UNIVERSITY OF JAMMU

NOTIFICATION
(24/Aug/Adp/60)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B. Tech) in Civil Engineering** for Semester V to VIII under the **Credit Based System** as per the new **AICTE Model** Curriculum adopted from batch 2022 and onwards **(as given in the Annexure)** for the candidates of **Govt. /Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Civil	Semester-V	Dec. 2024, 2025, 2026, and 2027
Engineering	Semester-VI	May 2025, 2026, 2027 and 2028
	Semester-VII	Dec. 2025, 2026, 2027 and 2028
	Semester-VIII	May 2026, 2027, 2028 and 2029

The Syllabi of the course is available on the University Website: www.jammuuniversity.in.

-Sd/

DEAN ACADEMIC AFFAIRS

No. F.Acd/III/24/ 8647-58
Dated: 7/08/2024

Copy for information & necessary action to:-
1. Dean Faculty of Engineering
2. Principal, GCET/MBSCET /UIET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint /Assistant Registrar (Exams Prof. /Eval Prof. /Confidential)
5. Incharge University Website for uploading the same in the University Website.

Deputy Registrar (Academic)

Item No-01: Resolved the syllabus of B.Tech. 5th Semester starting from session 2022 of Civil Engineering branch: -

B.Tech.5th Semester Civil Engineering
For Examination to be held in the Year December 2024,2025,2026,2027.

Contact hours/week = 25

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6501	Professional Core Course	Design of RCC Structures-I	2	1	0	25	75	100	3	100
CEP-6502	Professional Core Course	Geotechnical Engineering	2	1	0	25	75	100	3	100
CEP-6503	Professional Core Course	Railways, Airports and Harbour Engineering	2	1	0	25	75	100	3	100
CEP-6504	Professional Core Course	Estimation & Costing	2	1	0	25	75	100	3	100
MOC-6501	Massive Open Online Course	SWAYAM/NPTEL	3	0	0	--	100	100	3	100
CSO-3505	Open Elective Course	Python Programming	2	1	0	25	75	100	3	100
EEO-2505		Non Conventional Energy Sources And Instrumentation								
ECO-1505		Introduction To The Internet Of Things								
MEO-5505		3D Printing								
IOT-4505		Linux programming								
CSO-3515	Open Elective Course Lab	Python Programming lab	0	0	2	25	0	25	1	100
EEO-2515		Non-Conventional Energy Sources And Instrumentation Lab								
ECO-1515		Introduction to the Internet of Things Lab								
MEO-5515		3D Printing Lab								
ITO-4515		Linux Programming Lab								
SIT-6511	Summer Internship Training	Summer Survey Camp (IT-I)	0	0	0	100	0	100	3	100
CEP-6511	Professional Core Course	Building Drawing Lab	0	0	3	50	0	50	1.5	100
CEP-6512	Professional Core Course	Geotechnical Engineering Lab	0	0	2	25	0	25	1	100
Total			13	5	7	425	375	800	24.5	

①

REMARKS:

1. Three new professional core courses have been introduced: "**Railways, Airport & Harbour Engineering**" (**CEP-6503**), "**Estimation & Costing**" (**CEP-6502**) and "**Design of RCC Structures -I**" (**CEP-6501**) in the 5th semester.

2. **New Open Elective courses** for interdisciplinary branches have been introduced in the 5th semester to incorporate multidisciplinary courses as per NEP, out of which a student has to opt anyone.

3. **New Open Elective course (Labs)** for interdisciplinary branches have been introduced in the 5th semester to incorporate multidisciplinary courses as per NEP, out of which a student has to opt anyone.

4. The course code of the **Massive Open Online Course "SWAYAM/NPTEL"** has been changed from MOC-501 to **MOC-6501**. The department shall offer a SWAYAM/NPTEL course from the list of courses offered by SWAYAM/NPTEL around the commencement of the semester. However, the selected Massive Open Online Course should not be similar to the regular courses offered as part of the department curriculum.

5. The course code of course titled "**Geo-technical Engineering**" has been changed from PCE-502 to **CEP-6502** and the course contents in each case have been modified by more than 25%.

6. The course code of course titled "**Summer Survey Camp**" has been changed from PIT-511 to **CEP-6511**.

7. New Professional Lab course titled "**Building Drawing**" with course code **CEP-6511** has been introduced in the 5th semester.

8. The Course Code of course titled "**Geotechnical Engineering Lab**" has been changed from PCE-513 to **CEP-6512** with no change in syllabus.

②

Item No-02: Resolved the syllabus of B.Tech. 6th Semester starting from session 2024 of the Civil Engineering Branch:

B.Tech.6th Semester Civil Engineering

For Examination to be held in the Year May 2025,2026,2027,2028.

Contact hours/week = 23

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6601	Professional Core Course	Design of RCC Structures-II	2	1	0	25	75	100	3	100
CEP-6602	Professional Core Course	Hydrology & Irrigation Engineering	2	1	0	25	75	100	3	100
CEP-6603	Professional Core Course	Foundation Engineering	2	1	0	25	75	100	3	100
CEP-6604	Professional Core Course	Highway Engineering	2	1	0	25	75	100	3	100
HMT-7603	Humanities & Social Science Course	Industrial Management	2	1	0	25	75	100	3	100
MOC-6601	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
CEP-6611	Professional Core Course	Design of RCC Structure Lab	0	0	2	25	0	25	1	100
CEP-6612	Professional Core Course	Hydrology & Irrigation Engineering Lab	0	0	2	25	0	25	1	100
CEP-6613	Professional Core Course	Highway Engineering Lab	0	0	2	25	0	25	1	100
Total			10	5	8	200	400	600	19	

③

REMARKS:

1. The Professional core course "**Design of RCC Structures**" with code PCE-601 has been replaced with course titled "**Design of RCC Structures-II**" with code **CEP-6601** with change in course content more than 25% in the 6th semester.

2. The course code of course titled "**Hydrology & Irrigation Engineering**" has been changed from PCE-602 to **CEP-6602** and the course content has been modified by more than 25%.

3. Two new professional core courses have been introduced: "**Foundation Engineering**" (**CEP-6603**) and "**Highway Engineering**" (**CEP-6604**) in 6th semester.

4. The Course Code of "**Massive Open Online Course**" has been changed from MOC-601 to **MOC-6601** and credits have been reduced to 1 from 3.

5. The course code of course titled "**Industrial Management**" has been changed from HMC-603 to **HMT-7603** and the course content has been modified by more than 25%.

6. The Course Code of course titled "**Design of RCC Lab**" has been changed from PCE-611 to **CEP-6611** with no change in syllabus.

7. The Course Code of course titled "**Hydrology & Irrigation Engineering Lab**" has been changed from PCE-613 to **CEP-6612** with no change in syllabus.

8. The course "**Transportation Engineering Lab**" with code PCE-612 has been replaced by the course titled "**Highway Engineering Lab**" with code **CEP-6613** with no change in syllabus.

9. The **Elective I and Elective II** courses have been discontinued.

Item No-03: Resolved the syllabus of B.Tech. 7th Semester starting from session 2025 of the Civil Engineering Branch:

B.Tech.7th Semester Civil Engineering
For Examination to be held in the Year December 2025,2026,2027,2028.

Contact hours/week = 22

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6701	Professional Core Course	Design of Steel Structures	2	1	0	25	75	100	3	100
CEP-6702	Professional Core Course	Design of Hydraulic Structures	2	1	0	25	75	100	3	100
CCE-6701	Professional Elective Course-I/ MOOC	Disaster Management and Mitigations	2	1	0	25	75	100	3	100
CCE-6702		Water Resource Engineering								
MOC-6701		Swayam/ NPTEL				-	100			
CCE-6703	Professional Elective Course-II/ MOOC	Concrete Technology	2	1	0	25	75	100	3	100
CCE-6704		Solid Waste Management								
MOC-6702		Swayam/ NPTEL				-	100			
NCC-7706	Non Credit Course	Professional Practice Law & Ethics	2	0	0	Satisfactory/Unsatisfactory			0	100
SEM-6711	Seminar	Seminar	0	0	4	50	0	50	2	100
PRJ-6711	Project	Minor project	0	0	4	50	0	50	2	100
SIT-6711	Summer Industry Internship	Industrial training- II	0	0	0	50	0	50	2	100
Total			10	4	8	250/200*	300/350*	550	18	

* In case of Swayam/ NPTEL

REMARKS:

1. The Professional core course titled "**Design of Steel Structures** " with course code PCE-701 has been replaced as **CEP-6701** with change in course content more than 25% in the 7th semester.

2. The course code of course titled "**Design of Hydraulic Structures**" has been changed from PCE-702 to **CEP-6702** with change in course content more than 25%.

3. Under the **Professional Elective course- I**, three courses have been offered as listed below:

CCE-6701	Disaster Management and Mitigations
CCE-6702	Water Resource Engineering
MOC-6701	Swayam/NPTEL

Out of the three, the students have to opt any One in consultation with the Departmental committee.

4. Under the **Professional Elective course- II,** three courses have been offered as listed below:

CCE-6703	Concrete Technology
CCE-6704	Solid Waste Management
MOC-6702	Swayam/NPTEL

Out of the three, the students have to opt any One in consultation with the Departmental committee.

5. The Course Code of "**Professional Practice Law & Ethics**" has been changed from NCC-706 to **NCC-7706** and the course content has been modified by more than 25%.

6. The course code of course titled "**SEMINAR**" has been changed from SEM-706 to **SEM-6711** with no change in syllabus.

7. A new Course titled **Minor Project** has been introduced having course code **PRJ-6711.**

8. The course code of course titled "**Industrial Training -II**" has been changed from SII-706 to **SIT-6711** with no change in syllabus.

9. The **Open Elective Lab course** has been discontinued.

Item No-04: Resolved the syllabus of B.Tech. 8th Semester starting from session 2025 of the Civil Engineering Branch:

B.Tech.8th Semester Civil Engineering
For Examination to be held in the Year May 2026,2027,2028,2029.

Contact hours/week = 26

SCHEME I

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6801	Professional Core Course	Construction Planning and Management	2	1	0	25	75	100	3	100
CCE-6801	Professional Elective Course III	Pre stressed concrete	2	1	0	25	75	100	3	100
CCE-6802		Ground Improvement Techniques								
CCE-6803		Advance Structural Analysis								
MOC-6801	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
PRJ-6811	Project	Project	0	0	16	150	50	200	8	100
PCE-6811	Professional Core Course	Software lab	0	0	2	25	-	25	1	100
Total			4	2	20	225	225	450	16	

OR

SCHEME II

Contact hours/week = 26

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
PII-6801	Professional Industry Internship	Industry Internship-III	0	0	24	325	100	425	15	100
MOC-6801	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
Total			0	0	26	325	125	450	16	

REMARKS:

Students have the choice to opt among Scheme -I and Scheme -II

SCHEME-I

1. A new Professional core course titled **"Construction Planning &Management "** with course **CEP-6801** has been introduced in the 8th semester.

2. Under the **Professional Elective courses III**, three courses have been offered as listed below:

CCE-6801	Pre stressed concrete
CCE-6802	Ground Improvement Techniques
CCE-6803	Advance Structural Analysis

Out of the three, the students have to opt any One in consultation with the Departmental committee.

3. The Course Code of **"Massive Open Online Course"** has been changed from MOC-806 to **MOC-6801** and credits have been reduced to 1 from 2 with change in title **SWAYAM/NPTEL** any other MooC platform.

4. The course code of course titled **Project"** has been changed from PRJ-806 to **PRJ-6811**with no change in syllabus.

5. A new Course titled **Software Lab "** has been introduced having course code **PCE-6811.**

6. The **Open Elective course** has been discontinued.

OR

SCHEME -II

1. The Course Code of **"Industrial Internship"** has been changed from PII-806 to **PII-6801** and credits have been increased to 15 from 14.

2. The Course Code of **"Massive Open Online Course"** has been changed from MOC-806 to **MOC-6801** and credits have been reduced to 1 from 2

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B. Tech. 5th Semester Civil Engineering
For Examination to be held in the Year December 2024,2025,2026,2027.

Contact hours/week = 25

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6501	Professional Core Course	Design of RCC Structures-I	2	1	0	25	75	100	3	100
CEP-6502	Professional Core Course	Geotechnical Engineering	2	1	0	25	75	100	3	100
CEP-6503	Professional Core Course	Railways, Airports and Harbour Engineering	2	1	0	25	75	100	3	100
CEP-6504	Professional Core Course	Estimation & Costing	2	1	0	25	75	100	3	100
MOC-6501	Massive Open Online Course	SWAYAM/NPTEL	3	0	0	--	100	100	3	100
CSO-3505		Python Programming								
EEO-2505		Non Conventional Energy Sources And Instrumentation								
ECO-1505	Open Elective Course	Introduction To The Internet Of Things	2	1	0	25	75	100	3	
MEO-5505		3D Printing								100
ITO-4505		Linux programming								
CSO-3515		Python Programming lab								
EEO-2515		Non-Conventional Energy Sources And Instrumentation Lab								
ECO-1515	Open Elective Course Lab	Introduction to the Internet of Things Lab	0	0	2	25	0	25	1	
MEO-5515		3D Printing Lab								100
ITO-4515		Linux Programming Lab								
SIT-6511	Summer Internship Training	Summer Survey Camp (IT-I)	0	0	0	100	0	100	3	100
CEP-6511	Professional Core Course	Building Drawing Lab	0	0	3	50	0	50	1.5	100
CEP-6512	Professional Core Course	Geotechnical Engineering Lab	0	0	2	25	0	25	1	100
Total			13	5	7	425	375	800	24.5	

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	DESIGN OF RCC STRUCTURES-I						
COURSE NO.	CEP-6501	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3
COURSE OUTCOMES: On completion of the course the students will be able to:							
CO1	Interpret the design philosophies and analyze RC sections using Limit State method						
CO2	Design and detail RC beams using IS code provisions						
CO3	Design and detail RC columns and column footings using IS code provisions						
CO4	Design and detail RC slab and stairs using IS code provisions						

Section A

Design philosophies: knowledge of working stress method. Ultimate Load Method. Limit State Method in detail and its statistical back ground. Various Limit States. Analysis and design of singly, doubly reinforced beams, T beams, cantilever beams using Limit State Method. **(12 hrs)**

Shear, bond, anchorage provisions for rectangular beams using Limit State method. Serviceability conditions. Reinforcement detailing and drawings. Design of beams for Torsion. **(10 hrs)**

Section B

Analysis and design of columns by Limit State method. Short and long columns, biaxial bending. Use of design charts, Analysis and design of isolated footing, eccentric footing, combined footing, Introduction to Raft foundation. **(10 hrs)**

Design of one-way slab, Design of two-way slab with simply supported and restrained edges. Design of stairs.

(10 hrs)

BOOKS RECOMMENDED:

1	Reinforced Concrete Structures and Limit State Design	Jain, A.K.
2	Limit State Design of Reinforced Concrete	Varghese, P
3	Limit State Design of R.C.C.	Hughes
4	Plain and Reinforced Concrete	Jain &Jaikrishen
5	Limit State Theory and Design of Reinforced Concrete	Shah. V.L, &Karve S.R
6	Relevant I.S. Codes	

NOTE: There shall be a total 8 questions, four from each section. Each question carries 15 marks. Five questions have to be attempted by the students selecting at least two questions from each section. Use of calculator and IS Code 456, SP 16 Code are allowed.

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	GEOTECHNICAL ENGINEERING						
COURSE NO.	CEP-6502	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Carry out soil classification.
CO2	Solve problems related to permeability, soil stresses and seepage.
CO3	Estimate the compaction characteristics requirements of various soils.
CO4	Solve problems related to shear strength and consolidation settlement.

Section-A

Introduction: Origin & Formation of soil, Major soil deposits of India and General Types of soils, Three-Phase soil system and phase relationships.Clay minerals & its structural unit, Clay-water relationship, Soil structures.Index Properties: Specific Gravity, Specific Surface, Relative Density, Particle size Analysis, Stokes' law & Sedimentation analysis, Grain Size Distribution curve, Consistency of soils,various soil-classification systems.

(08 hrs)

Soil Hydraulics: Different forms of water flow through soils, Hydraulic heads, Pore water pressure, Principle of Effective stress, Capillarity, Darcy's law, Permeability of soils, factors influencing permeability, Lab & field methods of determination of permeability, Permeability of stratified soil deposits.
SOIL-Seepage& Flow Nets, Laplace equation for steady state flow, Seepage force, Quick sand & Critical Gradient, Construction of flow nets and their typical applications

(12 hrs)

Section-B

Determination of Compaction Characteristics: Need for soil compaction, Compaction Mechanism, Influencing factors, Proctor theory of compaction, Compaction tests, Compaction curve & parameters, Zero-air-void or saturation curve, Properties of compacted soils, Field compaction and field compaction control
Soil Compressibility: Fundamental concepts of consolidation, Types of Volume changes in Soil masses, Terzaghi's One dimensional consolidation equation, Compressibility parameters, Pre-consolidation pressure, OCR, Rate of Consolidation, Consolidation settlement, Degree of Consolidation, Secondary Consolidation, Time required for settlement, Field consolidation curve.

(12 hrs)
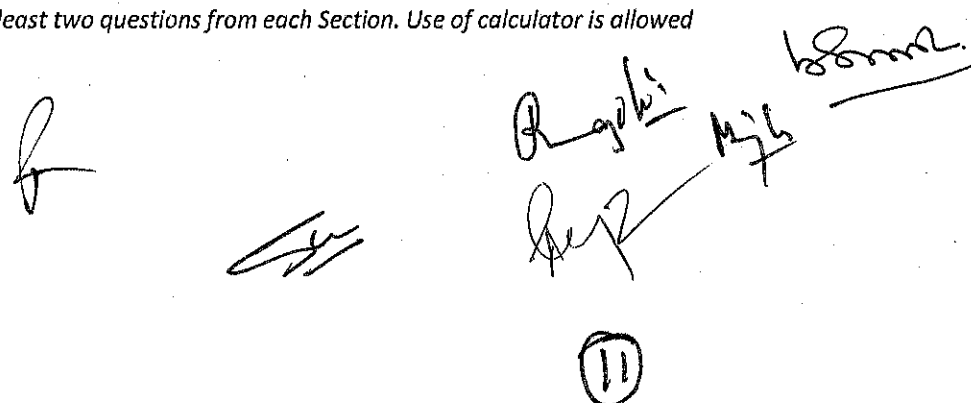
Shear Strength of soil: Mohr's Circle and its characteristics, Mohr's Coulomb's Equation, Different lab tests and drainage conditions, Stress-Strain curves.

(08 hrs)

BOOKS RECOMMENDED:

1	Principles of Geotechnical Engineering	Das, Braja M. (1999) PWS Publishing, Pacific Grove,Calif.
2	Soil Mechanics & Foundation Engg.	ARORA K.R, Standard Publisher Dist.
3	Basic and Applied Soil Mechanics	GopalRanjan& ASR Rao (2000) New Age Int'l Publishers
4	Geotechnical Engineering	Cernica, John N. (1995), John Wiley & Sons
5	Geotechnical Engineering	P. Purushothama Raj (1995), Tata McGraw-Hill

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed*

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING						
COURSE NO.	CEP-6503	L	T	P	MARKS		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Explain the basic components of Railway track.
CO2	Perform geometric design of permanent way and calculate the stresses in Railway track.
CO3	Explain Geometric elements of run way and developwind rose diagram for an airport.
CO4	Classify Docks &Harbors.

Section A

Railway Track : Introduction, Classification of Indian Railways(I.R), permanent way, Formation, requirements of an ideal permanent way. Rails - Requirements of Rail Section, Types of Rails, Nominal Weight of Rails, Standard Rail Section, Defects in Rails, Service Life of Rails. Rail Joint - Need for Rail Joint Requirements of a Rail Joint, Standard Joint, Combination Fishplate, Insulated Rail Joints. **(08 hrs)**

Sleepers : Historical Development, Requirements, Sleeper Density and Sleeper Spacing, Type of Sleepers, Design of Sleepers, Ballast less Track.
  Ballast - Functional Requirements, Types, Size, Specifications, Sub-Ballast and Blanket. **(06 hrs)**

Railway Curves-Necessity of Curves, Geometrical Terms, Classification of Curve, grade compensation on curves, Degree of a Curve, relation between radius & Versine of a curve, Elements of a circular curve, Superelevation (Cant) on curves, relation between super elevation, gauge, speed & radius of curve, Maximum values of Super elevation & Degree of a Curve as given by Indian Railways(I.R). Transition curves, necessity of a transition curves, forms of transition curves, length of a transition curve.
Welding of Rails-Gap Between Rail Ends, Methods of Welding, Long Welded Rails. **(08 hrs)**

Section B

Creep- indications of creep, causes of creep, pitch and depth of wave, magnitude and depth of creep, effects of development of creep, measurement of creep, methods of correcting creeps & Track Stresses. Switches and **Crossings :** Switches, parts of a switch or point, types of switches, Crossing, constituents of crossings, types of crossings with advantages and disadvantages, Turnouts. **(07 hrs)**
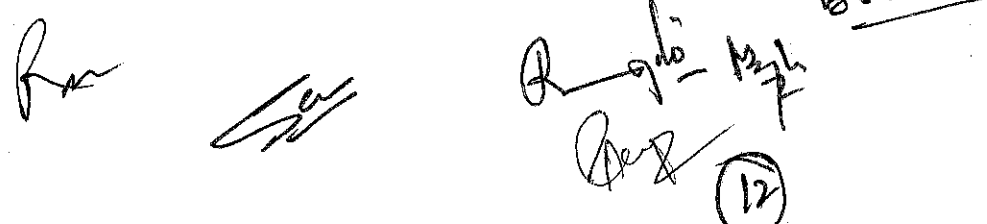
Airport site: selection, Air craft characteristics, various surface of an airport, Wind rose diagram, Geometric elements of run way and taxiway , holding apron, parking configuration , terminal building , visual aids, air traffic control, airport marking and lighting.

(07Hrs)

Harbour Engineering: Introduction toHarbour, Classification of Harbours, Introduction to Docks, classification of Docks -wet Docks & dry Docks, advantages and disadvantages of wet docks, break waters and Jetties. **(06 hrs)**

BOOKS RECOMMENDED:

1	Roads, Railways, Bridges, Tunnels & Harbour Dock Engineeering	B.L Gupta, Amit Gupta
2	A Text Book of Railway Engineering	S.C Sexena, S.P Arora
3	Airport engineering	Rangwala
4	Airport Planning & Design	S.K Khanna- M.G Arora- S.S Jain

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	ESTIMATION & COSTING						
COURSE NO.	CEP-6504	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Prepare various types of estimates and calculate quantities of works involved.
CO2	Carry out analysis of rates and preparation of bills.
CO3	Prepare specifications for various items of construction.
CO4	Estimate the quantities of earthworks in roads and estimate the value of buildings.

Section-A

Building Estimates: Methods of building estimates, Estimate of Masonry Platform, Single room building, two/three roombuilding Estimate, Estimate of office building, Estimate of Underground Water Tank. **(22hrs)**

Section-B

RoadEstimates: Methods,EstimateofearthworkforroadfromL-Section by numerical methods.
Estimates: Typesofestimates,contingencies,workchargedestimate.Layoutplan,indexplan.Subheads,Scheduleofrates, Administrativeapproval,expendituresanction, Technical sanction, Billofquantities, Plinth area,floorarea.

(08hrs)

AnalysisofRates: AnalysisofRates,overheadcosts,labor
required,Materialsfordifferentitemsofworkandtheirrates.Preparinganalysisofratesforvariousitemsofbuildingworks, Specificationsforvariousitemsof work.

(08hrs)

Valuations: Valuation,Grossincome,Netincome,outgoings,Scrapandsalvagevalues,capitalizedvalue,Depreciation,val uationofbuildings,fixationof rent, Plintharearequired.

(06hrs)

BOOKS RECOMMENDED:

1	ESTIMATING & COSTING	B.N DUTTA
2	ESTIMATING, COSTING,SPECIFICATION & VALUATION IN CIVIL ENGINEERING	M CHAKRABORTI
3	CONTRACTS & ESTIMATES	PATEL, B.S.

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SWAYAM / NPTEL						
COURSE NO.	MOC-6501	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	3	0	0	External	Internal	Credit
					100	0	3

The Department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester.The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the Department Curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the faculty In charge of the Department.The NPTEL certification course comprises of Assignments (25%) and Proctored Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the Concerned Department.

NOTE:

1. The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student.In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course.The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.

2. The student must select their college name from the drop down box while registering for a particular course. Thereafter theoption of sharingthe rest with the institute needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by the NPTEL to the college authorities.

No certificate will be accepted without this and student will be marked absent in college records.

B.Tech. 5th Semester Examination to be held in the Year December2024, 2025, 2026,2027.

SEMESTER	5th						
BRANCH	MECHANICAL /ELECTRICAL/E&C/IT/CIVIL ENGINEERING						
COURSE TITLE	PYTHON PROGRAMMING						
COURSE NO.	CSO-3505	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Describe the syntax and semantics of Python programming language.
CO2	Understand the use of loops and decision-making statements to solve problems.
CO3	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO4	Demonstrate proficiency in handling and creation of functions.

SECTION-A

Introduction to Python: Introduction to Python, history of Python, Unique features of Python, Python Syntax compared to other programming languages, First Python Program.   **(4hrs)**

Beginning Python Basics: Python Identifiers, Keywords and Indentation, Python Data Types, The Integer,Floating-Point, and String Data Types, String Operations in Python, Storing Values in Variables, Comments, Simple Input & Output, Operators in python.   **(7 hrs)**

Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Indentation, The If statement and its related statement, an example with If and its related statement, the while loop, the for loop, the range statement, Break & Continue, Examples for looping**(7 hrs)**

SECTION-B

Python Data Structures: Lists: Definition and syntax, Indexing and slicing, List methods (e.g., append(), extend(), insert(), remove(), pop(), clear(), index(), count(), sort(), reverse()), Iterating through lists; Tuples: Definition and syntax, Immutable nature, Accessing elements, Tuple methods (e.g., count(), index()); Dictionaries: Definition and syntax, Key-value pairs, Accessing elements by key, Adding, updating, and deleting key-value pairs, Dictionary methods (e.g., keys(), values(), items()), Iterating through dictionaries**(10 hrs)**
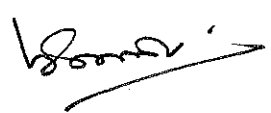
Functions in Python: Function definition, Function calling, Return statement, Scope, Default arguments, Variable-length arguments (Using *args and **kwargs), Docstrings, Lambda functions, Recursion, Function composition, Built-in functions (like print(), input(), len(), range(), map(), filter(), sorted())   **(10 hrs)**

BOOKS RECOMMENDED:

1.Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

NOTE: *There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.*

SEMESTER	5th						
BRANCH	E&C/COMPUTERS/IT/MECHANICAL/CIVIL ENGINEERING						
COURSE TITLE	NON-CONVENTIONALENERGYSOURCES AND INSTRUMENTATION						
COURSE NO.	EEO-2505	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Understandtheneedofenergy,Varioustypesofenergyandscenario.
CO2	Identifynon-conventionalenergyasalternateformofenergyand to knowhowitcanbetapped.
CO3	Understandingvariousmethodsofmeasurementandinstrumentation.
CO4	Understanding different types of wattmeter and their errors.

SECTION-A

Introduction: Limitations of conventional energy sources need & growth of alternate energysources, basic schemes and applications of direct energy conversion, Photovoltaic effect, characteristicsof photovoltaic cells, conversion efficiency, solar batteries and applications, Solar energy in India, solarcollectors, solar furnaces & applications, Geothermal system, Characteristics of geothermal resources,choice of generators, electric equipment and precautions. Low head hydro plants, definition of low headhydro power, choice of site and turbines.   **(12hrs)**

Wind Energy & MHD Generators: History of wind power, wind generators, theory ofwindpower,characteristicsofsuitablewindpowersites,and

scopeinIndia.BasicPrinciplesandHalfeffect,generatorandmotoreffect,differenttypesofMHDgenerators,conversioneffectiveness.PracticalMHDgenerators,applicationsand economicaspects.

(10 hrs)

SECTION-B

Measuring Instruments: Classification, effects utilized in measuring instruments.Indicating instruments: Deflection, controlling and damping forces, various damping. Measurement oflow resistance: - Potentiometer method, Kelvin double bridge. Ammeters and Voltmeters: Moving coil,movingiron ammeterand voltmeters, Errors in Ammeters andVoltmeters.   **(10 hrs)**

Module 4: MEASUREMENT OF POWER: Wattmeter measurement in single phase A.C. circuits,Wattmetererrors.Measurementofthreephasepowerbytwowattmetermethods.EnergymetersforA.C.circuits,Theoryofinductiontypemeters.

(10hrs)

RECOMMENDEDBOOKS:

1. Non-conventionalEnergyResources   D.S.Chauhan
2. ConventionalEnergySources   G.D.Rai
3. Non-ConventionalEnergySources   B.H.Khan
4. SolarEnergyFundamentals andApplications   H.P.GargandJaiPrakash
5. ACourse inElectrical andElectronicsMeasurement&Instrumentation   A.K.Sawhney

NOTE:*There will be eight questions of 15 marks each, four from each section. Students are required to attempt Fivequestionsselectingatleasttwoquestionsfromeachsection.Useof calculatorisallowed.*

17

SEMESTER	5th						
BRANCH	MECHANICAL /ELECTRICAL/COMPUTERS/IT/CIVIL ENGINEERING						
COURSE TITLE	INTRODUCTION TO THE INTERNET OF THINGS						
COURSE NO.	ECO-1505	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Demonstrate basic concepts, principles, and challenges in IoT.
CO2	Illustrate the functioning of hardware devices and sensors used for IoT.
CO3	Analyze network communication aspects and protocols used in IoT.
CO4	Apply IoT for developing real-life applications using Arduino programming.

Section-A

Introduction to IOT: Vision, Definition, Conceptual framework, Architecture view, Sources of IoT, Understanding IoT fundamentals, IOT Architecture and communication protocols, Various Platforms for IoT and cloud computing benefits,Real-time examples of IoT, Overview of IoT components and IoT Communication Technologies, Challenges in IoT.

(10hrs)

Arduino Simulation Environment: Arduino Uno Architecture and platform Board Anatomy, Setup the IDE, coding using an emulator. Overview of IOT-supported Hardware platforms such as Raspberry pi, and ARM cortex.

(6hrs)

Sensor& Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Actuators, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino. Interfacing LED, push button, buzzer with Arduino along with LCD and DC motor.**(8hrs)**

Section-B

Basic Networking with ESP8266 Wi-Fi module: Basics of Wireless Networking, Introduction to ESP8266 Wi-Fi Module, Various Wi-Fi libraries, Web server- introduction, installation, configuration, posting sensor(s) data to the web server platforms, Thing Speak API and MQTT, Interfacing ESP8266 with Webservices. **(11hrs)**

Challenges In IoT Design challenges: Development Challenges, Security Challenges, Other challenges IoT Applications: Smart Metering, E-health, City Automation, Automotive Applications, home automation, smart cards, communicating data with H/W units, mobiles, tablets, Designing of smart street lights in a smart city. **(10hrs)**

BOOKS RECOMMENDED:

1	"The Internet of Things key applications and protocols",	Olivier Hersent, David Boswarthick, Omar Elloumi
2	The Internet of Things key applications and protocols	Boswarthick, Omar Elloumi
3	Internet of Things	Jeeva Jose
4	The Internet of Things	Michael Miller
5	INTERNET OF THINGs	Raj Kamal

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	5th						
BRANCH	E&C/ELECTRICAL/COMPUTERS/IT/CIVIL ENGINEERING						
COURSE TITLE	3D PRINTING						
COURSE NO.	MEO-5505	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify key 3D printing technologies, and corresponding major industry segments
CO2	Identify key material properties for 3D printability for each printing technique
CO3	Compare and differentiate printing methods and printable materials based on specific application
CO4	Manufacture devices and tools using 3D printing
CO5	Assess the 3D printing industry and the global effects of 3D printing particularly on engineering and manufacturing

SECTION–A

3D Printing Materials: Types of Materials, Properties of materials, Application of materials in mechanical, chemical, electronics and software industry, Selection of Materials, Smart materials, Materials for 3D Printing, Bio materials, composite materials etc.

(06 hrs)

Introduction to Design, Prototyping fundamentals. Introduction to 3D printing, its historical development, Commonly used terms in3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Classification of 3D printing process, Applications to various fields.

(07 hrs)

Pre-Processing in 3D Printing (3D Modeling and Design) Creation of 2D geometry using Auto CAD, 2D drawing space, AutoCAD Modify commands, Construct orthographic sectional views of brackets with dimension in different layers, 3D solid Modeling Create 3D solid and edit solid, Create a new assembly, insert components into an assembly, Design for 3D printing.

(07 hrs)

SECTION–B

Liquid Based 3D Printing: Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages.
Solid ground curing (SGC): Models and specifications, process, working ,principle, applications, advantages and Disadvantages.

(10 hrs)

Solid Based 3D Printing,Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages.
Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages.

(10 hrs)

BOOKS RECOMMENDED:

1   Additive Manufacturing Technology   Ian Gibson, Davin Rosen
2   Additive Manufacturing Fundamentals and Advancement   Manu Srivastava, SachinMaheshwari
3   3D printing and Additive Manufacturing   Chua Chee Kai, Leong Kah Fai
TEXT & REFERENCES:

1   Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles an Applications, World Scientific publications, 3rdEd., 2010
2   Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

SEMESTER	5th						
BRANCH	E&C/COMPUTERS/ELECTRICAL/MECHAICAL/CIVIL ENGINEERING						
COURSE TITLE	LINUX PROGRAMMING						
COURSE NO.	ITO-4505	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:

CO1	Explain multi user OS LUNIX and its basic features
CO2	Interpret LUNIX Commands, Shell basics, and shell environments
CO3	Design and develop shell programming, communication, System calls and terminology.
CO4	Design and develop LINUX File I/O and LUNIX Processes.

Section- A

Overview of Linux: What is Linux, Linux, s root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Overview of Unix and Linux architectures, hardware requirements for Linux, hardware requirements for Linux, Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons. **(06 hrs)**

Essential Linux commands: Processes in Linux Process fundamentals, Connecting processes with pipes, I Redirecting input, Redirecting output Background processing, Managing multiple processes, Process scheduling – (at,batch), noh up command, kill, ps, who, find, sort, touch, file File processing commands – wc, cut, paste etc ,Mathematical commands – expr, factor etc ,Creating files with vi editor. Editing files with vi editor **(06 hrs)**

Shell programming: Basics of shell programming ,various types of shell available in Linux, Comparisons between various shells ,Shell programming in bash ,Conditional statements, Looping statements, Case statement ,Parameter passing and arguments, Shell variables ,System shell variables shell keywords ,Creating Shell programs for automating system tasks. **(08 hrs)**

Section- B
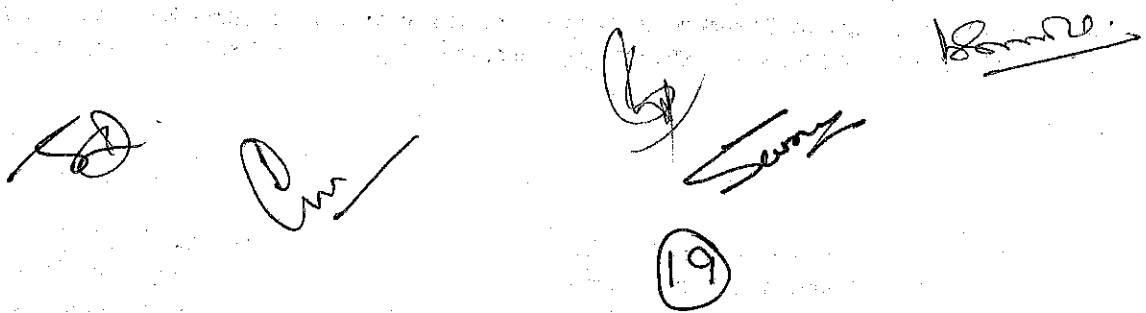
System administration: Common administrative tasks ,identifying administrative files,Configuration and log files ,Role of system administrator ,Managing user accounts –adding users ,Managing user accounts -deleting users ,Changing permissions and ownerships ,Creating and managing groups ,Temporary disabling of users accounts ,Creating and mounting file system Checking and monitoring system performance ,file security & Permissions ,becoming super user using su ,Getting system information with uname, host name ,Disk partitions; sizes ,rpm command. **(12 hrs)**

Simple filter commands & Understanding various Servers. Filter Commands-pr, head, tail, Filter Commands -cut, sort. Filter Commands uniq, tr,Filter using regular expression grep, DHCPDNS, Apache Squid, Apache, Telnet, FTP, Samba. **(08 hrs)**

BOOKS RECOMMENDED:

1	UNIX Shell Programming	Olivier Hersent, David Boswarthick, Omar Elloumi
2	Red Hat Linux Bible	Boswarthick, Omar Elloumi
3	Linux System Programming Robert Love	Jeeva Jose

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

SEMESTER	5th					
BRANCH	E&C/IT/Mechanical/Civil/Electrical					
COURSE TITLE	Python Programming Lab					
COURSE NO.	CSO-3515	L	T	P	Marks	
	3 HOURS	0	0	2	25	Credit
						1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	To write, test, and debug simple Python programs.
CO2	To implement Python programs with conditions and loops.
CO3	Use functions for structured Python programs.
CO4	Represent compound data using Python lists, tuples, and dictionaries.

Lab Experiments

Experiment 1   Write a program to demonstrate different number data types in Python.

Experiment 2   Write a program to perform different Arithmetic Operations on numbers in Python.

Experiment 3   Write a python program to find largest of three numbers.

Experiment 4   Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]

Experiment 5   Write a program to create, concatenate and print a string and accessing substring from a given string

Experiment 6   Write a program to create, append, and remove lists in python.

Experiment 7   Write a program to demonstrate working with tuples in python.

Experiment 8   Write a program to demonstrate working with dictionaries in python.

Experiment 9   Write a Python program to construct the following pattern, using a nested for loop:
```
*
* *
* * *
* * * *
* * *
* *
*
```

Experiment 10   Write a python program to find factorial of a number using Recursion.

NOTE: *Additional Lab Experiments/Practical will be performed based on the course contents requirements.*

20

SEMESTER	5th					
BRANCH	E&C/COMPUTERS/IT/MECHANICAL/CIVIL ENGINEERING					
COURSE TITLE	Non-ConventionalEnergySources And Instrumentation Lab					
COURSE NO.	EEO2515	L	T	P	Marks	
DURATION OF EXAM	3 HOURS	0	0	2	25	Credit
						1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Measure phase and frequency using CRO and Multimeter.
CO2	Studentswillbeabletounderstand SolarRadiation,distillation.
CO3	TostudySolarEnergysolarcooker,streetlightanditsapplications.
CO4	TostudyFuelCells.

LISTOFPRACTICALS:

1. TostudytheextensionofAmmeterand voltmeter ranges.
2. ToStudyBlockWiseConstructionofMultimeters&FrequencyCounter
3. ToStudyBlockWiseConstructionofAnalogOscilloscope&FunctionGenerator.
4. Tostudytheconnectionofsolarpanels.
5. TostudyoverallefficiencyofsolarPVandbatteryintegratedsystem
6. ToStudyofSolar RadiationbyusingPyranometer.
7. ToStudyofSolarDistillationorSolarStill.
8. Tostudytheconstructionaldetailsofaboxtypesolarcooker.
9. ToStudyofSolarStreet LightingandLanterns.
10. ToStudyofFuel cells.

NOTE: *Additional Lab Experiments/Practical will be performed based on the course content requirements.*

SEMESTER	5th					
BRANCH	MECHANICAL /ELECTRICAL/COMPUTERS/IT/CIVIL ENGINEERING					
COURSE TITLE	Introduction to the Internet of Things Laboratory					
COURSE NO.	ECO-1515	L	T	P	Marks	
	3 HOURS	0	0	2	25	Credit
						1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	To develop the knowledge and interfacing of components using embedded C
CO2	To know about XBEE and its communication devices
CO3	To have the knowledge about Arduino module and its interfacing with GSM and Bluetooth
CO4	To demonstrate the ESP8266 module and its interfacing with Arduino.

LIST OF PRACTICALS:

SECTION -A

Embedded Experiments

1. Learning the Embedded C programming concepts
2. Interfacing of peripherals like LEDs, seven segment and LCD.
3. Interfacing of Relay and Buzzer Module.
4. Interfacing of various Sensors with Arduino Board.
5. Interfacing of Temperature Humidity Sensors and turning on Relay at threshold level.

SECTION -B

Wireless Experiments
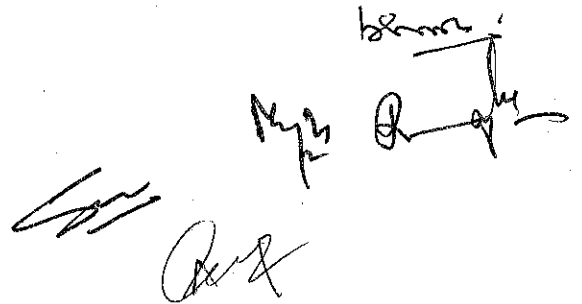
6. How to communicate two XBEE modules in AT mode
7. How to configure a XBEE module in Broadcast and API Mode
8. How to read the destination address of XBEE module using API mode
9. Data sharing using Bluetooth module to the Android APP
10. Making a call and receiving a call using GSM module

SECTION -C

IoT Experiments

11. Interfacing Wi-Fi with Arduino Module
12. Study of various AT Commands for Wi-Fi
13. Setting a Link with things Speak Server.
14. Updating Data of Sensors on Thing Speak cloud using Wi-Fi Module
15. Study of AT commands for the GSM Module.
16. Updating data on Cloud using GSM module.

NOTE: Each student has to perform at least ten experiments at least two from each section, out of which 40% shall be simulation-based. Additional Practicals / Experiments will be performed based on the course content requirements.

SEMESTER	5th					
BRANCH	E&C/ELECTRICAL/COMPUTERS/IT/CIVIL ENGINEERING					
COURSE TITLE	3D Printing Lab					
COURSE NO.	MEO-5515	L	T	P	Marks	
DURATION OF EXAM	3 HOURS	0	0	2	25	Credit
						1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Develop CAD models for 3D printing and import and export AD dataandgenerate.stlfile.
CO2	Selecta specific material and a 3D printing process for the given application.
CO3	Produce a product sing 3D Printing.

LIST OFEXPERIMENTS:

1. To study the basic features of a 3D printing machine.
2. To study the different components of 3D printer.
3. To study the various type of 3D Printer
4. To print a 3D model of nut/bolt using PLA material.
5. To print a 3D model of spanner using PLA material.
6. To print a 3D model of pyramid using PLA material.
7. To print a 3D model of gear using PLA material.
8. To print a 3D model of bearing using PLA material.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment will be performed based on course content requirement.
3. Simulation/virtual labs are used to enhance the practical ability of student

SEMESTER	5th					
BRANCH	E&C/COMPUTERS/ELECTRICAL/MECHAICAL/CIVIL ENGINEERING					
COURSE TITLE	LINUX PROGRAMMING LAB					
COURSE NO.	ITO-4515	L	T	P	Marks	
DURATION OF EXAM	3 HOURS	0	0	2	25	Credit
						1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Install LINUX and its working environment.
CO2	Understand Linux commands to manage files and file systems
CO3	Write a shell programs to solve a given problems
CO4	Write Regular expressions for pattern matching and apply them to various filters for a specific task.
CO5	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.

Experiment 1 Implement the Linux Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit , Commands related to inode, I/O redirection, piping, process control commands, mails,manage the password,Vieditors,wild card characters used in Linux.

Experiment 2 Write a shell programs to perform operations using case statement such as1) Addition 2)subtraction 3)multiplication 4)Division

Experiment 3 Write a shell scripts to see current date, time username and directory.

Experiment 4 Write a shell programs to find maximum of three numbers

Experiment 5 Write a script to check whether the given no. is even/odd

Experiment 6 Write a script to calculate the average of n numbers

Experiment 7 Write a script to check whether the given number is prime or not

Experiment 8 Write a script to calculate the factorial of a given number

Experiment 9 Write a script to calculate the sum of digits of the given number

Experiment 10 Write a shell script to print file names in directory showing date of creation & serial no. of file.

NOTE: Additional Lab experiments/practical will be performed based on the course contents requirements.

(24)

SEMESTER	5th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SUMMER SURVEY CAMP(IT-1)						
COURSE NO.	SIT-6511	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	0	0	0	100		Credit
							3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Conduct various types of survey in the field as per requirements.
CO2	Conduct survey using advanced instruments (Total Station).
CO3	Prepare the contour map for the given area.

Normally the camp shall be conducted after 4th Semester examination during summer vacations. During the survey camp the students will use all important Surveying Instruments. At the end of the camp, each student should independently complete the office work for the survey works done in the field, which includes the preparation of:

1.   Site Plan of the Area.
2.   Location of roads and important Installations.
3.   Leveling of the area to determine the difference of altitudes, at specified locations.
4.   Preparation of Contour Map of the prescribed area.
5.   Total station surveying to plot a boundary.

Guidelines for Evaluation of marks: The final examination of the survey camp shall be done by a team of minimum three internal examiners and shall include the followings:

Attendance marks: 20%
Maintaining of Daily Note book: 20%
Presentation: 20%
Viva voice: 40%

SEMESTER	5th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	BUILDING DRAWING LAB					
COURSE NO.	CEP-6511	L	T	P		
		0	0	3	Marks	Credit
					50	1.5

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Prepare the building plan satisfying the principles of planning.
CO2	Draw plan, elevation and section for various structures.
CO3	Draw working drawings of doors, windows and roof trusses.
CO4	Draw working drawings of beams, columns, footing, slab and staircase.

Standard conventions and drawings.Principles of Planning and Design. Drawing of Plan, Elevations, Sections of small buildings including drawings of a Hostel/School building.

(15hrs)

Drawing of Plans and Sections of Wooden Doors & Windows.Drawing of Timber Truss with joint details.Drawing of R.C.C. Slabs, Beams, Columns & their footings with Reinforcement Details, Staircases.
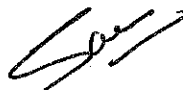
Drawing of Elementary Structural Steel work like:
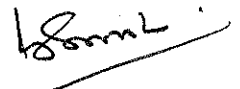
i) Riveted lap and butt joint
ii) Typical joint of a roof truss
iii) Connection beam to column
iv) Cross section and elevation of plate girder.

(20 hrs)

BOOKS RECOMMENDED:

1	BUILDING CONSTRUCTION	KAUL, B.N. & SHARMA, S.K.
2	A BETTER BUILDING	BERI, R.S.
3	BUILDING CONSTRUCTION	SINGLA, JUNEJA AND KUMAR.
4	BUILDING DRAWING	GURCHARAN SINGH.

SEMESTER	5th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	GEOTECHNICAL ENGG. LAB					
COURSE NO.	CEP-6512	L	T	P	Marks	Credit
		0	0	2	25	1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Determine index properties of soil.
CO2	Determine the insitu density and compaction characteristics of soil.
CO3	Determine engineering properties of soil.

LIST OF EXPERIMENTS:

1. To determine the moisture content of soil.
2. To determine the Specific gravity of Soil.
3. To determine the Atterberg's limit of soil specimen.
4. To determine the particle size distribution.
5. To find in-situ dry density by Sand replacement method.
6. To determine the compaction characteristics of soil by proctor's test.
7. To determine Permeability by constant head or falling head method.
8. To determine the shear strength of sandy soil by direct shear test.
9. To study Unconfined compression Test.

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B. Tech. 6th Semester Civil Engineering
For Examination to be held in the Year May 2025,2026,2027,2028.

Contact hours/week = 23

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6601	Professional Core Course	Design of RCC Structures-II	2	1	0	25	75	100	3	100
CEP-6602	Professional Core Course	Hydrology & Irrigation Engineering	2	1	0	25	75	100	3	100
CEP-6603	Professional Core Course	Foundation Engineering	2	1	0	25	75	100	3	100
CEP-6604	Professional Core Course	Highway Engineering	2	1	0	25	75	100	3	100
HMT-7603	Humanities & Social Science Course	Industrial Management	2	1	0	25	75	100	3	100
MOC-6601	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
CEP-6611	Professional Core Course	Design of RCC Structure Lab	0	0	2	25	0	25	1	100
CEP-6612	Professional Core Course	Hydrology & Irrigation Engineering Lab	0	0	2	25	0	25	1	100
CEP-6613	Professional Core Course	Highway Engineering Lab	0	0	2	25	0	25	1	100
Total			10	5	8	200	400	600	19	

28

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B.Tech.6th Semester Civil Engineering
For Examination to be held in the Year May 2025,2026,2027,2028.

Contact hours/week = 23

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6601	Professional Core Course	Design of RCC Structures-II	2	1	0	25	100	100	3	100
CEP-6602	Professional Core Course	Hydrology & Irrigation Engineering	2	1	0	25	100	100	3	100
CEP-6603	Professional Core Course	Foundation Engineering	2	1	0	25	75	100	3	100
CEP-6604	Professional Core Course	Highway Engineering	2	1	0	25	75	100	3	100
HMT-7603	Humanities & Social Science Course	Industrial Management	2	1	0	25	75	100	3	100
MOC-6601	Massive Open Online Course	MooCs	0	0	2	25	0	25	1	100
CEP-6611	Professional Core Course	Design of RCC Structure Lab	0	0	2	25	0	25	1	100
CEP-6612	Professional Core Course	Hydrology & Irrigation Engineering Lab	0	0	2	25	0	25	1	100
CEP-6613	Professional Core Course	Highway Engineering Lab	0	0	2	25	0	25	1	100
Total			10	5	8	225	375	600	19	

SEMESTER	6th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	DESIGN OF RCC STRUCTURES –II						
COURSE NO.	CEP-6601	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	Design single bay single storeyed portal frames using IS code provisions.
CO2	Design Cantilever and counterfort retail walls.
CO3	Design underground and overhead water tanks.
CO4	Design culverts and bridges.

SECTION A

Multi-storeyed Building Frames. Analysis and design of Single Bay single storeyed Portal Frames.

(12 hrs)

Retaining Walls, types, forces, stability requirements. Design of cantilever and counterfort retaining walls, surcharge .

(10 hrs)

SECTION B

Water Tanks : Tanks resting on ground, overhead tanks, underground tanks (rectangular and circular) Bracings, staging.

(10 hrs)
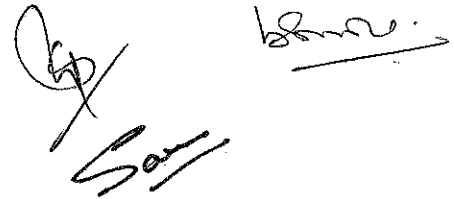
Culverts & Bridges : Design of slab culverts, T-beam bridge, Box culverts as per I.R.C. loadings **(10 hrs)**

BOOKS RECOMMENDED:

1	Reinforced Concrete - Limit State Design	Jain, A.K.
2	Reinforced Concrete Design	Sinha, S.N
3	Limit State Theory and Design of Reinforced Concrete	Shah. V.L, &Karve S.R
4	Design of Reinforced Concrete Structures	S. Ramamrutham

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator and IS Code 456, SP 16 Code are allowed.*

SEMESTER	6th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	HYDROLOGY AND IRRIGATION ENGINEERING						
COURSE NO.	CET6602	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Analyze hydro-meteorological data and estimate precipitation, evaporation, infiltration.
CO2	Develop unit hydrographs from surface runoff
CO3	Estimate the water requirement for irrigation and consumptive use of water for irrigation.
CO4	Design irrigation channels and canal regulation works

Section-A

Hydrologic cycle, Precipitation: forms of precipitation, type of precipitation, measurement of precipitation – recording and non-recording gauges, gauge network, adjustments of precipitation data, average depth of precipitation over an area - Arithmetic mean, Theissen polygon and isohyetal method, Hyetograph , Mass curve, Abstractions from precipitation - Evaporation Process, Evaporimeters, Analytical Methods of Evaporation Estimation, Reservoir Evaporation and Methods for its Reduction, Evapotranspiration, Interception, Infiltration, Infiltration Capacity, Measurement of Infiltration, Modelling Infiltration Capacity, Classification of Infiltration Capacities, Infiltration Indices.

(14hrs)

Run off: Factors affecting runoff, Empirical formulae-runoff, Hydrograph: Components of hydrograph, Separation of base flow, Hydrograph for isolated storm and complex storm, unit hydrograph, derivation of unit hydrograph, Unit hydrograph for different duration, S hydrograph. (08hrs)

Section-B

Development of Irrigation in India, Necessity, Benefits and ill effects of Irrigation, Systems of Irrigation Water Requirement of Crops and Crop Seasons in India, Cropping Pattern, Duty And Delta; Quality of Irrigation Water; Soil-Water Relationships, Root Zone Soil Water, Infiltration, Consumptive use, Irrigation Requirement, Frequency of Irrigation; Methods of Applying Water to The Fields: Surface, Sub-Surface, Sprinkler and Trickle / Drip Irrigation

(08hrs)

Canal Systems, Alignment of Canals, Canal Losses, Estimation of Design Discharge.Design of Channels- Rigid Boundary Channels, Alluvial Channels, Kennedy's and Lacey's Theory of Regime Channels. Canal Outlets: Non-Modular, Semi-Modular and Modular Outlets.Water Logging and its control, Lining of Canals, Types of Lining,Canal lining.

(10 hrs)

BOOKS RECOMMENDED:

1	Engineering Hydrology	K Subramanya, Mc-Graw Hill.
2	Irrigation Engineering & Hydraulic Structures	Garg, S.K.
3	Irrigation (Practice & Design)	Khushalani, K.B
4	Theory and Design of Irrigation Structures	R.S. & Gupta
5	Irrigation Engineering & Hydraulic Structures	Sahasrabudhe, S.R.
6	Irrigation Engineering	G L Asawa, Wiley Eastern

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	FOUNDATION ENGINEERING					
COURSE NO.	CEP-6603	L	T		Marks	
DURATION OF EXAM	3 HOURS	2	1	External	Internal	Credit
				75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Select type of foundation required for the given soil condition.
CO2	Find the dimensions of the foundation for isolated footing,combined footing and settlement of the footing.
CO3	Analyse the group of the piles for their load capacity.
CO4	Carry out stability analsyis of retaining walls.

Section-A

Site Investigation And Selection Of Foundation: Scope and Objectives ,Methods of exploration, auguring and boring ,wash boring and rotary drilling, Depth of boring- spacing of bore hole, sampling techniques, representative and undisturbed samplingmethods,split spoon sampler, Thin wall sampler, Stationery piston sampler,Bore log report,data interpretation,strength parameters and liquefaction potential, Selection of foundation based on soil condition.

Bearing Capacity And Settlement: Introduction- Location and depth of foundation, Codal provisions – bearing capacity of shallow foundation on homogeneous deposits,Terzaghi"s formula and BIS formula,factors affecting bearing capacity, problems ,Bearing capacity from in-situ tests (plate load and SCPT) Allowable bearing pressure – Seismic considerations in bearing capacity evaluation. Determination of Settlement of foundations on granular and clay deposits – Total and differentialsettlement.

Section-B

Shallow Foundation: Types of footings – Contact pressure distribution: isolated footing – combined footings – proportioning – Mat foundation – Types and applications- Floating foundation.

PileFoundation: Types of piles and their function – Factors influencing the selection of pile – Carrying capacity of single pile in granular and cohesive soil – static formula - dynamic formula – Capacity from insitu tests – negative skin friction – uplift capacity – Group capacity by different methods– Settlement of pile groups – interpretation of pile load test – Under reamed piles

Retaining Walls: Plastic equilibrium in soils – active and passive states- Rankine's theory – cohesionless and cohesive soil – Coulomb"s wedge theory – Condition for critical failure plane – Earth pressure on retaining walls of simple configurations – Culmann"s Graphical method – pressure on the wall due to line load – Stability analysis of retaining walls.

BOOKS RECOMMENDED:

1	Soil Mechanics in Theory and Practice	Alam Singh,CBS Publishers And Distributors.
2	Soil Mechanics & Foundation Engineering	Arora, K.K, Standard Publisher Dist.
3	Design aids in soil mechanics and Foundation engineering	Kaniraj,McGraw Hill Education
4	Geotechnical Engineering	P. Purushothama Raj (1995)
5	Physical and Geotechnical properties of soil	Bowles, J.E, , Tata McGraw-Hill
6	Basic and Applied Soil Mechanics	GopalRanjan& ASR Rao (2000) New Age Int'l Publishers

33

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	HIGHWAY ENGINEERING					
COURSE NO.	CEP-6604	L	T	Marks		
DURATION OF EXAM	3 HOURS	2	1	External	Internal	Credit
				75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Know about the origin of Roads from ancient period& to find out the best alignment for highway design
CO2	Suggest best suitable materials for highway construction
CO3	Design flexible and rigid pavement using IRC Methods
CO4	Estimate the run off, scour depth and IRC loadings on a bridge

SECTION-A

Highway Engineering: Introduction, History, Origin and Classification of Roads ,I.R.C, Motor Vehicle act, National Highway Act, Twenty year road plans, Alignment Design, Highway Location, Route Surveys.**(05 hrs)**

Highway Geometric Design: Elements, Signs, Gradients, Distance, I.R.C recommendations for carriage way width, Super Elevation, Introduction to horizontal and vertical alignments.

Curves: Horizontal Curves, transition curves, widening at curves, vertical curves, special considerations for Hill roads.

(08 hrs)

Highway Materials: Subgrade Soil and its preparation , tests for subgrade soil, properties of aggregates used in road construction, tests on road stone aggregatesand bitumen, classification of bitumen. **(06hrs)**

SECTION-B

Highway Pavement Design: Types of Pavement Structure, Objects and requirements of Pavements, Functions of Pavement Components, Design factors for Pavement, ESWL, Various methods of design of Flexible Pavements considering I.R.C considerations e.g., Group index method, CBR method and Burmister's method, Triaxial Method, General design consideration of Rigid Pavements, difference between Rigid and Flexible Pavements, Westergaard's Method for design of Rigid Pavements and concept for stresses due to load and temperature in rigid pavements.

(10hrs)

Bridges : Introduction, importance of bridges, brief history of development of bridges, basic components of a bridge ,classification of Bridges, selection of bridge site, recommended practice for site exploration and soil investigation.Determination of flood discharge, scour depth, afflux, economic span, requirements of an ideal bridge, Introduction to foundation of bridges and I.R.C classification of live loads for road bridges: I.R.C Class AA Loading, I.R.C Class A Loading, I.R.C Class B Loading, I.R.C Class70R loading. **(10hrs)**

BOOKS RECOMMENDED:

1	Traffic Engineering and Transportation Planning	Kadiyali, L.R.
2	Highway Engineering	Khanna& Justo
3	Bridge Engineering	Bindra S.P
4	Roads, Railways, Bridges, Tunnels and Harbour Dock engineering	B.L Gupta, Amit Gupta
5	Highway material testing	Khanna& Justo

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	INDUSTRIAL MANAGEMENT					
COURSE NO.	HMT-7603	L	T		Marks	
DURATION OF EXAM	3 HOURS	2	1	External	Internal	Credit
				75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	TO Understand the concept of management and its evolution
CO2	To enable them to understand authority relationships that is Departmentation& Delegation of Authority, Wage Administration and job analysis.
CO3	To develop Entrepreneurial skills and aquaint them with the policies for Entrepreneurship development.
CO4	To hone the skills of Industrial ownership and Industrial relations.

SECTION -A

Management: Meaning, Characteristics, Objectives and Functions of management. Classical Theory of Management: Henry Fayol's Administrative Management Theory & Taylor's Scientific Management Theory. Elton Mayo's Neo-Classical Theory of Human Relations Prospective and modern management theory.**(7hrs)**

Departmentation& Delegation of Authority: Meaning, Importance, Basis or pattern of Departmentation, **Delegation of Authority:** Meaning, Characteristics, Importance, Process, Obstacles/ Barriers to effective delegation of authority, Authority Relationships - Line Organization, Line & Staff Organization, Functional Organization. **(7hrs)**

Wage Administration and job analysis: Concept of Wages, Characteristics of good wage, Factors affecting wages, Methods of wage payments. Job Evaluation-Objectives, Principles & Methods of job evaluation.**(6hrs)**

SECTION-B

Entrepreneurship: Definition and types, Difference BetweenIntrapreneur& Entrepreneur, Types of Entrepreneur, Qualities of good Entrepreneurs-Role of Entrepreneurs in the economic development of a country. Functions of entrepreneur, Factors affecting entrepreneurship, Entrepreneurship as a career option for technocrats in India, Schemes and policies for entrepreneurship development.**(7hrs)**

Legal Forms of Industrial Ownership: Sole Proprietorship, Partnership and Joint Stock Company (Features, merits & demerits)   **(6hrs)**

Industrial Relations: Workers participation in management: Meaning, Objectives & Forms, Trade Union: Objectives, Functions, Present Position and Weaknesses. Industrial Conflict: Sources and managing conflict, Arbitration-a conflict resolution mechanism, Collective Bargaining: Meaning, Process, Essential conditions for effective bargaining.   **(7hrs)**

BOOKS RECOMMENDED:
1. George R Terry & Stephen G. Franklin   Principles of Management.
2. Harold Koontz & Heinz weihrich   Essentials of Management
3. S.A. Sherlekar   Principles of Business Management
4. M. Mahajan   Industrial Engineering & Production Management
5. Dr. NeeruVasisth   Principles of Management
6. Dr. B. P. Singh & Dr. T. N. Chhabra   Business Organization& Management

NOTE: *There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed*

Rita Sharma
19/07/2024

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	MooCs					
COURSE NO.	MOC-6601	L	T	P	Marks	Credit
		0	0	2	25	1

The Students shall select a MooC's of duration 4 weeks/minimum 40 hour; available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MooC's course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MooC's course will be under the supervision of the teacher in charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

NOTE: In case a student opts for a four week Nptel Course the following points need to be followed:

1. *The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course.The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

2. *The student must select their college name from the drop down box while registering for a particular course. Thereafter theoption of sharingthe rest with the institute needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by the NPTEL to the college authorities.*

No certificate will be accepted without this and student will be marked absent in college records.

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	DESIGN OF RCC STRUCTURE LAB					
COURSE NO.	CEP-6611	L	T	P	Marks	Credit
		0	0	2	25	1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Conduct quality control tests on concrete.
CO2	Design concrete mix of any grade.
CO3	Conduct Non- destructive tests on concrete.
CO4	Conduct tests on steel bars.

LIST OF EXPERIMENTS:

1. To determine bulk density and percentage of voids of given sample of aggregates
2. To ascertain bulking phenomena of given sample of sand.
3. To carry out Concrete mix design.
4. To determine workability of concrete mix of given proportion by slump test and compaction factor test.
5. To determine the flexural strength of concrete
6. To determine compressive strength of concrete
7. To determine the tensile strength of concrete by split cylinder test
8. To Study non destructive tests on concrete.
9. To determine Modulus of elasticity of concrete.
10. To determine tensile strength of steel bars.
11. To determine elongation of steel bars.
12. To study bend and re-bend test of steel bars.

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	HYDROLOGY AND IRRIGATION ENGG. LAB					
COURSE NO.	CEP-6612	L	T	P	Marks	Credit
		0	0	2	25	1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Develop unit hydrograph and draw flood hydrograph.
CO2	Design the canal and canal regulation works.
CO3	Design a diversion head work.

LIST OF EXPERIMENTS:

The practical work consists of:

1. Marking catchment area on a toposheet and determination of average annual rainfall and runoff.
2. To develop a unit hydrograph and to draw a flood hydrograph for given 2 or 3 successive storms
3. Design of canal section.
4. Design of weir and barrage.
5. Design of cross drainage work.
6. Design of Sarda canal fall.

NOTE:*The Department will ensure that students design and prepare the drawing of at least three of the above problems.*

SEMESTER	6th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	HIGHWAY ENGINEERING LAB					
COURSE NO.	CEP-6613	L	T	P	Marks	Credit
		0	0	2	25	1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Characterize the aggregates used for road construction.
CO2	Design a bituminous mixture.
CO3	Analyze the Properties of different Grades of Bitumen.

LIST OF EXPERIMENTS:

1. Determination of Impact value and crushing value of the road aggregate
2. Determination of Abrasion value the road aggregate
3. Determination of Flakiness and elongation value of the road aggregate
4. Determination of the California Bearing Ratio for the Sub-grade soil
5. To determine the penetration value of a given sample of bitumen
6. To determine the Softening point of a given sample of bitumen
7. Determination of Ductility of bitumen
8. To determine the Flash point & Fire point of a given bituminous material
9. To determine the abrasion value of Tile
10. Marshall stability test

39

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B. Tech. 7th Semester Civil Engineering
For Examination to be held in the Year December 2025,2026,2027,2028.

Contact hours/week = 22

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6701	Professional Core Course	Design of Steel Structures	2	1	0	25	75	100	3	100
CEP-6702	Professional Core Course	Design of Hydraulic Structures	2	1	0	25	75	100	3	100
CCE-6701	Professional Elective Course- I/ Massive Open Online Course	Disaster Management and Mitigations	2	1	0	25	75	100	3	100
CCE-6702		Water Resource Engineering								
MOC-6701		Swayam/ NPTEL				-	100			
CCE-6703	Professional Elective Course-II/ Massive Open Online Course	Concrete Technology	2	1	0	25	75	100	3	100
CCE-6704		Solid Waste Management								
MOC-6702		Swayam/ NPTEL				-	100			
NCC-7706	Non Credit Course	Professional Practice Law & Ethics	2	0	0	Satisfactory/Unsatisfactory			0	100
SEM-6711	Seminar	Seminar	0	0	4	50	0	50	2	100
PRJ-6711	Project	Minor project	0	0	4	50	0	50	2	100
SIT-6711	Summer Industry Internship	Industrial training- II	0	0	0	50	0	50	2	100
Total			10	4	8	250/200*	300/350*	550	18	

* In Case of SWAYAM / NPTEL

(40)

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	DESIGN OF STEEL STRUCTUTRES						
COURSE NO.	CEP-6701	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	Design Bolted and welded connections.
CO2	Design tension and compression members.
CO3	Design beams and plate girders.
CO4	Design Gantry Girders, elementsof sloping roof and column bases.

SECTION A

Introduction: Types and Properties of structural steel, advantages of steel as a structural material, I.S. rolled sections

Design philosophies: Introduction to working stress method, limit stress method, Types of loads acting on structure, introduction IS code and specifications: IS 875, IS 800.

Bolted connections: Types of bolts, behavior bolted joints, strength of joint, efficiency of joint.**(5 hrs.)**

Welded connections.: Types and properties of welds, types of joints, Design of connections beam to beam, beam to column, Analysis and design of moment resisting bolted and welded connections. **(5 hrs.)**

Tension members: Behavior modes of failure and design of single and double angle sections

Compression members: Behavior modes of failure, classification of cross section, effective length, slenderness ratio, design strength, compression members in trusses. **(10 hrs.)**

SECTION B

Design of Beams: Laterally restrained and unrestrained simply supported beams, design of compound beams and welded Plate Girder, curtailment of flanges plates. **(9 hrs.)**

Industrial Buildings (Steel Structures): Fire resistant design, Fatigue resistant design,Gantry Girders, Roofing elements, Design of industrial buildings.

Column bases:-slab base and gusseted base.**(10 hrs.)**

BOOKS RECOMMENDED:

1	DESIGN OF STEEL STRUCTURES	N. SUBRAMANIAN.
2	DESIGN OF STEEL STRUCTURES	ARYA, A. S. AND AJMANI, J. L.
3	DESIGN OF STEEL STRUCTURES	P.DAYARATNAM.
4	DESIGN OF STEEL STRUCTURES	RAMACHANDRA.
5	DESIGN OF STEEL STRUCTURES	S. K DUGGAL.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator and IS Codes IS:800 – 2007, IS:801 – 1975,IS:811 – 1987 and structural steel table is allowed.

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	DESIGN OF HYDRAULIC STRUCTUTRES						
COURSE NO.	CEP-6702	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Carry out stability Analysis of Dams.
CO2	Explain types of Spillways and design the Ogee Spillway.
CO3	Design Canal Fall and Cross Regulator.
CO4	Differentiate various cross drainage works and design Aqueduct.

Section-A

Dams: Embankment dams: Classification, design considerations, estimation and control ofseepage, Pheratic line in Earthen dam,slope protection.

(07 hrs)

Gravity dams: Forces on Gravity Dams, Causes of failure, stress analysis, elementary and practical profile. Arch and buttress dams.

(07 hrs)

Spillways: Components of Spillways, Types of Spillways; Design of Ogee spillway.

(06 hrs)

Section-B

Khosla's theory for determination of pressures and Exit gradient, Bligh's Creep theory.(06 hrs)

River Training Works: Pitched Island, Guide bank, Groynes, Meandering of river, Artificial cut off, Components of a Diversion headwork, Necessity and location of Fall, Classification of Falls, Design of Sarda fall.

(08 hrs)

Design of Cross regulator and Distributary head regulator, Necessity and types of Cross drainage works, Design of Aqueduct and Syphon Aqueduct.

(08 hrs)

BOOKS RECOMMENDED

1	Irrigation and Water Resources Engineering	G.L Asawa .
2	Irrigation Engineering and Hydraulic Structures	Sharma .R.K
3	Irrigation Engineering and Hydraulic Structures	S.K. Garg
4	Irrigation & Water Power Engineering	B.B Pande, A.K Lal, B.C Punmia

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

(42)

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	DISASTER MANAGEMENT AND MITIGATIONS						
COURSE NO.	CCE-6701	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify various types of disasters, their causes, and effects.
CO2	Understand the impacts of disaster and the use of emergency management system to tackle the problems.
CO3	Demonstrate the understanding of various phases of disaster management cycle and create vulnerability
CO4	Identify the roles and responsibilities of government, the employees and the general public

Section-A

Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management;, Important phases of Disaster Management Cycle Disasters- Disasters classification.
Natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.);
Man-made disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

(9 hrs.)

Impacts- Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.
Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

(9 hrs.)

Section-B

Disasters, Environment and Development- Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, landuse changes, urbanization etc.), sustainable and environmental friendly recovery; re-construction and development methods. Disaster Risk Reduction (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems.

(9 hrs.)

Application of Geo-informatics and Advanced Techniques: Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, early warning systems. Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction.

(9 hrs.)

BOOKS RECOMMENDED:
1   Disaster Management   Gupta .Harsh K
2   Disaster Management Techniques and Guidelines   Singh.BK
3   Disaster Risk Reduction in South Asia   Sahni .Pradeep

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	WATER RESOURCE ENGINEERING						
COURSE NO.	CCE-6702	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Explain the importance of water and Interstate river disputes
CO2	Prepare plan of water resource engineering projects.
CO3	Formulate and solve Linear Programming Problems using Graphical and Simplex method.
CO4	Do economic analysis and fixing of Cost allocations in multipurpose projects.

Section A

Introduction: Importance of water & water resource engineering, surface & ground water resources, water Resources of India and J&K. Necessity for Conservation and Development of Country's Water Resources. Different uses of Water Resources. Need for multipurpose and Single Purpose Projects. National water policy.

(9 hrs.)

River systems in India, Environment impacts on water resources, Project Planning for Water Resources, different types of data and their collection. Project formulation. Interstate Water transfer and Interstate River disputes.

(9 hrs.)

Section B

Optimization Techniques, elementary principles, Formulation of Linear programming problem, Graphical techniques for single purpose and multipurpose projects, Simplex method of solving Linear programming problem, Dynamic programming. (9 hrs.)

Economics of Water Resource Planning, Principles of Engineering Economics, Mathematics of Economic Analysis, Capital budgeting. Economic Planning for flood control, domestic and Industrial Water Supply, Irrigation and Hydroelectric Power. Cost allocation in multipurpose projects. (9 hrs.)

BOOKS RECOMMENDED:

1	Water Resource Engineering	Linsley
2	Economics of Water Resource Planning	James & Lee
3	A Text Book of Hydrology & Water Resources	Sharma, R.K.
4	Water Resource Project Planning	Kuiper

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

B.Tech. 7th Semester Examination to be held in the Year December2025, 2026, 2027,2028.

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SWAYAM/NPTEL						
COURSE NO.	MOC-6701	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	3	0	0	External	Internal	Credit
					100	0	3

ThThe Department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester. The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the Department Curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the faculty In charge of the Department. The NPTEL certification course comprises of Assignments (25%) and Proctored Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the Concerned Department.

NOTE:

1. The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course.The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.

2. The student must select their college name from the drop down box while registering for a particular course. Thereafter theoption of sharingthe rest with the institute needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by the NPTEL to the college authorities.

No certificate will be accepted without this and student will be marked absent in college records.

B.Tech. 7th Semester Examination to be held in the Year December2025, 2026, 2027,2028.

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	CONCRETE TECHNOLOGY						
COURSE NO.	CCE-6703	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Explain the constituents of the concrete, their properties and functions in concrete.
CO2	Design concrete mix of any grade as per IS code
CO3	Explain the properties of fresh, hardened and special concrete.
CO4	Differentiate between various types of Special Concretes.

Section A

Introduction to concrete, Ingredients of concrete, Characteristics of good concrete, types of concrete, Advantages and disadvantages, and failures of concrete. Ingredients of concrete: Cement- Manufacturing, types of cement, properties, and testing of Cement as per IS codes standards. Aggregates- Requirements of good aggregates, classification, testing of aggregates as per IS codes standards. Water -Quality of mixing water, water cement ratio law, heat of hydration, effects of water cement ratio, permissible impurities as per IS code. Admixtures-Functions and classifications of admixtures,. Accelerators, Retarders and use of silica fumes. **(10 hrs)**

Concrete Mix design- Factors causing variations in the quality of concrete, Grades of concrete, Proportioning of concrete mixes, basic considerations, Factors in the choice of mix proportion, different methods of mix design and examples Quality control -Frequency of sampling, test specimens, statistical analysis of test results standard deviation and acceptance criteria.

(08 hrs)

Section B

Properties of fresh concrete- Water cement ratio and its significance in fresh concrete, workability, different methods of assessing workability, Factors affecting workability of concrete, requirements of workability for various works, segregation, bleeding, setting, hardening and strength development of concrete. Properties of Hardened concrete- Strength of concrete, Strength of in compression, tension and flexure, stress strain characteristics and elastic properties- shrinkage and creep. Durability of concrete- permeability, chemical attack sulphate attack, resistance to abrasion and cavitation, resistance to freezing and thawing, resistance to fire.

(10 hrs)

Special concrete-Lightweight concrete, High strength concrete, polymer concrete, ready mix concrete, vacuum concrete, high performance concrete, Self-compacting concrete, Fiber reinforced and steel Fiber reinforced concrete. Concreting operations- Practices and equipment, storing, batching, mixing, transporting, placing, compacting, Curing, finishing and jointing in concrete.(9 hrs)

BOOKS RECOMMENDED:

1	CONCRETE TECHNOLOGY	M.L GAMBHIR
2	CONCRETE TECHNOLOGY	M.S. SHETTY
3	CONCRETE TECHNOLOGY	A.R. SANTHA KUMAR
4	CONCRETE TECHNOLOGY	NEVILLE. A.M

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

(46)

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SOLID WASTE MANAGEMENT						
COURSE NO.	CCE-6704	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Outline sources, types and composition of solid waste with methods of handling, sampling and storage of solid waste.
CO2	Select the appropriate method for solid waste collection, transportation, redistribution and disposal.
CO3	Explain municipal solid waste management systems with respect to its physical properties, and associated critical considerations in view of emerging technologies
CO4	Demonstrate the method to recover materials, conserve products, and to generate energy from solid and biomedical wastes.

Section A

Fundamentals of Solid Waste Management: Introduction of solid wastes and hazardous wastes, need for solid waste management , Elements of integrated waste management , Objectives and scope of integrated solid waste management, Salient features of Indian legislations on management and handling of municipal solid wastes, Nuisance potential and extent of solid waste problems. Characterization and Quantification: Types, composition, characteristics and quantities of wastes, Methods of quantification and characterization of wastes.

(10 hrs)

Collection, Storage and Transportation of Wastes: Storage and collection of municipal solid wastes, analysis of collection systems, Types of collection systems, Tools and equipments of collection systems; Concept of waste segregation at source and recycling and reuse of wastes; Transportation of Municipal waste: Transfer station-meaning, necessity and location, optimizing waste allocation.

(9 hrs)

Section B

Disposal of Municipal Solid waste: Waste processing, Objectives of waste processing – material separation and processing technologies, Composting – Principle, factors and Methods; Land filling technique, factors and methods, leachate and its control, biogas from landfill, advantages and disadvantages of landfill method; Introduction to Incineration of waste and pyrolysis of waste, Advantages and disadvantages of incineration.

(9 hrs)

Biomedical waste Management: Definition, Source and generation of biomedical waste, Classification and management technologies. E-waste Management: Definition, varieties and dangers of e-waste, Recycling and its disposal practices.

(8 hrs)

BOOKS RECOMMENDED:

1. Integrated Solid Waste Management — Tchobanoglous, G., Theisen, H. and Vigil, S. A
2. Environmental resources Management, Hazardous waste Management. — Michael, D. LaGrega, Buckingham, P. L. and Jeffrey, C. E.
3. Environmental Engineering — Peavy, H. S., Rowe, D. R. and Tchobanoglous, G
4. Hazardous waste Management — Wentz, C. A.
5. Manual on Municipal solid waste management. — CPHEEO

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SWAYAM/NPTEL						
COURSE NO.	MOC-6702	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	3	0	0	External	Internal	Credit
					100	0	3

The Department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester. The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the Department Curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the faculty In charge of the Department. The NPTEL certification course comprises of Assignments (25%) and Proctored Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the Concerned Department.

NOTE:

1. The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.

2. The student must select their college name from the drop down box while registering for a particular course. Thereafter theoption of sharingthe rest with the institute needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by the NPTEL to the college authorities.

No certificate will be accepted without this and student will be marked absent in college records.

SEMESTER	7th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	PROFESSIONAL PRACTICE LAW AND ETHICS					
COURSE NO.	NCC-7706	L	T	P	Marks	
DURATION OF EXAM	3 HOURS	2	0	0	Satisfactory	Unsatisfactory

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Take professional responsibility properly after adhering knowledge about various kinds of ethics.
CO2	Work properly in their field with knowledge about various kinds of law

SECTION-A

Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Conflict of Interest.

General Principles of Contracts Management: Indian Contract Act,1872, General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub-contracts; Joint Ventures & Consortium; Contract documentation; Contract Notices.

(12 hrs)

SECTION-B

Engagement of Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996).

(12 hrs)

BOOKS RECOMMENDED:

1	Dynamics of Industrial Relations	MamoriaC.B, S. MamoriaS.V.Gankar
2	Business Ethics	Murthy, C. S.V
3	Business Environment	Cherunilam, Francis
4	Legal Aspects of Business·	Akhileshwar Pathak

Evaluation of the course:
There will be internal evaluation based on two internal sessional tests of 30 marks each.

Ritu Sharma
19/07/2024

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	SEMINAR						
COURSE NO.	SEM-6711	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	0	0	4	50		Credit
							2

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Select a topic relevant to the field of Civil Engineering.
CO2	Undertake a review of the literature on the chosen topic.
CO3	Prepare and present a technical report.

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing literature survey, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

Guidelines and evaluation of Seminar in 7th semester:

The topic of the Seminar is to be finalized and approved by the departmental committee having a convener and at least two faculty members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 50 marks

i)	Project Report	15 marks
ii)	Presentation	25 marks
iii)	Attendance	10 marks.

Award of Marks:
Marks Under (1) will be awarded by the Seminar in charge.
Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose

SEMESTER	7th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	MINOR PROJECT						
COURSE NO.	PRJ-6711	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	0	0	4	100		Credit
							2
COURSE OUTCOMES: On completion of the course the students will be able to:							
CO1	Identify a problem statement either from a rigorous literature survey or the industry requirements analysis.						
CO2	Design a solution for the identified problem by applying acquired technical knowledge.						
CO3	Learn to work in a team and coordinate within the group for timely completion of project.						
CO4	Prepare and present a consolidated report.						

The project work may consist of the following :

1. Preparation of the plan of a civil engineering structure.
2. Analyze and Design/ prepare a detailed Estimate of the structure.
3. Preparation of detailed drawings.
4. Preparation of consolidated report.

The minor project is a team activity having 3-4 students in a team and it is expected from them to submit the proposal by second week of the semester.

Every project work shall have a guide who is a member of faculty of civil engineering of the college where the student is registered. The hours allotted this course shall be utilized by the students to receive directions from the guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project.

51

SEMESTER	7th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	INDUSTRY TRAINING-II					
COURSE NO.	SIT-6711	L	T	P	Marks	
DURATION OF EXAM	3 HOURS	0	0	0	50	Credit
						2

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Applytechnical, management and communication skills in the construction Industry.
CO2	Demonstrate the engineering principles and apply them as per necessity.
CO3	Prepare an effective report and presentation of the information collected during Internship.

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of CIVIL Engineering in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the department for evaluation.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 7th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per University statues:

Total marks of evaluation =50

i.	Report	=15	30%
ii.	Viva-Voce & Presentation	=10	50%
iii.	Level of IT	=25	20%

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B. Tech. 8th Semester Civil Engineering
For Examination to be held in the Year May 2026,2027,2028,2029.
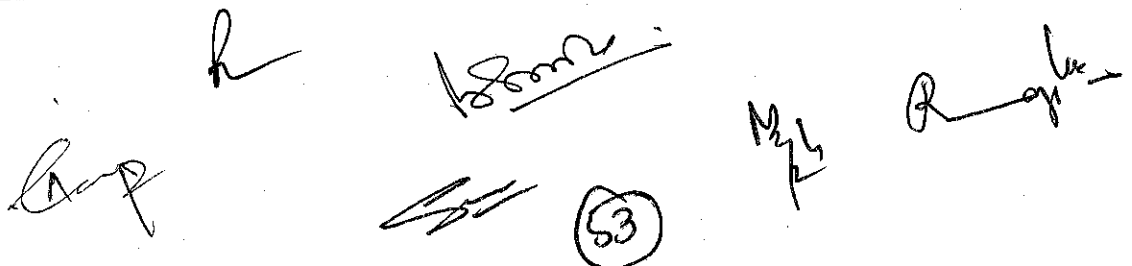
Contact hours/week = 26

SCHEME - I

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
CEP-6801	Professional Core Course	Construction Planning and Management	2	1	0	25	75	100	3	100
CCE-6801	Professional Elective Course III	Pre stressed concrete	2	1	0	25	75	100	3	100
CCE-6802		Ground Improvement Techniques								
CCE-6803		Advance Structural Analysis								
MOC-6801	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
PRJ-6811	Project	Project	0	0	16	150	50	200	8	100
PCE-6811	Professional Core Course	Software lab	0	0	2	25	-	25	1	100
Total			4	2	20	225	225	450	16	

OR

SCHEME - II

Contact hours/week = 26

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%AGE CHANGE
			L	T	P	Internal	External			
PII-6801	Professional Industry Internship	Industry Internship-III	0	0	24	325	100	425	15	100
MOC-6801	Massive Open Online Course	MooCs	0	0	2	0	25	25	1	100
Total			0	0	26	325	125	450	16	

53

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	CONSTRUCTION PLANNING AND MANAGEMENT						
COURSE NO.	CEP-6801	L	T	P	Marks		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Plan and schedule the Project by various network techniques of construction planning
CO2	Correlate the man power requirement, optimum duration and optimum cost of the project.
CO3	Explain the various concepts of Tenders and maintaining of different accounts.
CO4	Identify the quality control standards and the management of various resources used in construction.

Section-A

Unit-1: Introduction to Bar Charts and Mile stone charts, Elements of network, Development of network, Network rules, Network techniques CPM and PERT, Network analysis, Time estimates, Time computations, Determination of Slack and float, Critical Path.

(09hrs)

Unit-2: Determination of total cost of project, crashing of networks, Methods of resource allocation Resource Levelling and Resource Smoothing, CPM updating, Feasibility report of project, Cost - Benefit ratio.

(08hrs)

Section-B

Unit-3: Tenders, Earnest Money, Security Deposit, Comparative Statements, Contracts, Types and Conditions, Cash Book, Debit and Credit Notes, Imp rest accounts. Types of measurement book, Classification of works, Stages in construction of a project, Indent, Invoice, Depreciation and methods, Safety in construction at site works.

(10hrs)

Unit-4: Functions of construction management, Objectives of construction management, Stages of planning by different agencies, Construction agencies, Material Management, Inventory Control, Economic order quantity (EOQ), Organization, Types of organization and its principles. Quality control and Quality assurance techniques, Standardization.

(10hrs)

BOOKS RECOMMENDED:

1	Construction Planning Equipment& Methods	Purifoy, R.L.
2	Construction Management	Harpal Singh
3	Pert &Cpm - Principles & Applications	Srinath, Dr.L.S.
4	Management In Construction Industry	Dharwadkar, P.P.
5	Standardisation - A New Discipline	Verman, L.C.

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	PRE STRESSED CONCRETE						
COURSE NO.	CCE-6801	L	T	P	MARKS		
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:

CO1	Recognize the materials for prestressed concrete and its properties, advantages and applications.
CO2	Comprehend the concept of pre-tensioning and post-tensioning of prestressed concrete and Analyse the prestress, its losses.
CO3	Evaluate the strength and serviceability requirements of different prestresed concrete members.
CO4	Design the sections and reinforcement for prestressed concrete beams as per the IS specifications.

SECTION A

Materials for prestressed concrete: Introduction to prestressing concrete; High strength concrete- strength, creep and shrinkage, permissible stresses; High tensile prestressing steel –treatments, forms of prestressing steel, strength, relaxation of steel, permissible stresses.

(6 hrs)

Prestressing devices and systems: Types of prestressing, tensioning devices and equipments, pre-tensioning systems, post- tensioning systems (advantages and disadvantages, procedure, applications).

(6 hrs)

Analysis of prestress and bending stresses: Analysis of prestress, resultant stresses at a section, pressure line or thrust line concept and internal resisting couple, concept of load balancing, losses of prestress, deflection of beams.

(8 hrs)

SECTION B

Strength of prestressed concrete sections: Types of flexural failure, strain compatibility method, IS:1343 code procedure for flexural strength, design for limit state of shear and torsion and codal provisions for detailing.

(10 hrs)

Design of prestressed concrete beams: Transfer of prestress in pre tensioned and post tensioned members, design of anchorage zone reinforcement, design of simple beams/girders, cable profiles.

(10 hrs)

BOOKS RECOMMENDED:

1	PRESTRESSEDCONCRETE	N.KRISHNARAJU
2	PRESTRESSEDCONCRETE	K.U.MUTHU
3	PRESTRESSEDCONCRETE	RAJAGOPALANN
4	PRESTRESSEDCONCRETE	P.DAYARATNAM
5	DESIGNOFPRESTRESSEDCONCRETESTRUCTURES	T.Y.LIN,NEDH.BURNS
6	IS 1343 2012, Code of Practice for Prestressed Concrete.	
7	IS 456-2000, Code of practice for design of reinforced concrete.	

Note: The above mentioned codes are permitted in examination.

NOTE: *There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.*

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	GROUND IMPROVEMENT TECHNIQUES						
COURSE NO.	CCE-6802	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify the ground conditions and suggest ground improvement techniques.
CO2	Suggest In-situ densification methods in granular soils and cohesive soils
CO3	Recognize and suggest different grouts / grouting techniques for various field conditions.
CO4	Demonstrate the Concept of reinforced earth and its application areas including geo- synthetics.

Section A

Introduction to Ground improvement techniques: Role of ground improvement in foundation engineering, Factors affecting choice of ground improvement techniques, Geotechnical problems in alluvial, lateritic and black cotton soils.

Drainage and Dewatering: well point system, shallow & deep well system, vacuum dewatering, electro osmosis Chemical and Thermal.

(9 hrs)

In-situ densification methods in granular soils: Mechanical stabilization, deep dynamic compaction, vibro compaction, blasting.

In-situ densification methods In cohesive soils: Concept of three dimensional consolidation , preloading with sand drains, sand drain design and methods of their installation, prefabricated vertical drains, stone columns.

(9 hrs)

Section B

Grouting: Introduction; Kinds of grout- Cementitious grouts and Chemical grouts; Grouting methodsIntrusion grouting, Permeation grouting, compaction grouting and jet grouting

(9 hrs)

Earth Reinforcement: Concept of reinforced earth, Reinforcing materials, Backfill, construction of reinforced earth wall, Stability analysis of reinforced earth retaining walls, application areas of reinforced earth structures. **Geosynthetics:** Classification, Functions of geotextiles as separators, reinforcement, filters and in drainagedamage and durability of geotextiles, Natural Geotextiles and its application.

Stabization of soils: Mechanical Stabilization -Soil aggregate mixtures, properties and proportioning techniques, soft aggregate stabilization, compaction, field compaction control; Cement Stabilization-Mechanism, factors affecting and properties, use of additives, design of soil cement mixtures, construction techniques; Lime and Bituminous Stabilization-Type of admixtures, mechanism, factors affecting, design of mixtures, construction methods.

(10 hrs)

BOOKS RECOMMENDED:
1. FOUNDATION DESIGN AND CONSTRUCTION   TOMLINSON, M.J.
2. GROUND IMPROVEMENT TECHNIQUES   PURUSHOTHAMARAJ, P
3. GEOTECHNICAL ENGINEERING   GULHATI, S. K. AND DATTA, M
4. AN INTRODUCTION TO SOIL REINFORCEMENT AND   BABU, G. L. S.
   GEOSYNTHETICS
5. OIL IMPROVEMENT AND COIR GEOTEXTILES   BEENA, K. S

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

B.Tech. 8th Semester Examination to be held in the Year May 2026,2027, 2028, 2029.

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	ADVANCE STRUCTURAL ANALYSIS						
COURSE NO.	CCE-6803	L	T	P		MARKS	
DURATION OF EXAM	3 HOURS	2	1	0	External	Internal	Credit
					75	25	3

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Analysis of Continuous Beams, Plane Frames using flexibility and stiffness method
CO2	Analysis of Continuous Beams, Plane Frames using Kani's Method
CO3	Find Maximum Shear and Stresses in Arches and cables due to External Loads
CO4	Analysis of multi-storyed frames for lateral loads using Approximate Methods.

SECTION A

Introduction to the Flexibility and Stiffness Matrix Method of Analysis upto three Degree of Indeterminacy: Analysis of Continuous Beams including settlement of supports using flexibility and stiffness method, Analsyis of Pin-Jointed Determinate Plane Frames using flexibility and stiffness method, analysis of single Way single storey portal frames using stiffness method.

(12 hrs)

Kani 's Method: Analsyis of continuous beams including settlement of supports, analysis of single way single storey and single way two storyed frames including side sway.

(8 hrs)

SECTION B

Arches : Types of Arches, Comparison Between Three Hinged and Two Hinged Arches, Eddy's Theroem,Analysis of Three Hinged(Parabolic and Circular Arches).
Analysis of Two Hinged Parabolic Arches, Secondary Stresses in Two Hinged Arches due to Temperature and Elastic Shortening of Rib.

(8 hrs)

Cables & Suspension Bridges : Equilibrium of loaded chord. Cables with ends at different levels. Temperature stresses, Suspension Bridge with three hinged stiffening girder and two hinged stiffening girder.

(7 hrs)

Approximate Method of Analysis : Analysis of multi-storyed frames for lateral loads using Portal and Cantilever Method.

(5 hrs)

BOOKS RECOMMENDED:

1	BASIC STRUCTUAL ANALYSIS	REDDY,C.S
2	STRUCTURAL ANALYSIS – A MATRIX APPROACH	PANDIT, G. S. AND GUPTA, S. P
3	THEORY OF STRUCTURES	RAMAMURTHAM, S
4	THEORY OF STRUCTURES	JAIN, A. K

NOTE: There shall be total eight questions of 15 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each Section. Use of calculator is allowed.

SEMESTER	8th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	MooCs					
COURSE NO.	MOC-6801	L	T	P	MARKS	CREDIT
DURATION OF EXAM	3 HOURS	0	0	2	25	1

The Students shall select a MooCs of duration 4 to 6 weeks available at the time on any reputed platform and shall pursue the same after due approval of the same from the Departmental Committee. However, the selected MooCs course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MooCs course will be under the supervision of the teacher Incharge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	PROJECT						
COURSE NO.	PRJ-6811	L	T	P	MARKS		
DURATION OF EXAM	3 HOURS	0	0	16	External	Internal	Credit
					50	150	8
					200		

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify a problem statement either from a rigorous literature survey or the industry requirements analysis.
CO2	Design a solution for the identified problem by applying acquired technical knowledge.
CO3	Learn to work in a team and coordinate within the group for timely completion of project.
CO4	Prepare and present a consolidated report.

The project will be assigned to the students towards the end of 7th semester and they will start working on those projects at the commencement of their 8th semester.

The students will submit the synopsis of their project work in the 7th semester. The Departmental Academic Committee will finalize and approve the projects. However, a department guide will be allotted to each project who shall periodically evaluate the student's performance during the project.

The topic of the project will be decided as per the developments taking place in the field of CIVIL Engineering. This may require complete literature survey, design, fabrication, simulation of some models and/or some preliminary laboratory experiments etc.

The students will have to submit a detailed project report individually to the internal guide and a copy of the certificate should also be appended to the report.

Guidelines for evaluation of Project work in 8th semester:
Sub-distribution of marks:
• For External Examiner : 50
• For Internal Examiner : 150

Mark distribution of internal Project work as per the University statues shall be based on:

S.No.	DISTRIBUTION	MID SEM		INTERNAL FINAL	
1.	Viva-Voce	25	50%	30	30%
2.	Presentation	25	50%	30	30%
3.	Report	-	-	40	40%
		50		100	
	TOTAL	150			

The External Evaluation of 50 marks shall be done by the External Expert and shall be based on the work done, Viva-voce and Presentation.

NOTE:The students will submit a detailed project report individually to the Head of the department and a copy of the certificate if awarded should also be appended to the report.

SEMESTER	8th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	SOFTWARE LAB					
COURSE NO.	PCE-6811	L	T	P	Marks	Credit
		0	0	2	25	1

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Utilize the power and precision of AutoCAD as a drafting and design tool used in the CivilEngineering.
CO2	Apply basic CAD concepts to develop and construct accurate 2D geometry through creation of basic geometric constructions.
CO3	Able to identify and analyze the impact of Structural Engineering in development projects and find a suitable solution from number of alternatives.
CO4	To provide guidance to students for their choices in research and professional career outlook and to encourage students to take up research.

LIST OF EXPERIMENTS :

1. Basic AutoCAD operations and commands
2. Plan, Elevation and Cross-section of single storey residential building
3. Plan, Elevation and Cross-section of double storey residential building
4. Plan, Elevation and Cross-section of RCC framed residential building
5. Plan, Elevation and Cross-section of a Workshop Steel Structure
6. Introduction to Staad Pro.
7. Analysis of continuous beam.
8. Analysis of single storey frame.
9. Analysis of multi-storey frame.
10. Design of multi-storeyed building.

NOTE: Each student has to perform atleast Seven of the aforementioned Practical / Experiments.Additional Practical / Experiments will be performed based on the course content requirements.

60

SEMESTER	8th						
BRANCH	CIVIL ENGINEERING						
COURSE TITLE	INDUSTRY INTERNSHIP						
COURSE NO.	PII-6801	L	T	P	MARKS		
DURATION OF EXAM	3 HOURS	-	-	24	EXTERNAL	INTERNAL	Credit
					100	325	15
					425		

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Execute the construction work independently in the Industry/Organisation.
CO2	Demonstrate skills in the emerging technologies.
CO3	Prepare an effective report and presentation of the information collected during Internship.

The Project Industrial Internship letters shall be issued to the students in the 7th Semester based on the student request application, specifying the details of the company /industry/organisation from where they intend to do their Industrial Internship.The Departmental Academic Committee will finalize and approve the projects. Subsequently, An internal Supervisor shall be allotted to each student who will periodically review the student's performance during the Internship/project as decided by the department.

At the Completion of the Project Internship, the students have to submit a detailed project/Internship report individually to the department through their internal guides and a copy of the successful completion certificate should also be appended to the report. They shall also submit a monthly progress of their Internship/project duly signed by the concerned authority in the Organisation/Company via mail to their respective Supervisor. Following guidelines must be followed by the department while permitting the students for Industrial Internship:

Case 1:

i. Preference shall be given to the Students who are placed in the company/Industry that mandates the student to work in their Industries after Completion of course. The students shall have to submit an undertaking that he/she will join the company after the completion of the course.

Case 2:

i. No student shall be allowed to undertake Industrial Internship having backlog in any subject (Theory/Practical) upto the semester for which the result is declared by the University of Jammu (Except case1).

ii. The aggregate % of marks for applying shall be minimum 60% upto the Semester for which the result is declared by the university. (Except case 1).

iii. Number of students permitted (case 1 and 2) in any batch for the Industrial Internship shall not be more that the 50% of the strength of the class.

iv. If the number of applications are more, then the permission shall be granted as per the merit drawn (aggregate % of marks) upto the semester for which the result is declared by the university (Except case1).

v. Students with offer letters from reputed organisations/Industries and National Institutions, preferably with stipend, shall be given preference.

vi. Students who wish to initiate a Start Up shall submit a Detailed plan for the same and may be allowed if the DAC approves their proposal

61

Guidelines for evaluation of Industrial Internship in 8th semester:

There shall be a mid-semester offline evaluation, followed by an End Semester (Final) Evaluation Sub-distribution of marks:

• For External Evaluation : 100

• For Internal Evaluation : 325

Sub-distribution of internal Evaluation:

• Out of the total 325 marks for internal evaluation, 125 marks are for mid-sem evaluation and 200 marks are for final internal evaluation

• Mark distribution of internal evaluation of Industrial Internship shall be as per below table:

S.No.	Distribution	Mid-Sem (Internal Supervisor)	Internal Final(Departmental Committee)	
1	Viva-Voce	50	60	30%
2	Presentation	75	60	30%
3	Report	-	80	40%
		125	200	
	TOTAL	325		

The External Evaluation of 100 marks shall be done by the External Expert and shall be based on the Profile of Company/ Organisation, level of the work done, Viva-voce and Presentation.

SEMESTER	8th					
BRANCH	CIVIL ENGINEERING					
COURSE TITLE	MooCs					
COURSE NO.	MOC-6801	L	T	P	MARKS	CREDIT
DURATION OF EXAM	3 HOURS	0	0	2	25	1

The Students shall select a MooC's of duration 4 weeks/minimum 40 hour; available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MooC's course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MooC's course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

NOTE: In case a student opts for a four week Nptel Course the following points need to be followed:

1. *The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course.The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

2. *The student must select their college name from the drop down box while registering for a particular course. Thereafter theoption of sharingthe rest with the institute needs to be selected. Only those certificates will be accepted and validated by the department whose information will be shared by the NPTEL to the college authorities.*

No certificate will be accepted without this and student will be marked absent in college records.