COURSE INFORMATION SHEET

Course code: CE 205
Course title: CIVIL ENGINEERING DRAWING
Pre-requisite(s):
Co- requisite(s): CE204
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 4
Class: B. Tech
Semester / Level: 3RD SEMESTER/ LEVEL 2
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

A.	To introduce types of drawing and standard practices in drawing different components of the building.
B.	To introduce the students to draft the plan, elevation, and sectional views of buildings following development and control rules, satisfying orientation and functional requirements.

Course Outcomes

After the completion of this course, students will be able to:

1.	Apply various types of scales as per the need for preparing various types of drawings.
2.	Prepare, read, and interpret, component drawing, building drawings, and layout.
3.	Execute and supervise the construction work for buildings based on provided Engineering drawings.

List of experiments

1. Types of drawing- Index map, key plan, village map, site plan, layout plan with appropriate scale & uses. Sizes of various standard papers.
2. Symbols of Engineering materials, Electrical Installations, Water supply, and Sanitary fixtures.
3. Different masonry bonds.
4. Load-bearing wall and shallow Foundations.
5. Plan, Elevation and Section of the residential building.
6. Types of staircase, Plan and Section details.
7. Detailed drawings of water supply and drainage connections to the building.
    a) The layout of Single Storey Building Drainage System
    b) The layout of Water supply in Single Storey Building
    c) The layout of the Drainage system in Multi storeyed Building

7. Student Activity: Visit a construction site and collect drawings for the project

Textbooks:

1. Building Planning & Drawing – Kumaraswamy N., Kameswara Rao A., Charotar Publishing
2. Civil Engg. Drawing and House Planning – Verma B. P., Khanna Publishers
3. Building Drawing & Detailing – Balagopal & T.S. Prabhu, Spades Publishers
4. Building Planning and Drawing – S.S .Bhavikatti & M.V Chitawadagi, I.K International Publishing House Pvt.Ltd

Reference books:

1. National Building Code, BIS, New Delhi

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	**CO1**	**CO2**	**CO3**
Progressive Evaluation Marks	✓	✓	✓
End Examination Marks	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	2	2			3		3	2	3		3	3	2	3
2	3	3	2			3		3	3	3		3	3	3	3
3	3	3	2			3		3	3	3		3	3	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD8
CD2	Tutorials/Assignments		CO2	CD5, CD8
CD3	Seminars		CO3	CD4, CD5, CD7, CD8
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 206
Course title: FLUID MECHANICS LABORATORY
Pre-requisite(s): CE 203 (Fluid Mechanics)
Co- requisite(s):
Credits: 1 L:0 T:0 P:2
Class schedule per week: 2
Class: B.Tech.
Semester / Level: 3rd SEMESTER/LEVEL 2
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand basic concepts of fluid flow. (K1, K2)
B.	To have understanding of various types of flow measuring devices and their calibration. (K1, K2)
C.	To be able to estimate losses associated in the experimental devices due to friction etc. (K2, K3)
D.	To impart training to use various flow measuring devices for making engineering judgments. (K2, K3)

Course Outcomes

After the completion of this course, students will be able to:

1.	Acquire knowledge of basic principles of fluid mechanics. (K1, K2)
2.	Estimate the friction and measure the frictional losses in fluid flow. (K2, K3)
3.	Determine the coefficient of discharge of flow measuring devices. (K1, K2)
4.	Analyse fluid flow problems using momentum and energy principles. (K3, K4)
5.	Determine the centre of pressure and analyse stability of floating bodies. (K3, K4)

List of Experiments:

1. Determination of Centre of Pressure
2. Determination of Metacentric Height
3. Verification of Bernoulli's Theorem
4. Determination of Discharge Coefficients of Orifice
5. Determination of Discharge Coefficients of Mouthpiece
6. Calibration of Venturimeter
7. Determination of Discharge Coefficients of Triangular Notch
8. Determination of Impact of Jet
9. Determination of Pipe Friction
10. Calibration of Rotameter

Reference books:

1. Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publications.
2. Hydraulics and Fluid Machines, P. N. Modi and S. H. Seth, Standard Book House.
3. Experimental Fluid Mechanics, Vol. 1, G. L. Asawa, Nemchand and Bros, Roorkee.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Sem Examination	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation	✓	✓	✓	✓	✓
End Sem Examination	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student Feedback on Faculty
2. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
1	3	2	1	1	1	2	3	2	3	2	1	3	2	1
2	3	3	1	2	2	2	2	2	3	2	1	3	2	2
3	3	3	1	2	2	2	2	2	3	2	1	3	2	2
4	3	3	3	3	2	2	2	2	3	2	1	3	3	2
5	3	2	2	2	2	2	2	2	3	2	1	3	3	2

Mapping Between COs and Course Delivery (CD) methods

CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD8
CD2	Tutorials/Assignments		CO2	CD5, CD8
CD3	Seminars		CO3	CD5, CD8
CD4	Mini projects/Projects		CO4	CD5, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD5, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 211
Course title: STRUCTURAL ENGINEERING LABORATORY I
Pre-requisite(s):
Co- requisite(s):
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 4
Class: B. Tech
Semester / Level: 4TH SEMESTER/ LEVEL 2
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

A.	To give the basic understanding of structural member behavior under the action of loads.
B.	To verify theoretical formulas of linear elastic structural elements by conducting experiments.

Course Outcomes

After the completion of this course, students will be able to:

1.	Evaluate the behavior of different structures when loaded with various kinds of loading conditions
2.	Correlate the theoretical and experiment values on structural behavior.
3.	Solve a real-life structures project to satisfy functional and strength requirements.

List of experiments

1) Verification of Maxwell-Bett's Law.
2) Determination of the flexural rigidity of the beam and compare with the theoretical value.
3) Determination of deflection in a pin-jointed truss and to verify the results theoretically and graphically.
4) To study the behavior of different types of columns and find Euler's buckling load for each case.
5) Study on two hinged arches for the horizontal displacement of the roller end for a given system of loading and to compare the same with those obtained analytically.
6) Study behavior of a portal frame under different end conditions.
7) Verification of the Muller Breslau theorem by using Begg's deformator set.
8) Determination of material fringe value by using diffused light research polariscope.
9) Verification of the moment area theorem regarding the slopes and deflections of the beam.

10) Determination of the moment required to produce a given rotation (rotational stiffness) at one end of the beam when the other end is pinned.
11) Experimental and analytical study of deflection and unsymmetrical bending of a cantilever beam.
12) Virtual Labs - http://bsa-iiith.vlabs.ac.in/

Textbooks:

Reference books:

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	
Simulation	✓

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3
Progressive Evaluation Marks	✓	✓	✓
End Examination Marks	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	1	2	2	1						2	1		
2	3	2	3	3	2	1						2	3	2	
3	3	3	3	3	2	2		2				3	2	2	2

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD9
CD2	Tutorials/Assignments		CO2	CD5, CD9
CD3	Seminars		CO3	CD5, CD9
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 212
Course title: SURVEYING FIELDWORK
Pre-requisite(s): CE 208 SURVEYING
Co- requisite(s):
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 4
Class: B. Tech
Semester / Level: 4TH SEMESTER/ LEVEL 2
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students to:

A.	Execute chain, compass survey.
B.	Perform plane table surveying.
C.	Carry out levelling works, take measurements by theodolite.
D.	Set out different types of curves.
E.	Learn about modern surveying instruments.

Course Outcomes

After the completion of this course, students will be able to:

1.	Perform chain, compass survey.
2.	Perform plane table surveying.
3.	Carry out levelling work, take measurement of angles with theodolite.
4.	Set different types of curves in the field.
5.	Handle modern instruments like Total Station, Auto Level, Digital Theodolite.

List of experiments

Fieldwork I: Perform survey for an area using chain and compass

Fieldwork II: Perform survey for an area using plane table.

Fieldwork III: Carry out profile leveling and cross-sectioning work along a road.

Fieldwork IV: Measurement of horizontal and vertical angles with a theodolite.

Fieldwork V: Set out horizontal curves on the field.

Fieldwork VI: Perform traversing using Total Station.

Fieldwork VII: Handling Digital Theodolites and AutoLevels.

Text books:

1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and 2, Laxmi Publications (P) Ltd.
2. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.

Reference books:

1. Duggal, S.K. "Surveying" – Vol. 1 and 2, Tata McGraw-Hill Companies, New Delhi.
2. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	2	2	2	2		1	3	3	2		3	3	
2	3	3	2	2	2	2		1	3	3	2		3	3	
3	3	3	2	2	2	2		1	3	3	2		3	3	
4	3	3	2	2	2	2		1	3	3	2		3	3	
5	3	3	2	2	3	2		1	3	3	2		2	3	

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD6,CD8
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD6,CD8
CD3	Seminars		CO3	CD1, CD2, CD6,CD8
CD4	Mini projects/Projects		CO4	CD1, CD2, CD6,CD8
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD2, CD6,CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 213
Course title: SPECIFICATIONS, ESTIMATION AND COSTING
Pre-requisite(s):
Co- requisite(s):
Credits: 2 L: 1 T: 0 P: 2
Class schedule per week: 3
Class: B. Tech
Semester / Level: 4TH SEMESTER/ LEVEL 2
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students to:

A.	Understand the importance of estimation in civil engineering works and the different types of estimations and perform approximate estimation calculations.
B.	Understand the methodology for performing detailed estimations for building constructions.
C.	Understand the method for calculating reinforcement steel required in RCC works
D.	Understand how to analyse rates of different items of work
E.	Learn about writing specifications for different items of work.

Course Outcomes

After the completion of this course, students will be able to:

1.	Perform approximate estimate for a building to be constructed
2.	Perform detailed estimate for a building to be constructed.
3.	Calculate amount of reinforcement required in RCC works in a building construction.
4.	Perform rate analysis for various items of work.
5.	Fix specifications (and workmanship) required for the execution of different items of work.

Syllabus

Module I: Estimation Fundamentals
Importance of estimation, different types of estimates; Revised estimate, Supplementary estimate, how to prepare detailed estimate; abstract of estimate; contingencies; work-charged establishment; Tools & plants; market rate; lump-sum item, schedule of rates; substituted item, other definitions; general and

detailed specifications. Importance of approximate estimate; methods of approximate estimation; approximate cost for water supply, sanitary and electrification works.

Module II: Detailed Estimation of Buildings
General items of work for building estimates; principal units for various items of work; limits of measurement and degree of accuracy in estimation; method/mode of measurement for different items of works commonly encountered in building construction; detailed estimates of a single roomed and a two roomed single storey residential building; estimation of an underground tank; symmetrical and unsymmetrical boundary walls; principle of estimate for a two-roomed building having different cross-sections to that of the main wall; principle of estimate of a single-roomed building with verandah dwarf wall and pillars having different cross-sections and when the same footing joins with several footings of the main wall.

Module III: RCC works and bar bending schedule
Measurement of materials; reinforcement; MS and TOR steel; binding wires; developmental length; end anchorage; hook and bend allowance; estimation of reinforcement bars in slabs, beams, columns, lintel and footing.

Module IV: Analysis of Rates
What is analysis of rates and how it is to be prepared; quantify of materials per unit rate of work; estimating labour; calculating quantity of materials required for different items of work; rate of materials and labour; material and other cost considerations. Market rates; Schedule of Rates. Rate analysis for different items of work commonly done in building construction.

Module V: Specification
Purpose, necessity of specification; how to write specifications; types of specifications; standard specification; special specifications; brief and detailed specifications and workmanship for common items of work in building construction.

Text books:

1. Chakraborty M., "Estimating costing and valuation in Civil Engg., Principle and applications (Authors Publication, Kolkata)
2. B.N. Dutta “Estimating & Costing in Civil Engineering,” UBS Publishers & Distributors Pvt. Ltd. New Delhi.
3. CPWD Works Manual 2014 published under the authority of Director General CPWD.
4. CPWD Specifications 2009 published by Director General of Works, CPWD
5. CPWD DSR 2016 published by Director General of Works, CPWD

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2	3		1	3		3		3	3	3
2	3	3	3	2	2	3		1	3		3		3	3	3
3	3	3	3	2	2	3		1	3		3		3	3	3
4	3	3	3	2	2	3		1	3		3		3	3	3
5	3	1			1	3		1	3		3		2	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD6,CD8
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD6,CD8
CD3	Seminars		CO3	CD1, CD2, CD6,CD8
CD4	Mini projects/Projects		CO4	CD1, CD2, CD6,CD8
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD2, CD6,CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 306
Course title: WATER RESOURCES ENGINEERING LABORATORY
Pre-requisite(s): CE 203 (Fluid Mechanics)
Co- requisite(s):
Credits: 1 L:0 T:0 P:2
Class schedule per week: 2
Class: B.Tech.
Semester / Level: 5th SEMESTER/LEVEL 3
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students:

A.	To understand basic concepts of fluid flow in channels and fluid machinery. (K1, K2)
B.	To apply the concepts of fluid mechanics to analyse and solve engineering problems involving fluids in pipes, open channels, jets, turbines and pumps. (K3, K4)
C.	To analyse and understand working principles of hydraulic turbines and pumps. (K3, K4)
D.	To estimate friction losses in pumps, turbines and other flow devices. (K3, K4)

Course Outcomes

After the completion of this course, students will be able to:

1.	Acquire knowledge of working principles of open channel flow and hydraulic machines. (K1, K2)
2.	Estimate seepage losses through earthen reservoirs. (K3, K4)
3.	Determine discharge coefficients of hydraulic structures, losses in hydraulic jumps and roughness coefficients of open channels. (K3, K4)
4.	Conduct experiments on hydraulic turbines and pumps to draw characteristics curves. (K3, K4)
5.	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations. (K2, K3, K4)

List of Experiments

1. Determination of Seepage through Porous Media
2. Viscous Flow between Parallel Plates
3. Calibration of Ogee Weir
4. Analysis of Hydraulic Jump
5. Determination of Roughness Coefficients in an Open Channel
6. Analysis of Vortex Motion
7. Calibration of Reciprocating Pump
8. Calibration of Multistage Centrifugal Pump
9. Calibration of Jet Pump
10. Determination of Cavitation in Hydraulic Machines

Reference Books:

1. Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publications.
2. Hydraulics and Fluid Machines, P. N. Modi and S. H. Seth, Standard Book House.
3. Hydraulic Machines, Dr. Jagdish Lal, Metropolitan Book Company.
4. Experimental Fluid Mechanics, Vol. 1, G. L. Asawa, Nemchand and Bros, Roorkee.
5. Flow through Open Channels, K.G. Ranga Raju, Tata McGraw Hills.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation	60
End Sem Examination	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation	✓	✓	✓	✓	✓
End Sem Examination	✓	✓	✓	✓	✓

Indirect Assessment –

3. Student Feedback on Faculty
4. Student Feedback on Course Outcome

Mapping between Objectives and Outcomes

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes												Program Specific Outcome	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
1	3	2	1	1	1	2	3	2	3	2	1	3	2	1
2	3	3	3	3	2	2	2	2	3	2	1	3	3	2
3	3	3	3	3	2	2	2	2	3	2	1	3	3	2
4	3	3	3	3	2	2	2	2	2	2	1	3	3	2
5	3	3	3	3	2	2	2	2	3	2	1	3	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD8
CD2	Tutorials/Assignments		CO2	CD5, CD8
CD3	Seminars		CO3	CD5, CD8
CD4	Mini projects/Projects		CO4	CD5, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD5, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE307
Course title: Environmental Engineering Laboratory
Pre-requisite(s):
Co- requisite(s):
Credits: 2 L: 0 T: 0 P: 3
Class schedule per week: 3
Class: B.Tech.
Semester / Level: Vth SEMESTER/ LEVEL 3
Branch: Civil Engineering
Name of Teacher:

Course Objectives

This course enables the students:

A.	To describe the concept of water quality with reference to different standards (K1, K2)
B.	To apply different procedures for physico-chemical analysis of water (K3)
C.	To interpret and write water and wastewater quality analysis report (K2, K3)
D.	To assess optimum dosing of chemicals for water treatment (K4)
E.	To assess bacteriological quality of water (K4)

Course Outcomes

After the completion of this course, students will be able to:

1.	Explain the importance of water quality and various standards (K1, K2)
2.	Choose different procedures for physico-chemical analysis of water samples (K3)
3.	Prepare report on water and wastewater quality (K2, K3)
4.	Illustrate the process of optimizing chemical dosing for water treatment (K4)
5.	Outline the testing of bacteriological quality of water (K4)

Syllabus

1. Determination of pH, EC and turbidity of water
2. Determination of total solids, total dissolved solids and total suspended solids of water
3. Determination of acidity and alkalinity of water
4. Determination of total hardness of water
5. Determination of dissolved oxygen (DO) and BOD of water and wastewater
6. Determination of COD of water and wastewater
7. Determination of chloride and residual chlorine of water
8. Determination of nitrate in water
9. Determination of phosphate in water
10. Determination of sulphate in water
11. Determination of fluoride in water
12. Chemicals dose optimisation for water treatment
13. Coliform count of water and wastewater samples by MPN method

Text books:

1. Standard Methods of Testing of Water and Wastewater" Use by APHA, AWWA, AND WPCF (USA)
2. Chemistry for Environmental Engineering, Clair N. Sawyer, Perry Mccarty, Gene F. Parkin, McGraw Hill Inc. New York, USA
3. Introduction to Environmental Engineering and Science, G.M. Masters & Wendell Ela, PHI Publishers

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3	CO4	CO5
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1							3						3		3
2							3						3		3
3							3						3		3
4	1						3						3		3
5	1						3						3		3

COURSE INFORMATION SHEET

Course code: CE 309
Course title: STRUCTURAL ENGINEERING LABORATORY II
Pre-requisite(s):
Co- requisite(s):
Credits: 2 L: 0 T: 0 P: 4
Class schedule per week: 4
Class: B. Tech
Semester / Level: 6TH SEMESTER/ LEVEL 3
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

A.	To test the properties of materials used to make concrete.
B.	To test the fresh and hardened concrete property.
C.	To perform tests on bricks.

Course Outcomes

After the completion of this course, students will be able to:

1.	Conduct the regular test on quality check of materials used to make concrete
2.	Conduct tests to ascertain the desired fresh and hardened properties of concrete required for the concrete structure.
3.	Conduct and examine the quality of the bricks.

List of experiments

A) Test on Cement
   1. Determination of fineness of cement.
   2. Consistency test on cement.
   3. Determination of setting times of cement.
   4. Determination of soundness of cement.
   5. Determination of specific gravity of cement.
   6. Determination of compressive strength of cement

B) Test on aggregates
   1. Sieve analysis of coarse and fine aggregates.

2. Specific gravity and water absorption of fine and coarse aggregates.
3. Bulking of sand

C) Test on fresh concrete
   1. Slump cone test
   2. Flow table
   3. Compaction factor
   4. Vee Bee Test

D) Test on hardened concrete
   1. Compressive strength.
   2. Flexural strength.
   3. Split tensile strength.

E) Test on Bricks

Textbooks:

Reference books:

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	% Contribution during CO Assessment
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	CO1	CO2	CO3
Progressive Evaluation Marks	✓	✓	✓
End Examination Marks	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2				3	2	2				2		3	3
2	2	2				3	2	2				2		3	3
3	2	2				3	2	2				2		3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD8
CD2	Tutorials/Assignments		CO2	CD5, CD8
CD3	Seminars		CO3	CD5, CD8
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 310
Course title: COMPUTER AIDED ANALYSIS AND DESIGN
Pre-requisite(s):
Co- requisite(s):
Credits: 1 L: 0 T: 0 P: 2
Class schedule per week: 2
Class: B. Tech
Semester / Level: 6TH SEMESTER/ LEVEL 3
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students to:

A.	To introduce the students about the software tool/s useful for Civil Engineering.
B.	To make students aware of software/s which can be implemented for solving Civil Engineering problems.

Course Outcomes

After the completion of this course, students will be able to:

1.	Identify and formulate Civil Engineering problems using CAD tools necessary for engineering practice.
2.	Use the latest software to solve the Civil Engineering problems with the aid of technological aids.

Syllabus

- Use of latest software packages with pre-processors and post-processors facility for analysis and design of civil engineering problems.

Text books:

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	✓
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	**CO1**	**CO2**
Progressive Evaluation Marks	✓	✓
End Examination Marks	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	**Program Outcomes**												**Program Specific Outcome**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	3	3	3	1					2		3	3	3
2	3	3	3	3	3	1					2		3	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD6,CD8, CD9
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD6,CD8, CD9
CD3	Seminars			
CD4	Mini projects/Projects			
CD5	Laboratory experiments/teaching aids			
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE311
Course title: Geotechnical Engineering Laboratory
Pre-requisite(s): CE303 Geotechnical Engineering
Co- requisite(s):
Credits: 1 L: 0 T: 0 P: 2
Class schedule per week: 2
Class: B. Tech.
Semester / Level: 6th SEMESTER/ LEVEL 3
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students to:

A.	Perform Moisture content, Specific gravity, Atterberg limits tests.
B.	Perform Grain size distribution, Proctor tests.
C.	Perform Unconfined compression, Triaxial tests.
D.	Perform California Bearing Ratio, Vane Shear tests.
E.	Perform Sand replacement, Core cutter, Permeability tests.

Course Outcomes

After the completion of this course, students will be able to:

1.	Carry out Moisture content, Specific gravity, Atterberg limits tests.
2.	Carry out Grain size distribution, Proctor tests.
3.	Carry out Unconfined compression, Triaxial tests.
4.	Carry out California Bearing Ratio, Vane Shear tests.
5.	Carry out Sand replacement, Core cutter, Permeability tests.

List of experiments

Experiment 1: Determination of moisture content and specific gravity

Experiment 2: Determination of Atterberg limits

Experiment 3: Determination of Grain size distribution

Experiment 4: Proctor Compaction test

Experiment 5: Unconfined compression test

Experiment 6: Triaxial test

Experiment 7: Determination of California Bearing Ratio

Experiment 8: Vane shear test

Experiment 9: Direct shear test

Experiment 10: Sand replacement and Core cutter test

Experiment 11: Permeability test (constant and variable head)

Text books:

1. Soil Mechanics And Foundations – B.C. Punmia, Laxmi Publications (P) Ltd.
2. Textbook of Soil Mechanics and Foundation Engineering – V.N.S. Murthy, CBS Publishers & Distributors Pvt. Ltd.

Reference books:

1. Geotechnical Engineering – C. Venkatramaiah, New Age International Publishers

Gaps in the syllabus (to meet Industry/Profession requirements)

POs met through Gaps in the Syllabus

Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	✓
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes

Course Outcome	Program Outcomes						Program Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
1	3	3	3	2	1	3	3	2	2
2	3	3	3	2	1	3	3	2	2
3	3	3	3	2	1	3	3	2	2
4	3	3	3	2	1	3	3	2	2
5	3	3	3	2	1	3	3	2	2

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD1, CD2, CD4, CD5, CD6,CD8
CD2	Tutorials/Assignments		CO2	CD1, CD2, CD4, CD5, CD6, CD8
CD3	Seminars		CO3	CD1, CD2, CD4, CD5, CD6, CD8
CD4	Mini projects/Projects		CO4	CD1, CD2, CD4, CD5, CD6, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD1, CD2, CD4, CD5, CD6, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE 312
Course title: TRANSPORTATION ENGINEERING LABORATORY
Pre-requisite(s): CE 305 TRANSPORTATION ENGINEERING
Co- requisite(s):
Credits: 1 L: 0 T: 0 P: 2
Class schedule per week: 2
Class: B. Tech
Semester / Level: 6TH SEMESTER/ LEVEL 3
Branch: CIVIL ENGINEERING
Name of Teacher:

Course Objectives

This course enables the students to:

A.	Determine the CBR value for flexible pavement design
B.	Identify the different layers of soil and determine its thickness up to a certain depth
C.	Determine the properties of bitumen and the resistance of bituminous mix
D.	Determine the smoothness of profiles of pavements
E.	To conduct traffic volume study and spot speed study

Course Outcomes

After the completion of this course, students will be able to:

1.	Determine the CBR value of given soil sample
2.	Evaluate the different types of soil layers and calculate thickness of each layer up to a certain depth
3.	Determine viscosity, ductility, flash point, penetration value, softening point and specific gravity and also to calculate the strength of bituminous mix.
4.	Determine the undulations on the pavement surface which helps in maintenance of pavements
5.	Analyse the different variables and factors and distribution of traffic for the design of highway system

List of experiments

1. Determination of California Bearing Ratio of soil
2. Dynamic Cone Penetrometer
3. Determination of specific gravity and softening point of bitumen
4. Determination of viscosity of bitumen
5. Determination of ductility of bitumen
6. Determination of flash point of bitumen

7. Determination of penetration value of bitumen
8. Marshall apparatus
9. Profilograph
10. Traffic volume study and Spot speed study

Text books:

1. Khanna, S.K., Justo C.E.G., and Veeraraghavan.: Highway Engineering, Nem Chand and Bros.
2. Chakroborty, P. and A. Das Principles of Transportation Engineering, Prentice Hall of India Pvt. Ltd, New Delhi, India, 2005.
3. Ministry of Road Transport and Highways (5th Rev): Specifications for Road and Bridge Works (Indian Roads Congress)
4. IRC Codes of Practices

Reference books:

1. Garber N.J and Hoel L : Traffic and Highway Engineering (Cengage Learning)
2. Pignataro LJ. Traffic Engineering: Theory and Practice; Prentice hall
3. All laboratory tests are as per IS, ASTM, AASHTO, TRL, IRC, BS procedures / specifications and guidelines.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design
POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	
Tutorials/Assignments	
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	✓
Industrial visits/in-plant training	✓
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**				
Progressive Evaluation Marks	60				
End Examination Marks	40				
Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	Program Outcomes												Program Specific Outcome		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	3	3	2	2	2	2	2	1	3	3	2	2	3	3	3
2	3	3	3	2	2	2	2	1	3	3	2	2	3	3	3
3	3	3	3	2	2	2	2	1	3	3	2	2	3	3	3
4	3	3	2	2	2	2	2	1	3	3	2	2	3	3	3
5	3	3	2	2	3	2	2	1	3	3	2	2	2	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD6, CD7,CD8
CD2	Tutorials/Assignments		CO2	CD5, CD6, CD7,CD8
CD3	Seminars		CO3	CD5, CD6, CD7,CD8
CD4	Mini projects/Projects		CO4	CD5, CD6, CD7,CD8
CD5	Laboratory experiments/teaching aids		CO5	CD5, CD6, CD7,CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			

COURSE INFORMATION SHEET

Course code: CE402
Course title: Remote Sensing and GIS Laboratory
Pre-requisite(s):
Co- requisite(s):
Credits: 1 L: 0 T: 0 P: 2
Class schedule per week: 2
Class: B.Tech.
Semester / Level: Sem VII / Level IV
Branch: Civil Engineering
Name of Teacher:

Course Objectives

This course enables the students:

A.	To describe the concept of remote sensing and GIS (K1, K2)
B.	To understand the mechanism of image interpretation (K2)
C.	To interpret and identity features of a satellite data (K2, K3, K4)
D.	To assess the applicability of tools for civil engineering purpose (K5)
E.	To perform and analyse tools for environmental management (K5)

Course Outcomes

After the completion of this course, students will be able to:

1.	Explain the concepts of remote sensing and GIS (K1, K2)
2.	Compare different features on a satellite image using multiple image interpretation techniques. (K3,K4)
3.	Identify and apply software tools for civil and urban development (K5)
4.	Identify and apply software tools for environmental sustainability (K5)
5.	Prepare informative maps for multiple purposes (K5)

Syllabus

14. Introduction to Concepts of Remote Sensing, GIS and GPS
15. Introduction to various sensors, satellite and Softwares related to Remote Sensing, & GIS
16. Satellite Image Interpretation of known locations and ground verification
17. Satellite Image Interpretation of unknown locations
18. To create an Area on interest using subset and mosaic tools.
19. To Perform Supervised classification to prepare a LULC Map
20. To Perform UnSupervised classification to prepare a LULC Map
21. To apply Indices for urban and environmental analysis
22. To create point, line and polygon features for Map Generation
23. To add and create attributes for analysing data sets in Arc GIS platform
24. To apply buffering techniques for Urban and Environmental Analysis
25. To apply interpolation techniques for Urban and Environmental Analysis
26. To prepare maps using all map components.

Text books:

4. Remote Sensing of Environment. JR Jenson. 6ed (WSE) by Lillesand Paperback.

5. Remote Sensing: Principles and Applications, Third Edition. Floyd F. Sabins. Waveland press. Illinois.
6. Introduction to Geographic Information Systems (With CD) 4th Edition, Kang-tsung Chang, TMH pub.

Gaps in the syllabus (to meet Industry/Profession requirements)
POs met through Gaps in the Syllabus
Topics beyond syllabus/Advanced topics/Design

POs met through Topics beyond syllabus/Advanced topics/Design

Course Delivery methods	
Lecture by use of boards/LCD projectors/OHP projectors	✓
Tutorials/Assignments	✓
Seminars	
Mini projects/Projects	
Laboratory experiments/teaching aids	✓
Industrial/guest lectures	
Industrial visits/in-plant training	
Self- learning such as use of NPTEL materials and internets	✓
Simulation	

Course Outcome (CO) Attainment Assessment tools & Evaluation procedure

Direct Assessment

Assessment Tool	**% Contribution during CO Assessment**
Progressive Evaluation Marks	60
End Examination Marks	40

Assessment Components	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Progressive Evaluation Marks	✓	✓	✓	✓	✓
End Examination Marks	✓	✓	✓	✓	✓

Indirect Assessment –

1. Student feedback on teaching quality and teaching methods adopted
2. Student feedback on course syllabus and course outcome

Mapping of Course Outcomes onto Program Outcomes and Program Specific Outcomes

Course Outcome	**Program Outcomes**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	2		1		1		3		1			1	1	1	
2	2		1		1		3		1			1	1	1	
3	2		1		2		3		1			2	2	2	1

4	2		2		3		3		1			2	3	3	3
5	2		2		3		3		1			2	3	3	3

Mapping Between COs and Course Delivery (CD) methods				
CD	**Course Delivery methods**		**Course Outcome**	**Course Delivery Method**
CD1	Lecture by use of boards/LCD projectors/OHP projectors		CO1	CD5, CD8
CD2	Tutorials/Assignments		CO2	CD5, CD8
CD3	Seminars		CO3	CD5,CD8
CD4	Mini projects/Projects		CO4	CD5, CD8
CD5	Laboratory experiments/teaching aids		CO5	CD5, CD8
CD6	Industrial/guest lectures			
CD7	Industrial visits/in-plant training			
CD8	Self- learning such as use of NPTEL materials and internets			
CD9	Simulation			