	5	CO2	L3
38		A square A B C D as forces acting at along its sides as shown in the **fig-3.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.		CO2	L3
39		State and prove Parallelogram law of forces	5	CO2	L3
40		Explain different types of friction	5	CO2	L3
41		State and prove Lami'stheorem	5	CO2	L3
42		Define i) Angle of friction ii) Angle of Repose	5	CO2	L3
43		Define i) Equilibrant ii) Resultant force	5	CO2	L3
44		Define friction & Explain laws of static friction	5	CO2	L3
45		Explain with sketch Cone friction	5	CO2	L3
46		Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm	5	CO2	L3
47		Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	5	CO1	L3

D2. TEACHING PLAN - 2

Module – 3

Title:	Analysis of Non-Concurrent Force Systems	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**

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-	The student should be able to:	-	**Level**
1	compute the reactive force that develop as result of external load	CO5	L3
2	calculate the trusses by method of joints and section	CO6	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
17	Support Reaction in beams Types of Loads and Supports, statically determinate beams	CO5	L3
18	Numerical problems on support reactions for statically determinate beams with Point load (Normal and inclined) and	CO5	L3
19	Numerical problems on uniformly distributed and uniformly varying loads and Moments.	CO5	L3
20	Numerical problems on uniformly distributed and uniformly varying loads and Moments.	CO5	L3
21	Types of trusses,	CO6	L3
22	analysis of statically determinate trusses using method of joints and method of section	CO6	L3
23	analysis of statically determinate trusses using method of joints and method of section	CO6	L3
24	analysis of statically determinate trusses using method of joints and method of section	CO6	L3
c	**Application Areas**	**CO**	**Level**
1	Support reaction	CO5	L3
2	Analyzing the forces acting on trusses	CO6	L3
d	**Review Questions**	-	-
1	Explain different types of statically determinate beams	CO5	L3
2	Explain different types of statically indeterminate beams	CO5	L3
3	What is mean by support reaction	CO5	L3
4	Explain different types of supports and loads in the analysis of beam	CO5	L3
5	Determine the reaction at the supports for the system as shown in fig	CO5	L3
6	Find the support reaction for beam loaded as shown in fig	CO5	L3
7	Define trusses	CO6	L3
8	What are the assumption are made in analyzing the simple truss	CO6	L3
9	Explain classification of trusses	CO6	L3
10	Differentiate between method of joint and method of section	CO6	L3
11	Analysis of statically determinate trusses using method of joints shown in fig	CO6	L3
e	**Experiences**	-	-
1			
2			
3			
4			
5			

Module – 4

Title:	Centroids and Moments of Inertia of Engineering Sections:	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	determine centroid of built up section	CO7	L3
2	Calculate M.I of full/quadrant circular section	CO8	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
25	Introduction to the concept, centroid of line and area, centroid of basic	CO7	L3

	geometrical figures		
26	computing centroid for– T, L, I, Z and full/quadrant circular sections and their built up sections.	CO7	L3
27	computing centroid for– T, L, I, Z and full/quadrant circular sections and their built up sections.	CO7	L3
28	Numerical problems on centroid for– T, L, I, Z and full/quadrant circular sections and their built up sections.	CO7	L3
29	ntroduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem,	CO8	L3
30	Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I, Z and full/quadrant circular sections and their built up sections	CO8	L3
31	Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I, Z and full/quadrant circular sections and their built up sections	CO8	L3
32	Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I, Z and full/quadrant circular sections and their built up sections	CO8	L3
c	**Application Areas**	**CO**	**Level**
1	Calculating the area and center of gravity of geometric figures	CO7	L3
2	Computing the radius of gyration of geometric figures	CO8	L3
d	**Review Questions**	-	-
1	Define centroid	CO7	L3
2	Determine the centroid of quarter circle	CO7	L3
3	Determine the centroid of triangle by method of integration	CO7	L3
4	Determine the centroid of lamina as shown in fig	CO7	L3
5	Determine the centroid of semi circle by method of integration	CO7	L3
6	Define 2nd moment of force	CO8	L3
7	What is mean by radius of gyration and explain	CO8	L3
8	State and prove parallel axis theorem	CO8	L3
9	State and prove perdendicular axis theorem	CO8	L3
10	Determine the MI of semi circle by method of integration	CO8	L3
11	Determine the MI of lamina as shown in fig	CO8	L3
12	Determine the centroid of shaded part as shown in fig	CO7	L3
e	**Experiences**	-	-
1		CO7	L2
2			
3			
4		CO8	L3
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	CS501PC	Sem:	I	Marks:	30	Time:	75 minutes
Course:							

-	-	Note: Answer any 2 questions, each carry equal marks.	Marks	CO	Level
1	a	Explain different types of supports and loads in the analysis of beam	7	CO6	L3
	b	Determine the reaction at the supports for the system as shown in fig	8	CO5	L3
2	a	Differentiate between method of joint and method of section	7	CO5	L3
	b	Analysis of statically determinate trusses using method of joints shown in fig	8	CO6	L3
3	a	Determine the centroid of quarter circle	7	CO7	L3
	b	Determine the centroid of lamina as shown in fig	8	CO7	L3
4	a	Determine the centroid of semi circle by method of integration	7	CO7	L3
	b	Determine the centroid of shaded part as shown in fig	8	CO7	L3

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b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	CS501PC	Sem:	I	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Design and Analysis of Algorithms						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Explain different types of statically determinate beams	5	CO8	L3
2		Explain different types of statically indeterminate beams	5	CO8	L3
3		What is mean by support reaction		CO8	L3
4		Explain different types of supports and loads in the analysis of beam	5	CO8	L3
5		Determine the reaction at the supports for the system as shown in fig	5	CO8	L3
6		Find the support reaction for beam loaded as shown in fig	5	CO8	L3
7		Define trusses		CO8	L3
8		What are the assumption are made in analyzing the simple truss	5	CO9	L3
9		Explain classification of trusses	5	CO9	L3
10		Differentiate between method of joint and method of section	5	CO9	L3
11		Analysis of statically determinate trusses using method of joints shown in fig		CO9	L3
12		Define centroid	5	CO9	L3
13		Determine the centroid of quarter circle	5	CO9	L3
14		Determine the centroid of triangle by method of integration	5	CO9	L3
15		Determine the centroid of lamina as shown in fig		CO9	L3
16		Determine the centroid of semi circle by method of integration	5	CO9	L3
17		Define 2nd moment of force	5	CO8	L3
18		What is mean by radius of gyration and explain	5	CO8	L3
19		State and prove parallel axis theorem		CO8	L3
20		State and prove perdendicular axis theorem	5	CO8	L3
21		Determine the MI of semi circle by method of integration	5	CO8	L3
22		Determine the MI of lamina as shown in fig	5	CO8	L3
23		Determine the centroid of shaded part as shown in fig	5	CO8	L3
24		Define centroid	5	CO8	L3
25		Determine the centroid of quarter circle		CO8	L3
26		Determine the centroid of triangle by method of integration	5	CO9	L3
27		Determine the centroid of lamina as shown in fig	5	CO9	L3
28		Determine the centroid of semi circle by method of integration	5	CO8	L3
29		Define 2nd moment of force		CO8	L3
30		What is mean by radius of gyration and explain	5	CO8	L3
31		State and prove parallel axis theorem	5	CO8	L3
32		State and prove perdendicular axis theorem	5	CO8	L3
33		Determine the MI of semi circle by method of integration	5	CO8	L3
34		Determine the MI of lamina as shown in fig		CO8	L3
35		Determine the centroid of shaded part as shown in fig	5	CO8	L3
36		Explain different types of supports and loads in the analysis of beam	5	CO8	L3
37		Determine the reaction at the supports for the system as shown in fig	5	CO8	L3
38		Find the support reaction for beam loaded as shown in fig		CO9	L3
39		Define trusses	5	CO9	L3
40		What are the assumption are made in analyzing the simple truss	5	CO9	L3
41		Explain classification of trusses	5	CO9	L3
42		Differentiate between method of joint and method of section		CO9	L3
43		Analysis of statically determinate trusses using method of joints shown in fig	5	CO9	L3
44		Explain different types of statically determinate beams	5	CO9	L3

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45		Explain different types of statically indeterminate beams	5	CO9	L3
46		What is mean by support reaction	5	CO9	L3
47		Explain different types of supports and loads in the analysis of beam	5	CO9	L3

D3. TEACHING PLAN - 3

Module – 5

Title:	Kinematics and Kinetics	Appr Time:	16 Hrs
a	***Course Outcomes***	-	**Blooms**
-	The student should be able to:	-	**Level**
1	illustrate relationship between motion of bodies	CO9	L3
2	describe relationship between plane motion and connected bodies	CO10	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
33	Concepts and Applications Definitions – Displacement – Average velocity	CO9	L3
34	Instantaneous velocity – Speed – Acceleration – Average acceleration	CO9	L3
35	Variable acceleration – Acceleration due to gravity – Newton's Laws of Motion.	CO9	L3
36	Variable acceleration – Acceleration due to gravity – Newton's Laws of Motion.	CO9	L3
37	D' Alembert's principle and its application in plane motion and connected bodies including pulleys	CO10	L3
38	application in plane motion and connected bodies including pulleys	CO10	L3
39	D' Alembert's principle and its application in plane motion and connected bodies including pulleys	CO10	L3
40	D' Alembert's principle and its application in plane motion and connected bodies including pulleys	CO10	L3
c	**Application Areas**	**CO**	**Level**
1	Kinematics	CO9	L3
2	Kinetics	CO10	L3
d	**Review Questions**	-	-
1	Define i) displacement ii) speed iii) uniform velocity iv) average velocity	CO10	L3
2	State and explain Newtons law of motion	CO10	L3
3	Derive relationship between linear acceleration and angular acceleration	CO9	L3
4	Derive relationship between r.p.m and angular velocity	CO9	L3
5	A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm	CO9	L3
6	A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	CO9	L3
7	Define: i) Instantaneous velocity ii) Uniform acceleration iii) Variable acceleration iv) Retardation	CO9	L3
8	What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh	CO9	L3
9	State and explain D' Alemberts principle	CO10	L3
10	What is Banking (super elevation) and why it is provided?	CO10	L3
11	Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	CO10	L3
e	**Experiences**	-	-
1		CO10	L2
2			
3			

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4		CO9	L3
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	CS501PC	Sem:	I	Marks:	30	Time:	75 minutes
Course:	Design and Analysis of Algorithms						

-	-	**Note: Answer any 2 questions, each carry equal marks.**	**Marks**	**CO**	**Level**
1	a	State and prove parallel axis theorem	7	CO8	L3
	b	Determine the MI of semi circle by method of integration	8	CO8	L3
2	a	Determine the MI of lamina as shown in fig	7	CO8	L3
	b	Determine the radius of gyration for the lamina as shown in fig	8	CO8	L3
3	a	Derive relationship between linear acceleration and angular acceleration	7	CO9	L3
	b	A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	8	CO9	L3
4	a	State and explain D' Alemberts principle	7	CO10	L3
	b	Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	8	CO10	L3

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	CS501PC	Sem:	I	Marks:	5 / 10	Time:	90 – 120 minutes
Course:	Design and Analysis of Algorithms						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Define: i) Displacement ii) Velocity iii) Acceleration iv) Speed v) Decelaration vi) Average velocity	5	CO9	L3
2		What is Banking (super elevation) and why it is provided?	5	CO9	L3
3		What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of flight	5	CO10	L3
4		Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	5	CO10	L3
5		Define: i) Instantaneous velocity ii) Uniform acceleration iii) Variable acceleration iv) Retardation	5	CO10	L3
6		Define i) displacement ii) speed iii) uniform velocity iv) average velocity	5	CO10	L3
7		State and explain Newtons law of motion	5	CO10	L3
8		Derive relationship between linear acceleration and angular acceleration	5	CO10	L3
9		Derive relationship between r.p.m and angular velocity	5	CO10	L3
10		A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm	5	CO10	L3
11		A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	5	CO10	L3
12		Define: i) Instantaneous velocity ii) Uniform acceleration iii) Variable acceleration iv) Retardation	5	CO10	L3
13		What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh	5	CO10	L3
14		State and explain D' Alemberts principle	5	CO9	L3
15		What is Banking (super elevation) and why it is provided?	5	CO9	L3

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16		Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	5	CO9	L3
17		Define i) displacement ii) speed iii) uniform velocity iv) average velocity	5	CO9	L3
18		State and explain Newtons law of motion	5	CO9	L3
19		Derive relationship between linear acceleration and angular acceleration	5	CO9	L3
20		Derive relationship between r.p.m and angular velocity	5	CO9	L3
21		A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm	5	CO9	L3
22		A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	5	CO9	L3
23		Define: i) Instantaneous velocity ii) Uniform acceleration iii) Variable acceleration iv) Retardation	5	CO10	L3
24		What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh	5	CO10	L3
25		State and explain D' Alemberts principle	5	CO10	L3
26		What is Banking (super elevation) and why it is provided?	5	CO10	L3
27		Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	5	CO10	L3
28		Define i) displacement ii) speed iii) uniform velocity iv) average velocity	5	CO10	L3
29		State and explain Newtons law of motion	5	CO10	L3
30		Derive relationship between linear acceleration and angular acceleration	5	CO10	L3
31		Derive relationship between r.p.m and angular velocity	5	CO10	L3
32		A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm	5	CO10	L3
33		A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	5	CO9	L3
34		Define: i) Instantaneous velocity ii) Uniform acceleration iii) Variable acceleration iv) Retardation		CO9	L3
35		What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh		CO9	L3
36		State and explain D' Alemberts principle		CO9	L3
37		What is Banking (super elevation) and why it is provided?		CO9	L3
38		Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration		CO9	L3
39		Define i) displacement ii) speed iii) uniform velocity iv) average velocity		CO9	L3
40		State and explain Newtons law of motion		CO9	L3
41		Derive relationship between linear acceleration and angular acceleration		CO9	L3
42		Derive relationship between r.p.m and angular velocity		CO10	L3
43		A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm		CO10	L3
44		A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.		CO10	L3
45		Define: i) Instantaneous velocity ii) Uniform acceleration iii)		CO10	L3

		Variable acceleration iv) Retardation			
46		What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh		CO10	L3
47		State and explain D' Alemberts principle		CO10	L3
48		What is Banking (super elevation) and why it is provided?		CO10	L3
49		Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration		CO10	L3

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Design and Analysis of Algorithms					Month / Year	May /2018		
Crs Code:	CS501PC	Sem:	I	Marks:	100	Time:	180 minutes		

-	Note	Answer all FIVE full questions. All questions carry equal marks.	Marks	CO	Level
1	a	Define couple. Explain characteristics of couple	6	CO1	L3
	b	Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	6	CO1	L3
	c	A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	8	CO2	L3
		OR			L3
-	a	Define force. Explain the classification of force system	6	CO1	L3
	b	Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces	6	CO2	L3
	c	Replace 1000N force at point A, which is acting at point B as shown in the **fig-2.** Also find the moment at A	8	CO2	L3
2	a	Explain with sketch Cone friction	6	Co3	L3
	b	State and prove Lami'stheorem	6		L3
	c	Determine the reaction at contact points for spheres A & B as shown in fig Q 2(a).It is given that WA = 1200N, WB = 1500N, dA = 400mm, dB = 900mm	8	CO4	L3
		OR			
-	a	State and prove Parallelogram law of forces	6	CO3	L3
	b	Define i) Angle of friction ii) Angle of Repose	6	CO4	L3
	c	A square A B C D as forces acting at along its sides as shown in the **fig-4.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.	8		L3
3	a	Explain different types of supports and loads in the analysis of beam	7	CO5	L3
	b	Determine the reaction at the supports for the system as shown in **fig 5**	8	CO6	L3
		OR			
-	a	Differentiate between method of joint and method of section	7	CO5	L3
	b	Analysis of statically determinate trusses using method of joints shown in **fig 6**	8	CO6	L3
4	a	Determine the centroid of semi circle by method of integration	6	CO7	L3
	b	State and prove parallel axis theorem	6	CO8	L3
	c	Determine the radius of gyration for the lamina as shown in **fig 7**	8	Co8	L3
		OR			
-	a	Determine the MI of semi circle by method of integration	6	CO7	L3
	b	Determine the centroid of I section	6	CO8	L3
	c	Determine the centroid of shaded part as shown in **fig 8**	8	CO7	L3
5	a	State and explain D' Alemberts principle	6	CO10	L3
	b	What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh	6	CO10	L3
	c	A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	8	CO9	L3

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		OR			
	a	Define i) displacement ii) speed iii) uniform velocity iv) average velocity	6	CO9	L3
	b	Derive relationship between linear acceleration and angular acceleration	6	CO9	L3
	c	A wheel is rotating about a fixed axis at 20 r.p.m is uniformly accelerated for 70 sec, during which time it makes 50 revolution. Determine I) angular velocity at the end of this interval and ii) time required for the speed to reach 110 rpm	8	C010	L3

2. SEE Important Questions

Course:	Design and Analysis of Algorithms				Month / Year	May /2018
Crs Code:	CS501PC	Sem:	3	Marks:	100	Time: 180 minutes

	Note	Answer all FIVE full questions. All questions carry equal marks.	-	-	
Module	Qno.	Important Question	**Marks**	**CO**	**Year**
1	1	Define couple. Explain characteristics of couple	6	CO1	2004
	2	Bring out briefly scope of following specialization of civil engineering i) Structural Engineering i) Transportation Engineering	6	CO1	2004
	3	A force of 630N is acting on a block as shown in the **fig-1**. Find the i)Horizontal & vertical components ii)Inclined to the plane and right angles to the plane	8	CO2	2004
	4	Define force. Explain the classification of force system	6	CO2	2007
	5	Explain i)Principle of transmissibility of forces. ii)Principle of physical independence of forces	6	CO2	2007
2	1	Explain with sketch Cone friction	6	CO2	2005
	2	State and prove Lami'stheorem	6	CO2	2005
	3	State and prove Parallelogram law of forces	6	CO2	2009
	4	Define i) Angle of friction ii) Angle of Repose	6	CO2	2006
	5	A square A B C D as forces acting at along its sides as shown in the **fig-4.** Find the value of P & Q, if the system reduces the couple. Also find the magnitude of the couple.	8	CO2	2004
3	1	Explain different types of supports and loads in the analysis of beam	6	CO2	2006
	2	Determine the reaction at the supports for the system as shown in **fig 5**	8	CO2	2006
	3	Differentiate between method of joint and method of section	6	CO2	2007
	4	Analysis of statically determinate trusses using method of joints shown in **fig 6**	8	CO2	2004
4	1	Determine the centroid of semi circle by method of integration	6	CO2	2004
	2	State and prove parallel axis theorem	6	CO2	2004
	3	Determine the radius of gyration for the lamina as shown in **fig 7**	8	CO2	2006
	4	Determine the MI of semi circle by method of integration	6	CO7	2004
	5	Determine the centroid of I section	8	CO8	2007
5	1	State and explain D' Alemberts principle	6	CO10	2009
	2	What is a projectile? Define: i) Angle of projection ii) Horizontal Range iii) Vertical Height iv) Time of fligh	6	CO9	2007
	3	What is Banking (super elevation) and why it is provided?	6	CO10	2007
	4	Define:i) Centrifugal Force ii) Centripetal force iii) Centripetal Acceleration	6	CO10	2004
	5	A burglar's car starts with an acceleratin of 2 m/sec2. A police van came after 10 sec and continued to chase the burglar's car with an uniform velocity of 40 m/sec. Find the time taken by the police van to overtake the burglar's car.	8	CO9	2005

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