UNIVERSITY OF JAMMU

NOTIFICATION
(19/Aug/Adp/31)

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 revised Syllabus of **Bachelor of Engineering (Civil Engineering)** for Semester III & IV under the **Choice Based Credit System** as per the model curriculum of the **AICTE (as given in the Annexure)** for the candidates of **all (Govt./Pvt./UIET) 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-III	December 2019, 2020, 2021 and 2022
	Semester-IV	May 2020, 2021, 2022 and 2023

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

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/19/4793-4804
Dated: 20/08/2019
Copy for information & necessary action to:-
1. Dean Faculty of Engineering
2. Principal, GCET/MIET/MBSCET/UIET/BCET/YCET
3. C.A to the Controller of Examinations
4. Assistant Registrar (Exams/Confidential)
5. Section Officer (Confidential)
6. Incharge University Website

Assistant Registrar (Academies)
19/08/19

B.E. Civil Engineering 3rd Semester

Contact hours: 26

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%Change
			L	T	P	Internal	External			
PCE-301	Professional Core Course	Building Materials and Construction	3	0	0	25	100	125	3	100
PCE-302	Professional Core Course	Surveying	2	1	0	25	100	125	3	100
PCE-303	Professional Core Course	Building Drawing	1	0	0	25	100	125	1	100
PCE-304	Professional Core Course	Engineering Geology	3	0	0	25	100	125	3	100
EEE-301	Engineering Science Course	Basic Electrical Engg.	2	1	0	25	100	125	3	100
HMC-301	Humanities & Social Science Course	Engineering Economics	2	1	0	25	100	125	3	100
PCE-311	Professional Core Course	Material testing Lab	0	0	2	50	0	50	1	100
PCE-312	Professional Core Course	Surveying Lab	0	0	2	75	0	75	1	100
PCE-313	Professional Core Course	Building Drawing Lab	0	0	2	75	0	75	1	100
PCE-314	Professional Core Course	Engineering Geology Lab	0	0	2	25	0	25	1	100
MOC-315	Massive Open Online Course	MooCs*								100
EEE-311	Engineering Science Course	Basic Electrical Engg. Lab	0	0	2	25	0	25	1	100
Total			**13**	**3**	**10**	**400**	**600**	**1000**	**21**	

*Open choice to students with approval of faculty depending upon the courses available

3rdSemester Examination to be held in the Year December 2019,2020,2021,2022.

CLASS : B.E. 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDITS: 3**
COURSE TITLE : BUILDING MATERIALS AND CONSTRUCTION
COURSE NO. : PCE- 301   **L   T   P**   **Marks**
DURATION OF EXAM : 3 HOURS   **3   0   0   Theory   Sessional**
                                                                                              100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify the various building materials with symbols
CO2	Identify properties of building materials
CO3	Made acquainted with the manufacturing process of basic construction material
CO4	Made acquainted with the masonry construction and finishes

Detailed syllabus
Module- I (Materials)

BUILDING STONES: Origin, Classification and Engineering Properties.Essential requirements.Dressed stones and their role in Export market.   **(04 hrs)**

BRICKS: Selection of suitable soil for brick manufacture. Various methods of manufacturing of building bricks, brick classification, essential requirements of good building bricks.Tiles-their manufacture and requirements. Bricks used in Modern construction-hollow, glazed bricks.   **(04hrs)**

TIMBER: Felling of trees, growth of trees, Various Classifications of trees, Common structural Timbers. Seasoning of Timber, Defects and Decay in Timber and prevention.Processed Timber.   **(04 hrs)**

PORTLAND CEMENT: Methods of manufacture of Portland Cement, Various types of Cement and their use. Engineering Properties of Cement, Storage and Testing.   **(04hrs)**

Module-II (Construction)

Basic Principles underlying the Planning and Construction of Buildings.
BRICK MASONARY: Types of Bricks, Types of Bonds, Defects in Brick Masonry, Reinforced Brick work.   **(03 hrs)**

FOUNDATIONS: Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Piers, Excavation of Foundations in water logged sites. Pile Foundation, Concrete Piles, Pile Driving, Cofferdams.   **(03hrs)**

DAMP PROOFING: Problems of dampness, Causes, Sources of Dampness. Methods of Damp Proofing Materials.Damp Proofing treatment in Building.Treatment to Flat Roofs and Floors.   **(03 hrs)**

SHORING: Shoring, Types, Undermining, Scaffolding, Types.   **(03 hrs)**

FLOORING: Brick flooring, Mud Flooring, cement Concrete Flooring, Mosaic flooring, Marble flooring.   **(03 hrs)**

LINTELS &ARCHES: Lintels, Brick Lintels, R.B. Lintels, R.C.C. Lintels, Types of Arches.   **(03 hrs)**

DOORS AND WINDOWS: Location of Doors and Windows, Size, Types of Doors and Windows, Fixtures and Fittings**. (03 hrs)**

PLASTERING, PAINTING: Plastering, Lime Plaster, Cement Plaster, Finishes, Defects in Plaster Work**.**

PAINTS: Oil Paints, Characteristics of Good Paint. Bases, Vehicle, Thinners Pigments. Types of Paints, Process of Painting.
                                                                                                          (03 hrs)

BOOKS RECOMMENDED:
1.   BUILDING MATERIAL   BY SUSHIL KUMAR
2.   BUILDING MATERIAL   BY PARBIN SINGH
3.   BUILDING CONSTRUCTION   BY KOUL, B.N., SHARMA, S.K.
4.   A BETTER BUILDING   BY BERI, K.S.
5.   BUILDING CONSTRUCTION   BY SINGLA JUNEJA AND KUMAR.

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

CLASS : B.E. 3ʳᵈ SEMESTER
BRANCH : CIVIL ENGINEERING   CREDITS: 3
COURSE TITLE : SURVEYING
COURSE NO. : PCE- 302   **L   T   P   Marks**
DURATION OF EXAM : 3 HOURS   **2   1   0   Theory   Sessional**
                                                          100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Carry out Surveying in the field for various Civil Engineering projects.
CO2	Understand Traverse surveying and its adjustments by various methods.
CO3	Take accurate measurements with different surveying instruments
CO4	Prepare a contour plan and map of the area

Detailed syllabus

Module-I

Introduction, Principles of surveying, Measurement of distance.
Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting from the Field Books and Degree of Accuracy, Tape corrections.   **(10 hrs)**

Module-II

Compass, Compass and Chain Surveying, Traversing - Instruments used and procedure followed, Types of Traverse, Correction and Plotting Errors.

Plane Table Surveying, Field Equipment, Methods of Plane Tabling, Two Point and Three Point Problems, Precautions and Accuracy in Plane Tabling.   **(10hrs)**

Module-III

Levelling, Instruments used and field book recording, Methods of Levelling height of Instrument method and Rise and Fall method, Testing of temporary and permanent adjustments in levels, Sensitivity of Bubble Tube.

Theodolite Surveying- Introduction and adjustments of theodolite.   **(10 hrs)**

Module-IV

Computation of areas and volumes by different methods.Methods of contouring, plotting of contours.

Introduction to Total Station and its applications.   **(10 hrs)**

BOOKS RECOMMENDED:
1. SURVEYING AND LEVELLING VOL.-I   BY KANETKAR & KULKARNI.
2. SURVEYING VOL.- I   BY B.C PUNMIA.
3. SURVEYING VOL.- I   BY ARORA.
4. SURVEYING   BY CLARK.
5. TEXT BOOK OF SURVEYING   BY HUSSAIN, S.K. &NAGARAJ.
6. SURVEYING VOL.- I   BY MODI & MODI.

NOTE: There shall be total Eight questions, two from each Module. Five questions have to be attempted, selecting at least one question from each Module. Use of calculator is allowed.

3rdSemester Examination to be held in the Year December 2019,2020,2021,2022.

CLASS : B.E. 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDITS: 1**
COURSE TITLE : BUILDING DRAWING
COURSE NO. : PCE- 303   **L   T   P   Marks**
DURATION OF EXAM : 3 HOURS   **2   1   0   Theory   Sessional**
                                                                  100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Understand the basic principles of building design and planning.
CO2	Develop ideas for residential and commercial buildings.
CO3	Draw the elevation and section of buildings.
CO4	Draw the plan and sections for various structural components .

Detailed syllabus

Module-I

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)**

Module-II

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

NOTE: There shall be total Six questions, Module-I is compulsory having weight-age of 40 Marks. Three questions out of five have to be attempted from Module-II having weightage of 20 marks each. Use of calculator is allowed.

3rdSemester Examination to be held in the Year December 2019,2020,2021,2022

CLASS : B.E. 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDITS: 3**
COURSE TITLE: ENGINEERING GEOLOGY
COURSE NO. : PCE- 304   **L   T   P   Marks**
DURATION OF EXAM : 3 HOURS   **3   0   0   Theory   Sessional**
                                                                     100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Know the various types of rocks and their formation.
CO2	Know the structural features of rocks.
CO3	Know the engineering properties of rocks.
CO4	Know the earthquake effects and its seismic design consideration

Detailed syllabus

Module-I

Introduction, Geological work of atmosphere, wind, water (running lakes, oceans and subsurface water), ice, geomorphological features resulting from their action. Minerals and Rocks.Introduction to Crystalline State of Minerals, important crystal systems, rock forming minerals, their main properties and identification.Rock classification, textures and structures and important types of igneous, Sedimentary and Metamorphic rocks, Processes involved in their formation.   **(10hrs)**

Module-II

Structural Geology, main structural features of stratified and unstratified rocks, Folding, Faulting and Jointing, Classification and major types of folds, faults, joints and unconformities. Their significance in Engineering Geology.Mountains - Types and Origin.
                                                                                               (10hrs)

Module-III

Engineering properties of rocks, common methods for investigation of geological characteristics of sites and alignments for engineering projects, Geology aquifers and their characteristics, Stability of Slopes, landslide and other mass movements, their causes, types and methods to control them.   **(10hrs)**

Module-IV

Earthquakes : causes and effects, consideration for seismic designs, geological consideration for selection of sites-alignments for Dams, Tunnels, Highways, Water Storage Tanks, Multi-Storeyed buildings and Port Structures.   **(10 hrs)**

BOOKS RECOMMENDED :

1.   ENGINEERING & GENERAL GEOLOGY   BY PARBIN SINGH

2.   ELEMENTS OF STRUCTURAL GEOLOGY   BY HILLS, E.S.

3.   INTRODUCTION TO PETROLOGY   BY BRIAN BOLY.

4.   ENGINEERING GEOLOGY & GEOTECHNICS   BY KRYNINE & JUDD RUTLEYS.

5.   ELEMENTS OF MINERALOGY.

NOTE: There shall be total Eight questions, two from each Module. Five questions have to be attempted, selecting at least one question from each Module. Use of calculator is allowed.

CLASS : B.E. 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDITS: 3**
COURSE TITLE: BASIC ELECTRICAL ENGINEERING
COURSE NO. : EEE- 301   **L   T   P   Marks**
DURATION OF EXAM : 3 HOURS   **2   1   0   Theory   Sessional**
                                                              100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	At the end of this course, students will demonstrate the ability.
CO2	To understand and analyze basic electric and magnetic circuits.
CO3	To study the working principles of electrical machines.
CO4	To introduce the components of low-voltage electrical installations.

Detailed syllabus
Module-I

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Mesh and Nodal analysis, Superposition, Maximum Power Transfer theorem, Thevenin and Norton Theorems.   **(08hrs)**
Representation of sinusoidal waveforms, peak and rmsvalues, phasor representation, real power, reactive power, apparent power, power factor.Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel) and resonance   **(08hrs)**
Three-phase Circuits Concept of three phase voltage, voltage and current relations in star and delta connections. Measurement of power in three-phase balanced circuits.   **(06hrs)**

Module-II

Transformers: Principle of operation, ideal and practical transformer (no-load & on-load phasor diagrams), equivalent circuit, losses in transformers, Transformer test (open circuit & short circuit), regulation and efficiency.   **(06hrs)**
Electrical Machines: DC Machines- Principle 'of operation, emf equation, torque production. AC Machines- Three-phase induction motor, principle of operation, slip and rotor frequency.Synchronous machines- Principle of operation and emf equation.   **(08hrs)**
Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.   **(06hrs)**

Text / References:
1. D.P. Kothari and J. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.
2. D.C Kulshreshtha, "Basic Electrical Engineering', McGraw Hill.

3. L. S. Bobrow, "Fundamentals of Electrical Engineering', Oxford University Press. Zo

4. E. Hughes, "Electrical and Electronics Technology", Pearson. a
5. V.D. Toro, "Electrical Engineering Fundamentals', Prentice Hall India.

NOTE: The question paper shall comprise of total eight questions, four from each Module. Students are required to attempt five questions selecting at least two questions from each module. Use of scientific calculator is allowed.

CLASS : B.E. 3ʳᵈ SEMESTER
BRANCH : CIVIL ENGINEERING   CREDITS: 3
COURSE TITLE: Engineering Economics
COURSE NO. : HMC- 301   L   T   P   Marks
DURATION OF EXAM : 3 HOURS   2   1   0   Theory   Sessional
                                                                  100   25

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Understand the micro economic concepts in details (Such as demand, utility, consumer behaviour, etc.).
CO2	Understand the laws of production and cost analysis and their applicability in day to day life.
CO3	Understand and apply macroeconomics concepts such as national income, index numbers, inflation and business cycle in real life situations.
CO4	Understand and learn about functioning of central and commercial banks.

Detailed Syllabus
Module-I
DEMAND THEORY
Meaning of demand and law of demand; Factors affecting demand; Elasticity of demand (price; income & cross elasticity)
                                                                                    (06hrs)

CONSUMER BEHAVIOUR
Cardinal utility analysis: the concept: law of diminishing marginal utility; law of Equi-marginal utility; Ordinal utility analysis: meaning and properties of indifference curves and utility maximization (Consumer Equilibrium)   **(06hrs)**

THEORY OF PRODUCTION AND COST ANALYSIS
Factors of Production and Production Function; Law of Variable Proportions; law of Returns to Scale; The concept of Fixed, Variable, Total, Marginal, and Average Costs; their shapes and relationships (Short Run)
                                                                                    (06hrs)

Module-II
BASIC MACRO ECONOMICS CONCEPTS
Meaning & Concept of National Income (Different methods of calculating national income and difficulties in measuring national income); Concept of stock market.   **(06hrs)**

INDEX NUMBERS: Meaning, Construction and difficulties in measurement of Index Number and its uses; Meaning and phases of Trade/ Business Cycle.   **(06hrs)**

BANKING AND INFLATION
Functions of CentralBank and methods of credit control; Functions of Commercial Bank and methods of credit creation.Inflation (Types ,effects and methods to control inflation .   **(06hrs)**

BOOKS RECOMMENDED :
1.   K.K.Dewett   : Modern Economic Theory
2.   H.L Ahuja   : Advanced Economic Theory
3.   M.L. Jhingan   : Macro Economics
4.   P.N Chopra   : Business Economics/Advanced Eco. Theory
5.   A. Koutsoyiannis   : Modern Micro Economics

NOTE FOR PAPER SETTER: There shall be total eight questions, four from each Module. Each question carries 20 marks. Students have to attempt Five questions selecting at least two from each module. Use of calculator is allowed.

CLASS : B.E. 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDITS: 1**
COURSE TITLE: MATERIAL TESTING LAB

COURSE NO. : PCE-311	L	T	P	Marks
DURATION OF EXAM : 3 HOURS	0	0	2	Practical
				50

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Perform various tests on bricks.
CO2	Determine the physical properties of cement .
CO3	Perform various tests on aggregates.

LIST OF EXPERIMENTS:

1. To determine the compressive strength of brick.

2. To determine the water absorption for the given sample of brick.

3. To determine the Effloresce and dimension tolerance for the given sample of brick.

4. To determine the physical properties of cement using Vicat's apparatus (consistency, initial setting time, final setting time and compressive strength).

5. To perform soundness test on cement using Le Chatlier's apparatus.

6. To find out absolute density of cement using specific gravity bottle.

7. To find the specific surface area of given combined aggregates.

8. To determine the fineness modulus of fine and course aggregates.

9. To find bulk density of aggregates and bulking factor of fine aggregates.

10. To determine the compressive strength and water absorption of tiles.

Note: Students have to complete at least 06 experiments in the lab.

3rdSemester Examination to be held in the Year December 2019,2020,2021,2022

CLASS : B.E 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDIT: 1**
COURSE TITLE: SURVEYING LAB   **Marks**
COURSE NO.: PCE- 312   **L   T   P**   **Practical**
                                                    0   0   2   **75**

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Use conventional surveying tools in the field for various civil engineering projects.
CO2	Perform survey and enter the observations in the field book.
CO3	Prepare map of area using plane table surveying
CO4	Prepare L-section and X-sections with the help of level.

LIST OF EXPERIMENTS:

1.   To Locate various objects by Chain and cross staff survey.
2.   To measure distance by ranging and chaining.
3.   Temporary and Permanent adjustment of a Dumpy level.
4.   Measurement of horizontal angles with the help of theodolite.
5.   Determination of horizontal distance between two inaccessible points with theodolite.
6.   To measure the area with the help of chain Surveying.
7.   To measure angles with the help of a Prismatic Compass.
8.   To locate given building by plane table traversing.
9.   Determination of elevation of various points with Dumpy level by H.I and Rise and fall Method.
10.   Plotting of longitudinal section and cross-section with the help of a level.

Note: Students have to complete at least 06 experiments in the lab.

CLASS : B.E 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDIT: 1**
COURSE TITLE: BUILDING DRAWING LAB   **Marks**
COURSE NO.: PCE- 313   **L   T   P**   **Practical**
                                                                          0   0   2   **75**

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

CO1	Understand the basic principles of building design and planning.
CO2	Develop ideas for residential and commercial buildings.
CO3	Draw the elevation and section of buildings.
CO4	Draw the plan and sections for various structural components .

LIST OF PRACTICALS:

1.   Drawing of Plan, Elevations, Sections of small buildings

2.   Drawings of a Hostel Building.

3.   Drawings of a School l Building

4.   Drawing of Plans and Sections of wooden doors

5.   Drawing of Plans and Sections of windows.

6.   Drawing of Timber Truss with joint details.

7.   Drawing of R.C.C. Slabs with reinforcement details.

8.   Drawing of R.C.C. Beams with reinforcement details.

9.   Drawing of R.C.C. Columns with reinforcement details.

10.   Drawing of elementary structured 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

Note: Students have to draw/complete at least 08 drawings/experiments in the lab.

CLASS : B.E 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   **CREDIT: 1**
COURSE TITLE: ENGINEERING GEOLOGY LAB   **Marks**
COURSE NO.: PCE- 314   **L   T   P**   **Practical**
                                                  0   0   2   **25**

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Categorize engineering properties of minerals
CO2	Categorize engineering properties of rocks
CO3	Apply geological principles to rock masses and discontinuities for use in engineering design.
CO4	Interpret geological maps.

List of Laboratory Experiments/Demonstrations:

1. Megascopic and microscopic identification of minerals
2. Megascopic and microscopic identification of rocks
3. Study of salient characters of crystals with the help of models
4. Study of Topographic features and geological structures (on models).
5. Study of geological structures on sections in different directions.

Field Visit: -

Minimum 3 days' field visit to acquaint with essentials of Geology.

Note: Students have to complete at least **04** experiments in the lab.

CLASS : B.E 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   CREDIT: 1
COURSE TITLE: MooCs   **Marks**
COURSE NO.: MOC- 315   **L   T   P**   **Practical**
                                                                         0   0   2   **25**

MooCs: A massive open online course (MooC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester. Here the students will have a choice to choose between Engineering Geology Lab and a MooC course.

Open choice to students with approval of faculty depending upon the courses available.

To evaluate a MooCs course following break up of Marks is proposed:

Attendance- 5 marks
Students will have to visit the lab twice a week as per the time table and pursue their respective online course.
Report file-7.5 marks
A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester, which should contain Details of the course undertaken, Copy of the assignments with solutions uploaded on the MooC platform and Copy of the Certificate, if awarded.
Presentation-7.5 marks.
The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.
Certification- 5 marks
The students awarded with the certificate will be given 5 marks.

CLASS : B.E 3rd SEMESTER
BRANCH : CIVIL ENGINEERING   CREDIT: 1
COURSE TITLE: **BASIC ELECTRICAL ENGINEERING LAB**   Marks
COURSE NO.: EEE-311   L   T   P   Practical
                                                 0   0   2   25

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Get an exposure to common electrical components and their ratings.
CO2	Understand the usage of common electrical measuring instruments.
CO3	Demonstration of various laws and theorems
CO4	Determination of efficiency of single phase transformer

List of Laboratory Experiments/Demonstrations:

1. Basic safety precautions. Introduction and use of measuring instruments

2. Demonstration of cut-out sections of machines dc machine and ac machines.

3. Study of wires, cables, fuses and MCBs

4. Verification of Kirchoff's Laws.

5. Verification of Superposition Theorem.

6. Verification of Thevenin's Theorem.

7. Study of single phase transformers. Determination of Polarity Test of given single phase transformer.

8. To perform open and short circuit test on single phase transformer.

Note: Students have to complete at least 04 experiments in the lab.

B.E. Civil Engineering 4ᵗʰSemester   **Contact hours:26**

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	%Change
			L	T	P	Internal	External			
PCE-401	Professional Core Course	Structural Analysis – I	2	1	0	50	100	150	3	100
PCE-402	Professional Core Course	Fluid Mechanics	2	1	0	50	100	150	3	100
PCE-403	Professional Core Course	Estimation & Costing	2	1	0	50	100	150	3	100
BSC-402	Basic Science Course	Mathematics – III	2	1	0	50	100	150	3	100
EEC-401	Engineering Science Course	Basic Electronics	2	1	0	50	100	150	3	100
EME-405	Engineering Science Course	Mechanical Engineering	2	1	0	50	100	150	3	100
NCC-402	Non- Credit Course	Organization Behavior	2	0	0	Satisfactory/Unsatisfactory			Non Credit	100
PCE-412	Professional Core Course	Fluid Mechanics Lab	0	0	2	50	0	50	1	100
EEC-411	Engineering Science Course	Basic Electronics Lab	0	0	2	25	0	25	1	100
EME-415	Engineering Science Course	Mechanical Engg. Lab	0	0	2	25	0	25	1	100
Total			**14**	**6**	**6**	**400**	**600**	**1000**	**21**	

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS :B.E 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 3**

COURSE TITLE : STRUCTURAL ANALYSIS – I

COURSE NO. : PCE- 401	**L**	**T**	**P**		**Marks**	
DURATION OF EXAM : 3 HOURS	**2**	**1**	**0**		**Theory**	**Sessional**
					100	**50**

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Evaluate the stresses due to different types of loading.
CO2	Draw S.F.D and B.M.D of different end conditions for beams.
CO3	Analyze the deflection of beam.
CO4	Understand the behavior of different kind of columns under different conditions.

Detailed syllabus
Module-I

Simple Stresses and Strains, Hooks law, Composite sections.
Strain Energy, Stresses due to different type of loadings, Gradually& suddenly applied loads.   **(10 hrs)**

Module-II

Shear force and Bending Moment for simply supported, cantilevers, fixed beam, continuous beams & members subjected to couples & oblique loadings.

Stresses in beams, Theory of simple bending, Neutral axis, Bending stress distribution, Shear stresses, Unsymmetrical bending & shear center.   **(10 hrs)**

Module-III

Direct and Bending stresses, eccentrically loaded rectangular columns, Circular section, hollow sections, Structural sections, walls and pillars.
Deflection of beams, Slope, Deflection and radius of curvature, Derivation of slope deflection formula, Macaulay's method.
          (10 hrs)

Module-IV

Principal stresses and strains, Mohr's circle, Graphical and Analytical method, Strain energy in terms of principal stresses, Ellipse of strain, Thin cylinders, Circumferential & longitudinal stresses.
Columns & Struts: Short & Long Columns Euler's Theory. Effective Length, Empirical Formulae.Eccentrically Loaded Columns.Laterally Loaded Columns.   **(10 hrs)**

BOOKS RECOMMENDED :
1.   STRENGTH OF MATERIALS   BY TEMOSHONKO & YOUNG
2.   THEORY OF STRUTURES   BY TEMOSHONKO & YOUNG
3.   STRENGTH OF MATERIALS   BY RAMAMURTHAM
4.   ANALYSIS OF STRUCTURES   BY O.P. JAIN

NOTE: There shall be total Eight questions, two from each Module. Five questions have to be attempted, selecting at least one question from each Module. Use of calculator is allowed.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 3**

COURSE TITLE: FLUID MECHANICS

COURSE NO.: PCE- 402	**L**	**T**	**P**		**Marks**	
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**		**Theory**	**Sessional**
					100	**50**

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Understand the properties of fluid & Solve problems of manometers and submerged surfaces.
CO2	Understand the concept of continuity , Bernoulli's equation and its applications.
CO3	Understand the Momentum equation & dimensional analysis.
CO4	Solve basic problems of losses through pipes and the concept of drag and lift on immersed surfaces.

Detailed syllabus
Module-I

Properties of Fluids : Mass density, Specific weight, Specific volume, Viscosity, bulk modulus of elasticity, Surface tension and capillarity.
Fluid Statics : Fluid pressure, manometers, forces on immersed plane surfaces, floating bodies.
Kinematics of Fluid flow - Types of fluid flow, stream lines, path lines, streak lines, continuity equation, rotation, vorticity, circulation, velocity potential and stream function, flow nets.   **(10 hrs)**

Module-II
Equation of motion and energy theorem - Integration of Euler's theorem of motion along a stream line.
Applications of Bernoulli's Equation: Pressure rotation in irrotational flow, Hydraulic grade line and total energy line, Flow through small and large orifices, Flow through mouth pieces. Measuring devices in pipes, weirs, flow under a sluice gate.
                                                                                                       (10 hrs)

Module-III
Momentum equation and its application. Dimensional analysis and similitude, important dimensional parameters, procedure for dimensional analysis.   **(10 hrs)**

Module-IV
Problems in pipe flow: Sudden expansion and diffusers, Flow in pipe bends, pipe flow problems, pipe networks.
Forces on Immersed Bodies : Deformation drag, form drag, drag lift.   **(10 hrs)**

BOOKS RECOMMENDED :
1.   ENGINEERING FLUID MECHANICS   BY GARDE & MIRAJGAONKAR
2.   ENGINEERING FLUID MECHANICS   BY KUMAR, K.L.
3.   FLUID MECHANICS & FLUID POWER ENGG.   BY KUMAR, D.S.
4.   FLUID MECHANICS & MACHINERY   BY MODI SETH
5.   FLUID MECHANICS & ITS APPLICATIONS   BY GUPTA & GUPTA
6.   FLUID MECHANICS (THEORY & PROBLEMS)   BY JAIN, S.C.
7.   THEORY & APPLICATIONS OF FLUID MECHANICS   BY SUBRAMANYA, K.

NOTE: There shall be total Eight questions, two from each Module. Five questions have to be attempted, selecting at least one question from each Module. Use of calculator is allowed.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 3**

COURSE TITLE: ESTIMATION AND COSTING

COURSE NO.: PCE- 403   L   T   P   **Marks**

DURATION OF EXAM: 3 HOURS   2   1   0   Theory   Sessional

                                                                                100   50

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Prepare quantities for different items of work and probable cost in the construction project
CO2	Find out quantity of cutting and filling from L-section of a road.
CO3	Analyze rates for different items of works.
CO4	Evaluate the cost and fixation of rent of a building.

Detailed syllabus
Module-I

Building Estimates - Methods of building estimates, Estimate of Masonry Platform, Single room building, two/three room building estimate. Estimate of office building. Estimate of R.C.C. works, R.C.C. water tank estimate and underground water tank estimate.   **(20 hrs)**

Module-II

Road Estimates - Methods, estimate of earthwork of road from L Section.
Steel roof truss; Estimate of road Section , G.I and A.C sheets.
Types of Estimates - Types of estimates, contingencies, work charged estimate. Layout plan, index plan. Sub-heads, Schedule of rates. Administrative approval, expenditure sanction.Technicalsanction.Bill of quantities.Plinth area, floor area.
Analysis of Rates - Analysis of Rates, overhead costs, labor required. Materials for different items of work and their rates.Preparing analysis of rates for various items of building works, Specifications for various items of work.
Valuations - Valuation, Gross income, Net income, outgoings, Scrap and salvage values, capitalized value, Depreciation, valuation of buildings, fixation of rent. Plinth area required.   **(20 hrs)**

BOOKS RECOMMENDED:

1.   ESTIMATING & COSTING   BY DUTTA & DUTTA

2.   ESTIMATING, COSTING, SPECIFICATION & VALUATION IN CIVIL ENGINEERING   BY M CHAKRABORTI

3.   CONTRACTS & ESTIMATES   BY PATEL, B.S.

NOTE: Question No.1 from Module I is compulsory having a weight age of 40 Marks. From Module II students have to attempt three questions out of five each having weight-age of 20 Marks. Use of calculator is allowed.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E. 4th SEMESTER

BRANCH : CIVIL ENGINEERING   CREDITS: 3

COURSE TITLE: MATHEMATICS-III

COURSE NO.: BSC- 402   L   T   P   Marks

DURATION OF EXAM: 3 HOURS   2   1   0   Theory   Sessional

                                                                    100   50

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Find limit, continuity, differentiability of a function in a plane.
CO2	Calculate the integrals using residue evaluation instead of actual complicated calculation.
CO3	Understand the basics of Operators and their types.
CO4	To obtain the values of function at a given point within the given data by using certain method of Interpolation
CO5	Find out the exact real root of algebraic and transcendental equations.

Detailed syllabus
SECTION A
THEORY OF COMPLEX VARIABLES (20 hrs)

Limits, Continuity, Derivatives, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties. Line Integral, Cauchy's theorem, Cauchy Integral formula, Liouville's theorem and Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem and Contour integration.

SECTION B
NUMERICAL METHODS (20 hrs)

Solution of polynomial and transcendental equations – Newton-Raphson method, direct iterative method and Regula-Falsimethod.Finite and divided difference, Interpolation using Newton's and Lagrange's formulae. Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule. Ordinary differential equations: Taylor's method, Picard's method, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations.

BOOKS RECOMMENDED:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. Dr.Bhopinder Singh, A textbook on complex variables and Numerical methods, Kirti Publishers.
3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Each question carries 20 marks. Use of calculator is allowed.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E.4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 03**

COURSE TITLE: BASIC ELECTRONICS

COURSE NO.: EEC- 401	**L**	**T**	**P**	**Marks**	
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**	**Theory**	**Sessional**
				100	**50**

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Understand the operation of rectifiers and the noise removal using filters and their applications.
CO2	Understand the fundamental concepts of different types of transistors, its biasing conditions along with concept of load lines and operating points.
CO3	Identify the need for cascading, frequency response and different coupling methods of multistage amplifiers
CO4	Understand number system and design of combinational circuits used in digital world

Detailed syllabus
Module I

Introduction to Rectifires:-Half wave, full wave and bridge rectifier with necessary derivations, Voltage regulation, Capacitor filter, Inductor filter, LC filter, Bleeder resistor, numerical problems. **(09 hrs)**

Transistors: Transistor and itscharacteristics in CE,CB,CC mode, generalized transistor equation, Base width modulation, types of biasing circuits, operating point and load line. **(11hrs)**

Module II

Amplifiers: Principle of operation and classification of amplifiers (Single stage and multistage amplifiers), Frequency response of single and multistage amplifiers- LC, RC, DC and transformer coupled. **(09hrs)**

Digital Electronics: Number system, radix conversion, logic gates, Boolean algebra, , Simplification of Boolean expressions, Minimization techniques, Karnaugh map, Half and Full adders, Subtractors, MUX, Demultiplexer, Decoder, Encoder. **(11 hrs)**

BOOKS Recommended:-
1. Integrated Electronics   MillmanHalkias
2. Electronics Devices   Bolystead
3. Digital Electronics   By R.P Jain
4. Digital Electronics & Microcomputer   By R.K. Gaur

NOTE: There will be 8 questions in all, four from Module. Students are required to attempt five questions in all, at least two question from each module. Use of scientific calculator will be allowed in the examination hall.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E.4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 3**

COURSE TITLE: MECHANICAL ENGINEERING

COURSE NO.: EME- 405		L	T	P		Marks	
DURATION OF EXAM: 3 HOURS		2	1	0		Theory	Sessional
						100	50

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Use and practice two property rule and hence thermodynamic tables thermodynamicdiagrams and conceptof equation of state, also their simple application
CO2	Develop intuitive problem solving technique
CO3	Discuss second law of thermodynamics and its corollaries viz. absolute (thermodynamics) temperature scale, reversibility, entropy, feasibility of a process based on first law and second law, isentropic efficiency of adiabatic machines
CO4	Reviews introductory concept of power and refrigeration cycles, their efficiencies and coefficients of performance. Illustrate ideas of heat transfer in conduction, convection and radiation modes and Application of these concepts to heat transfer in single and combined mode.

Detailed syllabus
Module-I

INTRODUCTION TO AIR STANDARD CYCLES: Air standard efficiency. Otto cycle: Air standardefficiency, mean effective pressure, Power developed. Diesel cycle: Air standard efficiency,mean effective pressure and power developed .   **(10 hrs)**
CLASSIFICATION OF IC ENGINES: Basic operations Actual P-V diagram of four stroke otto cycleengine and four stroke diesel cycle engine. Engine performance parameters.Measurements offuel and air consumption, brake power and in-cylinder pressure.
                                                                                (10 hrs)

Module-II

VAPOUR COMPRESSION refrigeration system and its working principle .Classifications ofrefrigerants, properties, eco- friendly refrigerants.Analysis of vapor compression refrigerationcycle, P-h chart.Factors affecting the performance of VCR system. Sub-cooling and superheatingphenomena in VCR cycle.   **(10 hrs)**
PSYCHROMETRY AND AIR CONDITIONING: Properties of atmospheric air and Psychrometricchart..Psychrometricprocesses., sensible heating and cooling. cooling and dehumidification,heating and humidification. Adiabatic mixing of two air streams and property calculations.Summer, Winter and Year round air conditioning systems**.**   **(10 hrs)**

BOOKS RECOMMENDED:
1.   Thermal Engineering   PL Ballaney

2.   Heat Engineering   VP Vasandani

3.   Thermodynamics- Work and Heat Transfer   Rogers & Mayhew

4.   Engineering Thermodynamics   PK Nag

NOTE: There will be 8 questions in all, four from Module. Students are required to attempt five questions in all, at least two question from each module. Use of scientific calculator will be allowed in the examination hall.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E. 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 0**

COURSE TITLE: ORGANIZATIONAL BEHAVIOUR

COURSE NO.: NCC- 402   **L   T P**   **Marks**

DURATION OF EXAM : 3 HOURS   **2   0 0**   **Theory   Sessional**

                                                                  Satisfactory/unsatisfactory

Objective of the course
The objective of the course is to familiarize the students with the working of an organization and make them experts in the domain of organizational behaviour.

Detailed Syllabus
Unit 1
Organization Dynamics: Organisation: Meaning, Definition, Need & Principles, Formal & Informal Organisation; Emotional Intelligence: Concept and Application within organization; Attitudes and Values.

(08hrs)
Unit 2
Organizational Behavior: Fundamental Concepts, Nature of people, Nature of organization, Features, Need to study Organization Behaviour, Models of organizational behavior; Learning concepts and Theories of Learning.

(08hrs)
Unit 3
Work Teams: Concept of Team, Types of Teams, Effective Teams, Teams Creations: Planning for Team Creation and Implementation of Team Creation Programs   **(08hrs)**

Note for Teachers
The course should aim at making students expert in efficient organizational working.

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

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E.4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 1**

COURSE TITLE: FLUID MECHANICS LAB   **Marks**

COURSE NO.: PCE- 412   **L   T   P**   **Practical**

                                                 0   0   2   **50**

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Determine the discharge using various instruments like venture meter and orifice meter.
CO2	Study the stability of floating bodies.
CO3	Understand various types of flow.
CO4	Calculate the various losses in the flow of fluid through pipes.

LIST OF EXPERIMENTS:

1.   To verify Bernoulli's Theorem.

2.   To find Metacentric height of a floating body.

3.   To verify Impulse - Momentum Equation.

4.   To determine C_c, C_v and C_d for an Orifice/Mouthpiece.

5.   To determine friction factor ' f ' for a given pipe.

6.   To determine C_d for Venturimeter and Orifice meter.

7.   To study Reynold's Experiment.

8.   To determine C_d for Notch/Weir.

9.   To determine Coefficient of Drag on a immersed body.

10.   To visualize the flow patterns for irrotational flow around aero foil using Hele Shaw apparatus.

Note: Students have to complete at least 06 experiments in the lab.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E. 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS:1**

COURSE TITLE: BASIC ELECTRONICS LAB   **Marks**

COURSE NO.: EEC- 411   **L   T   P   Practical**

                                                                                                  0   0 2   25

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

CO1	Fabricate half and full wave rectifiers and evaluate their performance parameters.
CO2	Plot V-I characteristics of transistor for various configurations using trainer kit
CO3	Implementation and verification of Boolean expressions using logic gates.
CO4	Design and implementation of various combinational circuits using digital IC's.

LIST OF PRACTICALS

1. To study the operation of Half wave Rectifier.
2. To study the operation of Full wave / Bridge Rectifier.
3. To study the operation characteristics (Input/Output) of PNP/NPN Transistor (Common Emitter/Common Base).
4. Verification of truth tables of logical gates AND / OR / NOT, NAND, NOR, EXOR, EXNOR, gates.
5. Implementation of Boolean expression using AND, OR, NOT, NAND, & NOR logic.
6. Implementation of Decoder, Encoder using IC's & gates.
7. To implement half adder, half subtractor, full adder, full subtractor using different IC's & gates.
8. Implementation of multiplexer, Demultiplexer using IC's & gates.

Note: Students have to complete at least 06 experiments in the lab.

4th Semester Examination to be held in the Year May 2020,2021,2022,2023.

CLASS : B.E. 4th SEMESTER

BRANCH : CIVIL ENGINEERING   **CREDITS: 1**

COURSE TITLE: MECHANICAL ENGG LAB   **Marks**

COURSE NO.: EME- 415   **L   T   P   Practical**

                                                  0   0   2   25

COURSE OUTCOMES :	
On completion of the course the students will be able to:	
CO1	Compute the property of real gases.
CO2	Demonstrate the performance of Refrigerator and Heat pump.
CO3	Interpret the characteristics of Boiler.

LIST OF EXPERIMENTS

1.   To study the p-v-T behavior of real gases in comparison with Ideal gases.
2.   To study steam boiler and its accessories and determination of:
    i)   Equivalent Evaporation
    ii)   The dryness fraction of steam using Throttling Calorimeter
3.   To verify Second law of thermodynamics with the help of heat engine.
4.   To find out the COP of the Refrigerator.
5.   To find out the COP of the Heat Pump.
6.   To analyze isentropic flow of a perfect gas through a nozzle.
7.   To find volumetric and isothermal efficiency of reciprocating air compressor.
8.   To find COP of air conditioning unit.

Note: Students have to complete at least 06 experiments in the lab.