UNIVERSITY OF JAMMU

NOTIFICATION

(18/Oct/Adp/70)

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 Engineering (Electrical Engineering)** for Semester I & II under the **Choice Based Credit System** as per the model curriculum of the **AICTE (as given in the Annexure Pages 01 to 24)** 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
Electrical	**Semester-I**	**December 2018, 2019, 2020 and 2021**
	Semester-II	**May 2019, 2020, 2021 and 2022**

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

s/d-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/18/10791-10802
Dated: 31/10/2018
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 (Academics)

31/10/18

B.E. Electrical Engineering First Semester Examination to be held in the Year December 2018,2019,2020,2021

B.E. Electrical Engineering 1st Semester

Contact Hrs. : 24

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits	% Change
			L	T	P	Internal	External			
BSC-101	Basic Science course	Engineering Mathematics-I	3	2	0	50	100	150	5	100
BSC- 103	Basic Science course	Engineering Chemistry	3	1	-	50	100	150	4	100
BSC-113	Basic Science course	Engineering Chemistry (Lab)	-	-	3	50	-	50	1.5	100
ESC-101	Engineering Science Course	Computer Programming	3	1	-	50	100	150	4	100
ESC-111	Engineering Science Course	Computer Programming (Lab)	-	-	2	50	-	50	1	100
ESC-102	Engineering Science Course	Engineering Graphics	1	-	3	50	100	150	2.5	100
NCC-101	Non- Credit Course	Mentoring & Professional Development	-	-	2	Satisfactory/ Unsatisfactory			Non-Credit	100
NCC-102		Environmental Sciences								
NCC-103		Indian Constitution								
TOTAL			**10**	**4**	**10**	**300**	**400**	**700**	**18**	

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH: COMMON TO ALL BRANCHES

COURSE TITLE: ENGINEERING MATHEMATICS-I **CREDITS: 5**

COURSE No.: BSC-101

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	2	0	100	50

Course Outcomes: At the end of the course the Student will be able to

CO 1 Learn the rules of nth derivative, to find maximum and minimum value of any function, to trace the curves.

CO 2 Understand the concept of definite integrals and find arc length, area, surface area and volume of various curves.

CO 3 Solve the differential equations of first order and higher order.

CO 4 differentiate the concept of scalars , vectors, gradient, divergence and curl.

CO 5 Evaluate the complex no. in polar form and understand the idea of hyperbolic functions

Detailed Syllabus

UNIT - I Differential Calculus – I **(07 hrs)**

Leibnitz theorem (without proof) , Partial differentiation, Euler's theorem on homogeneous functions, Asymptotes, Double points, curvature, Curve tracing in Cartesian, polar and parametric forms.

UNIT – II Differential Calculus – II **(07 hrs)**

Rolle's theorem , Mean value theorem , Taylor's and Maclaurin's series with remainder , Indeterminate forms , Taylor's series in two variables , Maxima and Minima of functions of two variables , Method of Lagrange's multiplier's.

UNIT – III Integral Calculus **(08 hrs)**

Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, applications of definite integrals to find length, area, volume and surface area of revolutions, transformation of coordinates, double and triple integrals with simple problems.

UNIT –IV Vector Calculus **(06 hrs)**

Scalar and vector product of vectors, Derivatives of vectors, Partial derivatives of vectors, Directional derivatives and Gradient, Divergence and Curl of a vector, Vector Integration ; Gauss's Divergence theorem,Green's theorem, Stoke's theorem,

UNIT – V Complex Trigonometry **(05 hrs)**

Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable; Summation of series by C+ iS method.

UNIT – VI Ordinary Differential Equations **(08 hrs)**

Differential equations of first order and first degree: Exact and non-exact differential equations, Linear and Bernoulli's differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations, Cauchy's and Lagrange's differential equations. Applications of ordinary differential equations to simple Electrical and Mechanical Engg. Problems.

BOOKS RECOMMENDED:

1.	Calculus and Analytic Geometry	Thomas and Finney, 9th Edition, Pearson, 2002.
2.	Differential Calculus	S. Narayan and P.K. Mittal, S.Chand, New Delhi.
3.	Vector Calculus	S. Narayan andP.K. Mittal, S.Chand, New Delhi.
4.	Higher Engineering Mathematics	B.S Grewal, Khanna Publishers, New Delhi
5.	Engineering Mathematics-I	Dr. Bhopinder Singh
6.		

NOTE: (I) There shall be total seven questions. Question no.1 is compulsory and short answer/ objective type .It will consists of 10 questions each of 01 mark (Total: 10 marks)

(II) There will be two questions from each unit. Attempt one question from each unit. Each question carry 15 marks.

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH:CIVIL/MECHANICAL/ELECTRICAL ENGINEERING

COURSE TITLE: ENGINEERING CHEMISTRY **CREDITS: 4**

COURSE No.: BSC-103

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	1	0	100	50

Course Outcomes : At the end of the course the student will be able to -

CO 1 Know the importance of stereochemistry in organic compound and apply the knowledge gain in this course to the variety of chemical compounds.

CO 2 Summarize the chemical structure, molecular properties, vulcanization process and application of major type of rubber.

CO 3 The different polymerisation processes used to make thermoplastic and thermosetting plastics.

CO 4 Through Spectroscopy, One could acquire Knowledge about the identification of newly synthesized products.

CO 5 Explain the air quality, emission, pollution control and Environmental health.

CO 6 Define basic knowledge on cement, its production, characteristics, properties etc.

CO 7 Recognise the common physical, chemical process encountered in treatment process of water.

SECTION – A

Module – I **STEREOCHEMISTRY AND DRUGS**

Optical isomerism, enantiomerism and diastereoisomerism, racemisation, Methods for resolution of racemic mixture, asymmetric synthesis.

Definition and synthesis of a drug, structure and applications of following drugs:-

(a) Antipyretic
(b) Narcotics
(c) Tranquilizers
(d) Antibiotics

6hrs

Module – II **PLASTICS, RUBBER AND PAINTS**

Plastics : Introduction, importance and uses of plastics, classification of plastics, moulding constituents of a plastic, moulding of plastic into articles (compression, injection, transfer and extraction mouldings).

Rubber : Introduction, types of rubber, treatment of latex, vulcanization of rubber.

Paints : Introduction, requisites of a good paint, constituents of a paint, manufacture of paint, a brief idea of manufacture, properties and uses of white pigments such as white lead and lithopone.

9hrs

Module – III **SPECTROSCOPIC TECHNIQUES AND APPLICATIONS**

UV Spectroscopy : Principle, Laws of absorption, Band nature of UV Spectrum, types of electronic transitions, applications.
I R Spectroscopy : Principle, molecular vibrations, applications.
NMR Spectroscope : Principle and applications. 8hrs

SECTION – B

Module – IV **ENVIRONMENTAL SCIENCE**

Concepts of Environmental Chemistry, Segments of environment (a brief idea about atmosphere, hydrosphere and Lithosphere).

Air Pollution : Types and control of Air Pollution.

Water Pollution: Classification and control of Water Pollution.

Chemical Toxicology :Biochemical effects of Pb, Hg, As, Zn & CN. 8hrs

Module – V **ALLOYS AND CEMENT**

Alloys : Introduction, purpose of making alloys, preparation of alloys, classification of alloys (Ferrous & Non-Ferrous alloys), alloy steels and copper alloys (Brass & Bronze).

Cement & its types, manufacture of Portland cement, setting and hardening of cement. 5hrs

Module – VI

WATER TREATMENT

Introduction, softening of water by Lime-Soda, zeolite & ion-exchange processes, priming and foaming, sludge & scale formation, determination of hardness of water by EDTA method, Numericals on hardness and softening of water. 6hrs

NOTE: The paper will be divided into two sections. There shall be a total of eight questions, four from each section A and B, selecting at least one question from each module. Each question carries 20. Five questions will have to be attempted, selecting at least two questions from each section. marks Use of calculator is allowed.

Books Recommended:

S.No.	Books Recommended	Author
1.	Engineering Chemistry	Jain & Jain
2.	Engineering Chemistry	Sharma, B.K.
3.	Engineering Chemistry	Dara, S.S.
4.	Engineering Chemistry	Shashi, Chawla
5.	Organic Chemistry	Bahl, B.S.
6.	Environmental Chemistry	De, A.K.
7.	Spectroscopy of Organic Compounds	Silverstein
8.	Spectroscopy of Organic Compounds	Kalsi, P.S.
9.	Polymer Science	Gowrikar, V.R. etal
10.	Engineering Chemistry	Dr. Rajinder Kumar

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH:CIVIL/MECHANICAL/ELECTRICAL ENGINEERING

COURSE TITLE: ENGINEERING CHEMISTRY LAB **CREDITS: 1.5**

COURSE No.: BSC-113

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	3	0	50

Course Outcomes : At the end of the course the student will be able to -

CO 1 Capability to visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.

CO 2 To provide an overview of preparation and identification of organic compound.

CO 3 This course relies on quantitative analysis and makes use of simple equation to illustrate the concept involved.

CO 4 Handling different types of instruments for analysis of materials, using small quantity of material involved for quick and accurate results.

CO 5 Estimation of total hardness of water by EDTA complex metric method.

CO 6 Detection of various elements and functional groups in unknown organic compound.

CO 7 To determine the alkali content in antacid tablets.

S. No.	TITLE OF EXPERIMENT
1.	Determine the percentage of $CaCO_3$ in precipitated chalk. You are provided with IN HCI and 0.IN NaOH.
2.	To analyse the given antacid tablets.
3.	Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10 $K_2Cr_2O_7$ (using an external indicator).
4.	Determine Volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals, Z gms of which have been dissolved per litre, provided 0.IN $Na_2S_2O_3$.
5.	To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
6.	Determine the surface tension of a unknown liquid Stalagmometer.
7.	To prepare a pure and dry sample of Aspirin.
8.	To prepare a pure and dry sample of Glucosazone.
9.	Determine the method of purification of organic compounds by coloumn chromatography.
10.	Organic Analysis: Identify the following organic compounds (preparation of at least one derivative).
11.	Determine the total hardness of a sample of water by complexometric method (using EDTA).
12.	Determine the percentage of calcium oxide in cement.

Note:- A minimum of ten experiments to be performed.

BOOKS RECOMMENDED:-

TITLE	AUTHOR
1. A manual of practical Engineering Chemistry	(Dr. Rajinder Kumar)
2. Experimental Engineering chemistry	(Shashi Chawla)

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH:COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: COMPUTER PROGRAMMING **CREDITS: 4**

COURSE No.: ESC-101

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	1	0	100	50

Course Outcomes : At the end of the course the student will be able to -

CO 1 Understand, analyze and implement software development tools like algorithm, pseudo codes and flow charts.

CO 2 Understand the use of loops and decision making statements to solve the problems.

CO 3 Apply different operations on arrays and user-defined functions to solve real-time problems.

CO 4 Analyze the operation of pointers, structures and unions.

CO 5 Implement file operations in C programming for a given application.

Detailed Syllabus
Section-A

Introduction to Programming (Flow chart/pseudocode, compilation etc.
Evolution of programming languages, structured programming, the compilation process,object code, source code, executable code, operating systems, fundamentals of algorithms, flow charts.
Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.
Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input-output Assignments. **(10 hrs)**

Control Statements, Storage Classes, Library Functions.
Control structures, Decision making and Branching, Decision making & looping.
Storage Classes: Types of storage class, Scoping rules.
Standard Library Functions, advantages and use of various library functions (I/O functions, String, Character, Mathematics, Time and Date, functions) **(10 hrs)**

Section-B

Functions, Arrays, Recursion, User Defined Data Types, Structures, Unions, Passing Structure to Functions.
User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing, Call-by-value, Call-by-reference, Nested functions.
One dimensional Array, Multidimensional Array declaration and their applications, String Manipulation, Recursion, Passing array to a function. Declaration of structures, declaration of unions, pointer to structure & unions. **(10hrs)**

Pointers, Operation on Pointers, Passing Pointers to Functions, Data Files – Opening, Closing, Creating Data Files

Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, Dangling pointer,dynamic memory allocation.

Console input output functions, Disk input output functions, opening closing and creating Data files.

(10 hrs)

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

BOOKS RECOMMENDED:

1. C How to Program, 7/e - Paul J. Deitel
2. Programming With C - Byron Gottfried.
3. Programming With C - E. Balaguruswamy.
4. C The Complete Reference - Herbert Schildt.
5. Let us C - Yashwant Kanitkar.
6. Programming in C : A Practical Approach - Ajay Mittal

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: COMPUTER PROGRAMMING LAB **CREDIT: 1**

COURSE No.: ESC-111

DURATION EXAM: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	2	0	50

Laboratory Outcomes: After Completion of this course the student will be able to –

CO 1 Read, understand and trace the execution of programs written in C language.
CO 2 Exercise conditional and iterative statements to write C programs.
CO 3 Implement Programs using operators, arrays and pointers to access functions.
CO 4 Write programs that perform operations using derived data types and files.

Lab Experiments

Experiment 1: Problem solving using computers: Familiarization with programming Environment.
Experiment 2: Variable types and type conversions: Simple computational problems using arithmetic expressions.
Experiment 3: Branching and logical expressions: Problems involving if-then-else Structures.
Experiment 4: Loops, while and for loops: Iterative problems e.g., sum of series
Experiment 5: 1D Arrays: searching, sorting: 1D Array manipulation
Experiment 6: 2D arrays and Strings, memory structure: Matrix problems, String Operations
Experiment 7: Functions, call by value: Simple functions
Experiment 8: Recursion, structure of recursive calls: Recursive functions
Experiment 9: Pointers, structures and dynamic memory allocation: Pointers and Structures
Experiment 10: File handling: File creation, writing and reading a file, File manipulation Operations

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH:ELECTRICAL/COMPUTER/E&C/ I.T ENGINEERING

COURSE TITLE: ENGINEERING GRAPHICS **CREDITS: 2.5**

COURSE No.: ESC-102

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
1	0	3	100	50

Course Outcomes (COs): At the end of the course the Student will be able to-

- CO 1 Draw orthographic projections of sections.
- CO 2 Use architectural and engineering scales with accuracy.
- CO 3 Work with zeal of office practices and standards.
- CO 4 Convert sketches to engineered drawing.
- CO 5 Perform auto cad two dimensional drawing.

SECTION A

Engineering Curves: Conventional lines and signs used in Engineering Drawing, Dimension and Tolerances, Printing and Lettering, Curves used in Engineering Practice: Cycloidals, Involutes, Spirals and Hellices,

Loci-Conic section: Terms used in conic-conic curves curved defined as Loci, Practical application of conics, Ellipse,Parabola ,Hyperbola

Projection of Planes: Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method. Space relation of a plane. To locate a point on a plane given its projections. Parallel relation of planes. Projection of planes inclined to different principal plane.

Projection of Solids: Classification and main features-Prisms and Pyramids. Projection of solids inclined to both the reference planes by (1) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

Sectioning of Solids: Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions.

SECTION B

Interpenetration of Solids and Intersection of Surface: Intersection of geometrical solids/hollow sections, Tracing of lines of intersection by line method and by section method.

Development of Surfaces: Classification of surfaces, Methods of development-Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces. To draw projections from given development.

Isometric Projection: Isometric scale, Isometric axes and Isometric planes, Isometric projection of solids and simple machine blocks.

Overview of Computer Graphics covering:

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Orthographic Projections: Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection.

Text/ Reference Books

1. Engineering Drawing by P.S GILL
2. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
3. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
4. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
5. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers 5.
6. (Corresponding set of) CAD Software Theory and User Manuals

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

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: MENTORING & PROFESSIONAL DEVELOPMENT **CREDIT: Non-Credit**

COURSE No.: NCC-101	**L**	**T**	**P**
DURATION EXAM: 3 HRS	**0**	**0**	**2**

Detailed Syllabus

1. Mentoring: - Meaning and importance of mentoring, Stress management, Conflict management, Time management .Role of mentor in: mitigating stress and conflict in time management, in confidence building, in overall personality development, in developing life skills and emotional intelligence. (7)

2. Meaning and components of personality, Personality development models –Johari Window and Transactional analysis, Motivation – meaning and approaches, Leadership –meaning and style. (8)

Note: - i. There shall be a case study, viva –voce of the students by internal examiner consisting of 40 marks each.

ii. There will be an Internal MCQ/Objective type Questions based examination of 40 marks.

iii. Evaluation: Satisfactory>= 40%: Unsatisfactory<40%.

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: ENVIRONMENTAL SCIENCES **CREDIT: Non-Credit**

COURSE No.: NCC-102 **L T P**

DURATION EXAM: 3 HRS **0 0 2**

Detailed Syllabus

1. **Introduction**
   Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness. (2)
2. **Natural Resources**
   Natural Resources and associated problems, use and over exploitation. (2)
3. **Ecosystems**
   Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, biodiversity and importance. (2)
4. **Environmental Pollution**
   Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, nuclear hazards. Solid waste Management: Causes, effects and control measure of urban and industrial wastes. Disaster Management: Floods, earthquake, cyclone and landslides. (4)
5. **Social Issues**
   Water conservation, rain water harvesting, Climate change, global warming, acid rain. Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of pollution) Act, Wildlife Protection Act, Forest Conservation Act. (3)
6. **Human Population and the Environment**
   Population growth, Population explosion. Environment and human health, Human Rights. Role of Information Technology in Environment and human health. (2)

Note:

i. There will be an Internal MCQ/Objective type Questions based examination of 40 marks.
ii. Evaluation: Satisfactory>= 40%: Unsatisfactory<40%.
iii. A field visit of students to make them aware about the environmental issues is compulsory.

BOOKS RECOMMENDED:

1. Environmental Sciences - Basak, A
2. Environmental Studies - Benny Joseph
3. Environment Pollution Control Engineering - Rao, C.S.
4. Perspectives in Environmental Studies - Kaushik, A.
5. Elements of Environment Science & Engineering - Meenakshi.
6. Elements of Environment Engineering - Duggal.

First Semester Examination to be held in the Year December 2018,2019,2020,2021

CLASS: B.E. 1ST SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: INDIAN CONSTITUTION CREDIT: Non-Credit

COURSE No.: NCC-103 L T P

DURATION EXAM: 3 HRS 0 0 2

Detailed Syllabus

1. Indian Constitution-Sources and Features, Preamble (2)
2. Fundamental Rights, Fundamental Duties (2)
3. Directive Principles of state policy (2)
4. Structure of State and Central Government (4)
5. Judiciary-Supreme court, High court, Judicial Review and Judicial Activism (5)

Note:

i. There will be an Internal MCQ/Objective type Questions based examination of 40 marks.
ii. Evaluation: Satisfactory>= 40%: Unsatisfactory<40%.

B.E. Electrical Engineering Second Semester Examination to be held in the Year May 2019,2020,2021,2022

B.E. Electrical Engineering 2nd Semester

Contact Hrs. : 26

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits	% Change
			L	T	P	Internal	External			
BSC-201	Basic Science Course	Engineering Mathematics-II	3	2	-	50	100	150	5	100
BSC-202	Basic Science Course	Engineering Physics	3	1	-	50	100	150	4	100
BSC-212	Basic Science Course	Engineering Physics (Lab)	-	-	3	50	-	50	1.5	100
HMC-201	Engineering Science Course	Communication Skill	2	-	-	25	50	75	2	100
HMC-211	Engineering Science Course	Communication Skill (Lab)	-	-	2	25	-	25	1	100
ESC-203	Engineering Science Course	Basic Electrical Engineering	3	1	-	50	100	150	4	100
ESC-213	Engineering Science Course	Basic Electrical Engineering (Lab)	-	-	2	50	-	50	1	100
ESC-214	Engineering Science Course	Workshop Technology	1	-	3	50	-	50	2.5	100
TOTAL			**12**	**4**	**10**	**350**	**350**	**700**	**21**	

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH: COMMON TO ALL BRANCHES

COURSE TITLE: ENGINEERING MATHEMATICS-II **CREDITS: 5**

COURSE No.: BSC-201

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	2	0	100	50

Course Outcomes: At the end of the course the Student will be able to

CO 1 Learn the rules of nth derivative, to find maximum and minimum value of any function, to trace the curves.

CO 2 Understand the concept of definite integrals and find arc length, area, surface area and volume of various curves.

CO 3 Solve the differential equations of first order and higher order.

CO 4 differentiate the concept of scalars , vectors, gradient, divergence and curl.

CO 5 Evaluate the complex no. in polar form and understand the idea of hyperbolic functions

Detailed Syllabus

UNIT- I Introduction to infinite series & sequences **(06 hrs)**

Convergence and divergence of a series, p-test, comparison test, Cauchy's root test, D' Alembert Ratio Test, Raabe's Test,Guass test, Logarithmic test, Leibnitz test on alternating series.

UNIT- II Fourier series and Power Series Solutions of Second order O.d.e **(10 hrs)**

(i) Fourier series: Euler's formula, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier -series.

(ii) Power series: Analytic function, ordinary point, singular point, regular and irregular singular points of o.d.e. $Y'' + P(x)\,Y' + Q(x)\,Y = 0$, Series solution of differential equations about an ordinary point, Frobenius series solution about a regular singular point. Examples of Legendre and Bessel's differential equations.

Unit – III First Order partial differential equations **(05 hrs)**

Formation of p.d.e, First order linear p.d.e, Non-Linear p.d.e. of 1st order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique: $f(p,q) = 0$, $f(z,p,q) = 0$, $f(x,p) = g(y,q)$ and Clauraut's form.

Unit – IV Higher Order Linear p.d.e **(07 hrs)**

Homogenous and Non-homogenous higher order linear partial differential with constant coefficients Rules for finding P.I and C.F, Non-Linear equations of 2^{nd} order. Application of p.d.e, method of separation of variables to solve equations of vibrations of strings (or one dim wave equation), one dim heat flow equations, Laplace equations.

Unit – V Matrices **(08 hrs)**

Introduction, Rank of matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Linear dependence and independence of vectors, consistency of linear system of equations, Guass Jordan method, Gauss elimination method, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Reduction to diagonal form, Reduction of quadratic form to canonical form.

Unit – VI Vector Spaces **(5 hrs)**

Definition, Linear transformation, basis, dimensions of a vector space, Range and Kernel of a linear transformation, Rank, Nullity, Rank-Nullity theorem, Matrix associated with a linear transformation.

NOTE: (I) There shall be total seven questions. Question no.1 is compulsory and short answer/ objective type. It will consist of 10 questions each of 1 mark (Total: 10 marks)

(II) There will be two questions from each unit. Attempt one question from each unit. Each question carry 15 marks.

BOOKS RECOMMENDED:

1. Advanced Engineering Mathematics — E. Kreyszig, 2006
2. Higher Engineering Mathematics — Dr. B.S. Grewal, Khanna Publication, New Delhi
3. Engineering Mathematics -II — Dr. Bhopinder Singh
4. Partial differential equations — M.D.RaiSinghania
5. Linear Algebra — D.Poole,2nd Edition, 2005

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH:CIVIL/MECHANICAL/ELECTRICAL ENGINEERING

COURSE TITLE: ENGINEERING PHYSICS **CREDITS: 4**

COURSE No.: BSC-202

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	1	0	100	50

Course Outcomes (CO) : At the end of the course the Student will be able to -

CO 1 Understand the significance of Maxwell's equations as the basis of Electromagnetic theory.
Gain the knowledge on the basic concepts of Quantum Mechanics and its applications.
Acquire the concepts of different types of oscillations.

CO 2 Assimilates the basic concepts of Semiconductor Physics.
Get familiar with different aspects of applied optics & their applications.
Understand the working principle of various lasers and optical fibres and their applications in various fields.

SECTION – A

Module -I: ELECTROMAGNETIC FIELDS AND WAVES

Concepts of Del Operator- gradient, divergence, curl and their physical significances, Displacement Current. Maxwell's equations in vacuum and non conducting medium, Electromagnetic wave propagation in free space (e.m wave equations for electric & magnetic fields for free space) & their solutions (plane wave solution) , velocity of E.M. waves, Relation between E_o & B_o , definition of Poynting vector, Poynting theorem.

8hrs, Weightage = 20%

Module –II : QUANTUM MECHANICS

Inadequacies of Classical Mechanics ,De-broglie's concept of Matter waves, Wave-packet (Wavegroup), Phase and Group velocity, Heisenberg's uncertainty Principle, Experimental illustration of Uncertainty principle using single slit, Wave-function definition, interpretation and significance of wave-function, Schrodinger's wave equation (Steady-state and Time dependent) for one- dimensional case, Concept of Operators and Expectation values, Applications of Schrodinger's equation (Time independent) to ;

i) Particle in a one-dimensional box of infinite height, ii) Single step potential barrier, iii) Tunnel effect,

9hrs, Weightage = 20%

Module-III : OSCILLATIONS

Damped and Forced oscillations and their differential equations , Logarithmic decrement, Relaxation time & Quality factor,Ultrasonic waves and their production by Piezoelectric method and general applications.

4hrs, Weightage = 10%

SECTION – B

Module –IV: SEMICONDUCTOR PHYSICS

Structure of Atoms, Energy Band diagram, Metal, Insulator and Semiconductor, Intrinsic and Extrinsic semiconductors , Direct & Indirect semiconductors , Bond in semiconductor & effect of temperature on semiconductors, Hole & Electron description , Charge densities in semiconductor , Generation & Recombination of charge carrier, Law of mobility & conductivity, Current densities in semiconductors , Fermi levels, Mass action law, Drift & Diffusion currents, Hall effect, Hall co-efficient & its applications .

9hrs, Weightage = 20%

Module –V : APPLIED OPTICS

Interference in thin films (by reflection and transmission of light), Theory of Newton's rings by reflected light, Determination of wavelength and refractive index of monochromatic light by Newton's rings theory.

Fraunhoffer & Fresnel's diffractions, Fresnel's half period zones and rectilinear propagation of light, Fraunhoffer diffraction due to a single slit , Plane diffraction grating& its theory for secondary maxima & minima.

Unpolarised and polarised light, Double refraction phenomenon, Nicol Prism, Mathematical representation of elliptically and circularly polarized light, Quarter and Half wave plates.

7hrs, Weightage = 20%

Module VI : LASERS AND FIBRE OPTICS

Principal of Laser action , Einstein's co-efficients, Ruby & Co_2 Lasers, Holography , Propagation of Light in Optical fibres, Acceptance angle & acceptance cone,Numerical Aperture, Single mode & Multimode fibres,Characteristics and General applications of Lasers & Optical fibres.

5hrs, Weightage = 10%

TUTORIALS

S.No	TOPICS
T-1	Numerical Problems pertaining to topics in Unit-I
T-2	Numerical Problems based on topics in Unit-II
T-3	Numerical Problems related to topics in Unit-III
T-4	Numerical Problems based on topics in Unit- IV
T-5	Numerical Problems associated with topics in Unit-V
T-6	Numerical Problems related to topics in Unit-VI

NOTE: There shall be a total of eight questions, four from Each Section A & Section B selecting at least one question from each module. Each question carries 20 marks. Five questions will have to be attempted. Selecting at least two from each section. Use of Scientific calculator is allowed.

Books Recommended:

	TITLE	AUTHOR
1.	Physics	Reisnick & Halliday
2.	Fundamentals of Electricity & Magnetism	Duggal & Chabbra
3.	Modern Physics	Beiser
4.	Modern Physics	Blatt
5.	Modern Physics	Gupta & Gupta
6.	Sound	Subramaniam
7.	Basic Electronics	Millman & Halkias
8.	Semi conductor Physics and Devices: Basic Principles	Donald A. Neamen
9.	Optics	Brijlal & Subramaniam
10.	Fibre Optics	Ghatak, Tyagrajan
11.	Lasers	K.R. Nambiyar
12.	Modern Engineering Physics	A.S. Vasudeva

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH:CIVIL/MECHANICAL/ELECTRICAL ENGINEERING

COURSE TITLE: ENGINEERING PHYSICS **CREDITS: 1.5**

COURSE No.: BSC-212

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	3	0	50

Course Outcomes: At the end of the course the Student will be able to -

CO-1 Gain knowledge about the scientific methods of measuring different physical parameters based on the concepts of Physics.

CO-2 Develop the experimentation skills by displaying minimized measurement errors.

CO-3 Demonstrate & improve the practical skills to use the appropriate physical concepts to obtain the solutions pertaining to different physics experiments.

CO-4 Acquire a sense of scientific temper infused with innovation & creativity.

Experiment No.	Title of Experiment
Exp- I	To find the frequency of A.C. mains using an electrical vibrator.
Exp-II	To study the variation of magnetic field.
Exp-III	To verify the Faraday's laws.
Exp-IV	To find the co-efficient of self induction of a coil by Anderson's bridge using head phone.
Exp-V	To find the impedance of LCR circuit.
Exp-VI	To evaluate the value of Planck's constant using a photo-cell.
Exp-VII	To study the characteristics of a Solar cell.
Exp-VIII	To draw the V-I characteristics of a P-N junction diode.
Exp-IX	To study the common base/ common emitter characteristics of PNP/NPN junction transistor.
Exp-X	To study the Zener diode characteristics.
Exp-XI	To find the dispersive power of a given prism using a spectrometer.
Exp-XII	To find the wavelength of monochromatic light using Newton's rings apparatus.
Exp-XIII	To determine the wavelength of sodium light using a plane transmission grating.
Exp-XIV	To determine the specific rotation of sugar/glucose using Laurent's Half shade Polarimeter.
Exp-XV	To find the wavelength of He-Ne laser.

NOTE : A MINIMUM OF EIGHT EXPERIMENTS IS TO BE PERFORMED COVERING THE DIVERSE ASPECTS OF ENGINEERING PHYSICS.

BOOKS RECOMMENDED:

	TITLE	AUTHOR
1.	B.Sc. Practical Physics	C.L. Arora
2.	Practical Physics	Warsnop & Flint
3.	Practical Physics	Chauhan & Singh (Vol. I & Vol. II)

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: COMMUNICATION SKILLS **CREDITS: 2**

COURSE No.: HMC-201

DURATION EXAM: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
2	0	0	50	25

COURSE OUTCOME OF COMMUNICATION SKILLS

The student would be able to:

1. Acquire proficiency in reading, speaking and writing skills.
2. Equip themselves with grammatical and communicative competence.
3. Adept in communication skills required for the competence in present scenario.
4. Acquire proficiency in listening skills and professional etiquettes.
5. Enhance their linguistic competence for Group Discussions and public speaking.

SECTION-A

UNIT I

Writing Practice: Comprehension, Notices, Memos,Précis writing, Types of Letter- Enquiry letter, Reply to enquiry, Claims letter, Adjustment and sales letter, Job letter; E-mail writing.

5 hrs

UNIT II

Introduction to grammar: Use of phrase and clauses in sentences, use of proper punctuationConcept of word formation, Synonyms, Antonyms, Prefix, Suffix; Articles, Prepositions, Clichés, Subject-verb Agreement.

6 hrs

SECTION-B

UNITIII

Communication: Introduction, Elements of Business Communication, Media of verbal communication (oral & written), Barriers of Communication, Guidelines to improve Business communication.

5 hrs

UNIT IV

Professional Etiquettes- Meaning and types. **Listening skills:** Process of listening, types of listening, techniques to improve listening ability, skills of effective listening,**Group Discussion**-Advantages, Purpose, Group Dynamics, and Guidelines for Effective Group discussion.

5 hrs

UNIT V

Speaking Skills- Skills of Effective speaking, Components of Effective talk and body language; **Interviews**-Meaning, Types of interview, tips for giving an interview and handling questions. **Meeting skills**: purpose of meeting- procedures, notices, agenda, venue of meeting; minutes of meeting. **Brain Storming**-Purpose and techniques.

5 hrs

NOTE: The question paper shall consist of two questions from each unit (total 10 questions). Students have to attempt one question from each unit (total no. of questions to be attempted shall be five) i.e there shall be internal choice within each unit. Students have to attempt two questions from Section A and three questions from section B. Each question carries equal marks (10 marks).

BOOKS RECOMMENDED

- Communication Skills by Dr. Nageshwar Rao & Dr. Rajendra Prasad.
- Functional Aspects of Communication Skills by Dr. Prajapati Prasad, Published by S.K Kataria &Sons.
- An Approach to Communication Skills by Indrajit Bhattacharya, Published by Dhanpat Rai & Co. Ltd.
- Communication Skills by Varinder Kumar and Bodh Raj, Published by Kalyani Publishers.
- An Approach to Communication Skills by Bhanu Ranjan
- Communication Skills and Functional Grammar by Sadhna Gupta.
- Remedial English Grammar by F.T.Wood. Macmillan
- On Writing Well. William Zinsser. Harper resource Book

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH: COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

COURSE TITLE: COMMUNICATION SKILLS **CREDIT: 1**

COURSE No.: HMC-211

DURATION EXAM: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	2	0	25

COURSE OUTCOME OF COMMUNICATION SKILLS LAB

The student would be able to:

1. Identify difficult sounds, words and phrases and shall acquire proficiency in pronouncing the words correctly with proper stress and intonations.
2. Equip themselves with art of making resume/cv which can aptly highlight their self-introduction and their strongest attributes.
3. Make use of latest technology to communicate effectively in various settings and contexts.
4. Face their interviews confidently and shall acquire proficiency in Group Discussions and public speaking.
5. Acquire the art of holding meetings as well as preparing the annual reports of the organizations.

List of Practical:

1. Listening Comprehension.
2. Pronunciation, Intonation, Stress & Rhythm.
3. Common everyday situations and conversations & Dialogues.
4. Power point presentation
5. Resume/Bio data preparation including SWOT analysis.
6. Vocabulary improvement programs, Role play
7. Mock interviews
8. Group discussions
9. Minutes of Meeting
10. Annual Reports

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH: COMPUTER/E&C/ELECTRICAL/I.T ENGINEERING

COURSE TITLE: BASIC ELECTRICAL ENGINEERING **CREDITS: 4**

COURSE No.: ESC-203

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	SESSIONAL
3	1	0	100	50

Course Outcomes:

At the end of this course, students will demonstrate the ability

- To understand and analyse basic electric and magnetic circuits.
- To study the working principles of electrical machines.
- To introduce the components of low-voltage electrical installations.

Section-A

Module 1: DC Circuits **(8 hours)**

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Mesh and Nodal analysis, Superposition, Maximum Power Transfer theorem, Thevenin and Norton Theorems.

Module 2: AC Circuits **(8 hours)**

Representation of sinusoidal waveforms, peak and rms values, 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.

Module 3: Three-phase Circuits **(6 hours)**

Concept of three phase voltage, voltage and current relations in star and delta connections. Measurement of power in three-phase balanced circuits.

Section-B

Module 4: Transformers **(6 hours)**

Principle of operation, ideal and practical transformer(no-load & on-load pahsor diagrams), equivalent circuit, losses in transformers, Transformer test (open circuit & short circuit), regulation and efficiency.

Module 5: Electrical Machines **(8 hours)**

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.

Module 6: Electrical Installations **(6 hours)**

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.

Text / References:

1. D. P. Kothari and I. 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.
4. E. Hughes, "Electrical and Electronics Technology", Pearson.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India.

NOTE: 1. The question paper shall comprise of total eight questions, four from each section and atleast one question from each module.

2. Students are required to attempt five questions selecting at least two questions from each section. Use of scientific calculator is allowed.

Second Semester Examination to be held in the Year May 2019,2020,2021,2022

CLASS: B.E. 2ND SEMESTER

BRANCH: COMPUTER/E&C/ELECTRICAL/I.T ENGINEERING

COURSE TITLE: BASIC ELECTRICAL ENGINEERING LAB **CREDIT: 1**

COURSE No.: ESC-213

DURATION EXAM.: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	2	0	50

Laboratory Outcomes: The students are expected to

- Get an exposure to common electrical components and their ratings.
- Make electrical connections by wires of appropriate ratings.
- Understand the usage of common electrical measuring instruments.
- Understand the basic characteristics of transformers and electrical machines.

List of Laboratory Experiments/Demonstrations:

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, Ammeter, multi-meter, oscilloscope. Components-Resistors, capacitors and inductors.
2. Verification of Kirchoff's Laws.
3. Verification of Superposition Theorem.
4. Verification of Thevenin's Theorem.
5. Verification of Norton Theorem.
6. Verification of Maximum Power Transfer Theorem.
7. Measurement of current in various branches of RLC series-parallel circuit.
8. Measurement of three-phase power using Wattmeter.
9. Study of single phase transformers. Determination of Polarity Test of given single phase transformer.
10. To perform open and short circuit test on single phase transformer.
11. Demonstration of cut-out sections of machines: dc machine and ac machines.
12. Study of wires, cables, fuses and MCBs.
13. To perform calculations for energy consumption.

Note: A minimum of eight experiments is to performed by each Student

UNIVERSITY OF JAMMU

NOTIFICATION

(19/Aug/Adp/29)

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 (Electrical 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
Electrical	**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/19/4757-4768
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 (Academics)

19/8 19/8 19/08/19 19/8

B.E. Electrical Engineering 3rd Semester **Contact Hours: 28**

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	% change
			L	T	P	Internal	External			
PEE-301	Professional Core Courses	Electrical Machines-I	3	1	0	50	100	150	4	100
PEE-302	Professional Core Courses	Electrical Circuit Analysis	3	1	0	50	100	150	4	100
EEC-302	Engineering Science Course	Electronic Circuits I	2	1	0	50	100	150	3	100
BSC -301	Engineering Science Course	Numerical Methods & Transform Calculus	3	1	0	50	100	150	4	100
PEE- 306	Professional Core Courses	Energy Conservation	2	1	0	50	100	150	3	100
PEE-311	Professional Core Courses	Electrical Machine Lab-I	0	0	2	75	-	75	1	100
PEE-312	Professional Core Courses	Electrical Circuit Analysis Lab	0	0	2	50	-	50	1	100
PEE-313	Professional Core Courses	Electrical Workshop	0	0	2	75	-	75	1	100
EEC-312	Engineering Science Course	Electronic Circuits I Lab	0	0	2	50	-	50	1	100
NCC-304	Non Credit Courses	Engineering Mechanics	2	0	0	0	-	0	0	100
Total			**15**	**5**	**8**	**500**	**500**	**1000**	**22**	

Annexure-I

3rd Semester Examination to be held in the year December 2019,2020,2021,2022

CLASS: B.E. 3rd SEMESTER **CREDIT-4**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-301
TITLE: ELECTRICAL MACHINES-I
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
3	1	0	100	50

COURSE OUTCOMES:- At the end of theCourse the Student will be able to	
CO1	Understand the concepts of magnetic circuits
CO2	Understand the operation of dc machines
CO3	Analyse the differences in operation of different dc machine configurations.
CO4	Analyse single phase and three phase transformers circuits.

Detailed Syllabus

SECTION-A

Module 1: Magnetic fields and magnetic circuits
Review of magnetic circuits–MMF, flux, reluctance, inductance; review of Ampere Law and BiotSavart Law; Visualization of magnetic fields produced by a bar magnet and a current carrying coil through air and through a combination of iron and air; influence of highly permeable materials on the magnetic flux lines. **(6Hours)**

Module 2: Electromagnetic force and torque
B-H curve of magnetic materials; flux-linkage vs current characteristic of magnetic circuits; linear and nonlinear magnetic circuits; energy stored in the magnetic circuit; force as a partial derivative of stored energy with respect to position of a moving element; torque as a partial derivative of stored energy with respect to angular position of a rotating element. **(8 Hours)**

Module 3: DC machines
Basic construction of a DC machine, magnetic structure - stator yoke, stator poles, pole-faces or shoes, air gap and armature core, visualization of magnetic field produced by the field winding excitation with armature winding open, air gap flux density distribution, flux per pole, induced EMF in an armature coil. Armature winding and commutation - Elementary armature coil and commutator, lap and wave windings, construction of commutator, linear commutation Derivation of back EMF equation, armature MMF wave, derivation of torque equation, armature reaction, air gap flux density distribution with armature reaction.
(8 Hours)

SECTION-B

Module 4: DC machine - Motoring and Generation
Armature circuit equation for motoring and generation, Types of field excitations - separately excited, shunt and series. Open circuit characteristic of separately excited DC generator, back EMF with armature reaction, voltage build-up in a shunt generator, critical field resistance and critical speed.V-I characteristics and torque-speed characteristics of separately excited, shunt and series motors. Speed control of dc motor. Losses, load testing and back-to-back testing of DC machines.Starters- 3point and 4-point starters of dc machine. **(7 Hours)**

Module 5: Transformers
Principle, construction and operation of single-phase transformers, equivalent circuit, phasor diagram, voltage regulation, losses and efficiency Testing - open circuit and short circuit tests, polarity test, back-to-back test, separation of hysteresis and eddy current losses Three-phase transformer - construction, types of connection and their comparative features, Parallel operation of single-phase and three-phase transformers, Autotransformers - construction, principle, applications and comparison with two winding transformer, Magnetizing current, harmonics in magnetization current, Phase conversion - Scott connection, Tap-changing transformers - No-load and on-load tap-changing of transformers. Cooling of transformers. **(9Hours)**

Text / References:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011. 5. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

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. Use of calculator is allowed.

3rd Semester Examination to be held in the year December 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT-4**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-302
TITLE: ELECTRICAL CIRCUIT ANALYSIS
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
3	1	0	100	50

COURSE OUTCOMES: -At the end of the course the student will be able to:	
CO1	Apply the knowledge of basic circuital law, dot convention and topological description of Electrical networks.
CO2	Acquire knowledge about the application of differential equation method and Laplace transform in electrical circuits.
CO3	Understand pole-zero configuration and determine parameters of two port network.
CO4	Understand concept and design of filters and synthesize circuits using Foster and Cauer forms.

Detailed Syllabus

SECTION-A

Module1: Conventions for describing networks

Reference directions for currents and voltages, Conventions for Magnetically Coupled Circuits, Circuit Topology. **(5hours)**

Module2: First order differential equation &Laplace Transformations:

Differential equations as applied in solving networks, Application of initial conditions, evaluating initial conditions in networks. Laplace Transformations: Initial and final value theorems, convolution integral, convolution as summation, Solution of network problems with Laplace transformation. **(7 hours)**

Module3: Network Functions-poles and zeroes

Ports or terminal pairs, Network functions for one port and two port networks, Poles and Zeros of network functions, Restriction on pole and Zero locations for driving point and transfer functions. Time domain behaviour from pole-Zero plot. **(7 hours)**

SECTION-B

Module4: Two port parameters

Impedance ,Admittance , transmission and hybrid parameters, Relationship between parameter sets, parallel, series & Cascade connection of two port Networks, Characteristics impedance of two-port networks**.** **(7 hours)**

Module5: Filters

Filter fundamentals, filter classification, Constant K & m Derived Filters, Design of filters**.** **(6 hours)**

Module6: Network Synthesis:

Synthesis problem formulation, properties of positive real functions, Hurwitz polynomials properties of RC, LC and RL driving point, functions. Foster and Cauer synthesis of LC, RL and RC circuits. **(6 hours)**

RECOMMENDED BOOKS:

1.	Network Analysis	Van Valkenberg
2.	Network Analysis & Synthesis	F.F. Kuo
3.	Introduction to Circuit Synthesis & Design	Temes& La Patra
4.	Fundamentals of Network Analysis & Synthesis	Perikari
5.	Network Theory & Filter Design	V. Atre
6.	Network analysis and Synthesis	SudhakarShyam Mohan
7.	Circuit Theory analysis and Synthesis	A. Chakrabarti

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. Use of calculator is allowed.

3rd Semester Examination to be held in the year December 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT-3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC-302
COURSE TITLE: ELECTRONIC CIRCUITS -I
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES: At the end of the course the student will be able to:	
CO1	Understand the operation of semiconductor devices, rectifiers, concept of 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	Apply the concept of series, shunt, monolithic and IC regulators in circuit design.

Detailed Syllabus

SECTION -A

Module1: Semiconductor Diodes

Introduction, pn junction biasing conditions, Volt-ampere characteristics, breakdown mechanism(Avalanche, Zener breakdown), Zener diode, tunnel diode, schottky diode, LED, photodiode, varactor diode, Pn junction diode as rectifiers, filters, clippers and clampers**.** **(8 Hours)**

Module2: Transistors

Working principle, generalized transistor equation, transistor configurations (CE,CC,CB) and characteristics, early effect, Need for biasing, types of biasing circuit, load line concept (AC/DC), Bias stabilization, Introduction to JFET,characteristics, symbol and operation, Biasing of FET with necessary derivations, MOSFET. **(8 Hours)**

SECTION B

Module 3: Single and Multistage Amplifiers

H-parameters, principle of operation of CE amplifier, need for cascading, N-stage cascaded amplifiers, method of coupling multistage amplifiers (RC coupling, DC coupling, transformer coupling), Analysis and frequency response of amplifiers.
(8Hours)

Module 4: Voltage Regulators

Introduction and necessity of Voltage regulators, types of Voltage regulators (Shunt and Series), monolithic and IC regulators (78XX,79XX,LM317,LM337). **(8 Hours)**

Books Recommended:

1. Integrated Electronics — MillmanHalkais
2. Electronics Devices — Bolystead
3. Electronics Devices — Malvino Leach
4. Microelectronics — Sedra& Smith

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. Use of calculator is allowed.

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT-4**
BRANCH: ELECTRICAL ENGINEERING
COURSE TITLE - NUMERICAL METHODS AND TRANSFORM CALCULUS
COURSE CODE – BSC 301
DURATION-3 HOURS

L	T	P	MARKS	
			External	Internal
3	1	0	100	50

COURSE OUTCOMES:-At the end of the semester the Student will be able to	
CO1	Learn the basics of operators, their types and interpolation.
CO2	Find out the exact real root of algebraic, transcendental equations and differential equations.
CO3	Learn the concept of Laplace Transform, inverse Laplace transform of various functions and its applications.
CO4	Understand the idea of Fourier transform, Fourier sine and cosine transform and their property.

Detailed Syllabus
SECTION A

Module 1: NUMERICAL METHODS

Definition of operators, Finite and divided difference, Interpolation using Newton's and Lagrange's formulas. Numerical differentiation, numerical integration: Trapezoidal rule and Simpson's 1/3rd rule.
Numerical solutions of algebraic and Transcendental equations by RegulaFalsi, Newton-Raphson and direct iterative methods, solution of differential equations by Taylor's method, Picard's method, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations. **(20 hours)**

SECTION B

Module 2: LAPLACE TRANSFORM

Laplace Transform, Properties of Laplace Transform: Linear property, change of scale property, first shifting property, second shifting property, Multiplication by t property, division by t property, convolution property, Laplace transform of periodic functions, Laplace transform of derivatives. Finding inverse Laplace transform by different methods. Evaluation of integrals by Laplace transform, solving differential equations of higher order by Laplace Transform. **(12 hours)**

Module 3: FOURIER TRANSFORM

Fourier Integrals, Fourier transforms, Fourier integral theorem, Fourier sine and cosine integrals, and their inverses. Properties of Fourier transforms. Application of Fourier transform to solve integral equations. Fourier sine and cosine integrals, and their inverses. **(8 hours)**

Text / References:

1. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2008.
2. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2010.
3. Dr.Bhopinder Singh,'' ENGINEERING MATHEMATICS III"
4. Dr.Bhopinder Singh,'' A textbook on Complex analysis and Numerical Methods", Kirti Publications.

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. Use of calculator is allowed.

3rd Semester Electrical Exam to be held in the year December2019, 2020, 2021, 2022

CLASS: B.E. 3rdSEMESTER **CREDIT-3**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-306
TITLE: ENERGY CONSERVATION
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES: -At the end of the semester the Students will be able to	
C01	Obtain knowledge about energy conservation policy, regulations and business practices.
C02	Recognize opportunities for enabling rational use of energy audit.
CO3	Apply knowledge of Energy Conservation Opportunities in a range of contexts and Developing innovative energy efficiency solutions and demand management strategies.
CO4	Analyze energy systems from a supply and demand perspective.

Detailed Syllabus
SECTION A

Module 1: Energy Conservation

Introduction, Motivation for Energy Conservation, Principles of Energy Conservation, Energy Conservation Planning and its importance. Classification of Energy, Indian energy scenario, Sectorial energy consumption, Energy intensity, long term energy scenario, Energy security, energy conservation and, energy strategy for the future**. (8 hours)**

Module 2: Energy Audit

Aim of Energy Audit, Energy Flow Diagram, Strategy of Energy Audit, Comparison with Standards, Energy Management Team, Considerations in Implementing Energy with Conservation Programmes, Instruments for Energy Audit, Energy Audit of Illumination System, Energy Audit of Electrical System, Energy Audit of Buildings. **(10 hours)**

SECTION B

Module 3: Demand Side Management

Introduction, Scope of Demand Side Management, Evolution of DSM Concept, DSM Planning and Implementation, Load Management as a DSM Strategy, Applications of Load Control, End use Energy Conservation, Tariff Options , Customer Acceptance, Implementation Issues and Strategies, DSM and Environment, International Experience with DSM. **(10 hours)**

Module 4: Economics

Importance and role of energy management, Energy economics, Payback period, Energy needs of growing economy, Energy pricing, Internal rate of return, life cycle costing**. (6 hours)**

Texts/References

1. Gupta B. R.: Generation of Electrical Energy, Eurasia Publishing House Pvt. Ltd., New Delhi, 2001 IV Edition.
2. Durgesh Chandra &: Energy Scope, South Asian Publishers Pvt. Ltd, New Delhi.
3. M.V. Deshpande: Electrical Power System, Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. J. Nanda and D.P. Kothari: Recent Trends in Electric Energy Systems, Prentice Hall of India Pvt. Ltd, New.

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. Use of calculator is allowed.

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS : B.E. 3rd SEMESTER **CREDITS: 0**
BRANCH: ELECTRICAL ENGINEERING

COURSE TITLE: ENGINEERING MECHANICS	**L**	**T**	**P**	**MARKS**	
COURSE NO. NCC-304				**External**	**Internal**
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**	**100**	**50**

Satisfactory/Unsatisfactory

COURSE OUTCOMES: Student will be able to	
CO1	Draw free body diagrams and determine the resultant of forces and/or moments.
CO2	Determine the centroid and second moment of area of sections. Apply laws of mechanics to determine efficiency of simple machines with consideration of friction..
CO3	Analyse statically determinate planar frames.
CO4	Analyse the motion and calculate trajectory characteristics and Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.

SECTION-A
(STATICS)

MODULE I: Scope and basic concepts , concept of free body diagram, Resultant of Co-planar concurrent forces in a plane and space, moment of force, Principle of Moments, Coplanar and spatial applications. Virtual work method and its applications.

MODULE II: Equilibrium and its equations for planar and spatial systems, Analysis of trusses, Method of joints and sections.

MODULE III: Theory of friction, its laws and applications. Square threaded screws, Bolt friction, Centroids and centre of gravity, centroids of lines and composite areas, centroids determined by integration.

SECTION-B
(DYNAMICS)

MODULE IV: Moment of inertia, Area M.O.I, Transfer theorems, Polar M.O.I, Product of inertia, Principal M.O.I, Mohr's circle for area M.O.I, Transfer theorems and axes M.O.I of composite bodies.

MODULE V: Kinematics of a particle rectilinear motion, motion curves, Rectangular components of curvilinear motion, Flight of Projectile, Normal and tangential components of acceleration, Radial and transverse components.

MODULE VI: Kinematics of rigid bodies: Types of rigid body motion, Angular motion, fixed axis rotation, Analysis of plane motion and its applications, Instantaneous centre and Instantaneous axis of rotation.

RECOMMENDED BOOKS:

1. Engineering Mechanics (Statics & Dynamics) — Dr.Sarbjeet Singh &Er. Pardeep Singh
2. Engineering Mechanics (Statics & Dynamics) — Mariam and Kraige
3. Engineering Mechanics (Statics and Dynamics) — Timoshenko and Young
4. Engineering Mechanics (Statics and Dynamics) — Ferdinand L Singer.

NOTE:

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from Section- A (each of 20 marks) and four from Section - B.
3. Students are required to attempt five questions in all, atleast two question from each section. Use of scientific calculator will be allowed in the examination hall

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS: B.E. 3rd SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-311
TITLE: ELECTRICAL MACHINES LAB-I

L	T	P	MARKS PRACTICAL
0	0	2	75

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Identify the parts of cut-sectional model of D.C. machines.
CO2	Study the operating characteristics of D.C. machines.
CO3	Determine the voltage regulation and efficiency of Transformer.
CO4	Perform the various tests on single-phase Transformer.

LIST OF EXPERIMENTS:

1. To study the cut-sectional model of D.C. machines.
2. To study the magnetic characteristics of a D.C. Machines at various operating speeds and finds the operating point of D.C. shunt machine from the same.
3. To determine the load characteristics of a D.C. Shunt generator and find its overall efficiency.
4. To determine the Torque speed characteristics of a D.C. Shunt motor and compound motor (Short & long shunt). Also study of these using armature control and field control.
5. To study the torque/speed characteristics of a D.C. series motor using various field tapings.
6. To find the efficiency and study various losses of D.C. Machines using Hopkinson test.
7. To study the starting methods of DC machine.
8. To study a single phase transformer, its Voltage ratio and turns ratio relationship. Perform open & short circuit test to determine losses, efficiency and voltage regulation and also its various parameters.
9. To perform polarity test on single phase transformers for parallel operation and study the load sharing of two parallel operated transformers.
10. Conversion of three-phase to two-phase using Scott Connection.
11. Determination of losses and efficiency of transformer using sumpner's test.

Note: Each student has to perform at least nine experiments out of which 40% shall be simulation based. Additional Practical / Experiments will be performed based on the course content requirements.

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT:-1**

BRANCH: ELECTRICAL ENGINEERING	**L**	**T**	**P**	**MARKS**
COURSE CODE: PEE-312				**PRACTICAL**
TITLE: ELECTRICAL CIRCUIT ANALYSIS LAB	**0**	**0**	**2**	**50**

COURSE OUTCOMES: - At the end of the semester the Student will be able to	
CO1	Determine Z,Y, h and ABCD parameters
CO2	Acquire knowledge of designing passive filter circuit
CO3	Understand the step response of RL, RC and RLC circuits

LIST OF EXPERIMENTS:

1. To determine Z parameters of two-port networks.
2. To determine Y parameters of two-port networks.
3. To determine ABCD parameters of two-port networks.
4. To determine h parameters of two-port networks.
5. Design and frequency response of Passive filter circuit.
6. Determination of transient response of RL circuits with step input voltage.
7. Determination of transient response of RC circuits with step input voltage.
8. Determination of transient response of RLC circuits with step input voltage.
9. Determination of driving point and transfer function of a two port ladder network.

Note: Each student has to perform atleast seven experiments out of which 40% shall be simulation based. Additional Practical's / Experiments will be performed based on the course content requirements.

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-313
TITLE: ELECTRICAL WORKSHOP

L	T	P	MARKS
			PRACTICAL
0	0	2	75

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Understand and apply the general lab safety rules.
CO2	Familiarize with different types of wirings and joints.
CO3	Study different methods of earthing.
CO4	Analyse different electronic components.

List of experiments:

1. Study of various type of wiring.
2. Study of various joints of Wires & Cables.
3. Power & ordinary circuits suitable for domestic wiring.
4. Cost estimation for wiring of a single storied building having light & power circuits.
5. Method of Earthing& measurement of Earth Resistance.
6. Electrical shock precautions & treatment.
7. Identification of components.
8. Soldering of Joints.
9. Wiring practices in PVC, Conduit system of wiring.
10. Control of fluorescent lamp circuit.

BOOK RECOMMENDED:

1. Electrical Wiring & Estimation — S.I. Uppal
2. Lab. Manual for Electric Circuits — David A. Bell
3. Textbook of Practicals in Electrical Engineering — Dr. N.K. Jain
4. Electrical Installation & Costing — J.B. Gupta

NOTE : The Electrical circuit diagrams will be provided to the students. The operation of the circuits will be explained. The purpose of the exercise is to familiarize the students Fabrication/Assembling of the given Electrical circuits and to solder the different components to form different Circuits.

3rd Semester Examination to be held in the year Dec 2019,2020,2021,2022

CLASS: B.E. 3RD SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINNERING
COURSE NO: EEC-312
COURSE TITLE: ELECTRONIC CIRCUITS I LAB

L	T	P	MARKS PRACTICAL
0	0	2	75

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Plot forward and reverse characteristics of silicon and Zener diodes.
CO2	Fabricate half and full wave rectifiers and evaluate their performance parameters.
CO3	Plot the characteristics of FET using trainer kits.
CO4	V-I characteristics of transistor for various configurations using trainer kit.

LIST OF PRACTICALS

1. To study the operation characteristics of the P.N. junction, Ge /Si (Forward & Reverse Characteristics).
2. To study the operation characteristics of Zener diode (Forward & Reverse Characteristics).
3. Half wave Rectifier.
4. Full wave / Bridge Rectifier.
5. To study the operation characteristics (Input/Output) of PNP/
6. NPN Transistor (Common Emitter/Common Base).
7. To study the frequency response of signal amplifier (CE/CB).
8. To study the characteristics of FET.
9. Determination of h parameter from transistor characteristics.
10. Design of self -bias circuits using BJT.
11. Design of self -bias circuits using FET.

Note: Each student has to perform atleast nine experiments out of which 40% shall be simulation based. Additional Practical's / Experiments will be performed based on the course content requirements.

B.E. Electrical Engineering 4th Semester **Contact Hours: 26**

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	% change
			L	T	P	Internal	External			
PEE-401	Professional Core Courses	Electric Machines II	3	1	0	50	100	150	4	100
PEE-402	Professional Core Courses	Control System	3	1	0	50	100	150	4	100
PEE-403	Professional Core Courses	Signal and Systems	3	1	0	50	100	150	4	100
EEC-402	Engineering Science Course	Digital Electronics	2	1	0	50	100	150	3	100
EEC-403	Engineering Science Course	Electromagnetic Waves	2	1	0	50	100	150	3	100
PEE-411	Professional Core Courses	Electric Machines Lab II	0	0	2	75	-	75	1	100
PEE-412	Professional Core Courses	Control System Lab	0	0	2	75	-	75	1	100
EEC-412	Engineering Science Course	Digital Electronics Lab	0	0	2	50	-	50	1	100
PEE-413/ 414	Professional Core Courses	Mini Project/ MOOCs	0	0	2	50	-	50	1	100
Total			**13**	**5**	**8**	**500**	**500**	**1000**	**22**	

Annexure-II

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

CREDIT-4

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EE-401
TITLE: ELECTRICAL MACHINES-I1
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
3	1	0	100	50

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Understand the concepts of rotating magnetic fields.
CO2	Understand the operation of ac machines.
CO3	Acquire knowledge of starting and braking of ac machines
CO4	Analyse performance characteristics of ac machines

Detailed Syllabus

SECTION A

Module 1: Fundamentals of AC machine windings

Physical arrangement of windings in stator and cylindrical rotor; slots for windings; single turn coil, full-pitch coils, concentrated winding, distributed winding, Air-gap MMF distribution with fixed current through winding, distribution factor. **(6 hours)**

Module 2: Pulsating and revolving magnetic fields

Magnetic field produced by a single winding - fixed current and alternating current ,Pulsating fields produced by spatially displaced windings, Three windings spatially shifted by 120 degrees (carrying three-phase balanced currents), revolving magnetic field. **(6 hours)**

Module 3: Induction Machines

Construction, Types (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque.Equivalentcircuit.Phasor Diagram, Losses and Efficiency. Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency). Methods of starting, braking and speed control for induction motors. Generator operation. Self-excitation. Doubly-Fed Induction Machines. **(10 hours)**

SECTION B

Module 4: Single-phase Induction Motors

Constructional features, double revolving field theory, equivalent circuit, determination of parameters. Split-phase starting methods and applications. **(6 hours)**

Module 5: Synchronous Machines

Constructional features, cylindrical rotor synchronous machine - generated EMF, equivalent circuit and phasor diagram, armature reaction, synchronous impedance, voltage regulation. Operating characteristics of synchronous machines, V-curves.Salient pole machine - two reaction theory, analysis of phasor diagram, power angle characteristics. Parallel operation of alternators.

(10 hours)

Text/References:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
5. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
6. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007.

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. Use of calculator is allowed.

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

CLASS: B.E. 4TH SEMESTER **CREDIT- 4**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-402
TITLE: CONTROL SYSTEMS
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
3	1	0	100	50

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Understand the concept of open loop and closed loop system, transfer functions and modelling of physical systems
CO2	Obtain transfer function using block diagram technique and signal flow graph and time domain analysis of control system.
CO3	Understand stability criterions and design of feedback control system.
CO4	Understand the concept of state space analysis and non linear system.

Detailed Syllabus

SECTION-A

Module 1: Introduction to Linear Control System

Control Systems, types of control systems, feedback and its effects, mathematical modelling of physical systems.**(6 hours)**

Module2: System Representation

Block diagrams, representation of control systems, transfer functions, signal flow graphs, Time Domain Analysis of Control Systems: Time domain analysis of first & 2nd order Control systems. Typical test signals for time response of control systems, time domain performance of first and second order control systems (steady state response and transient response). **(7 hours)**

Module 3: Control Components

AC and D.C. Servomotors, a.c. tachometer, synchro transmitter and receiver, synchro pair as control transformer, a.c. and d.c. position control system, stepper motor, magnetic amplifier and adaptive control. **(6 hours)**

SECTION-B

Module 4: Frequency Domain Analysis of Control System

Stability characteristic equation, stability of linear time invariant systems, Routh-Hurwitz stability Criterion, Root locus plot, Bode plot, Polar Plot, Nyquest Criterion. **(7hours)**

Module 5: Design of Feedback Control Systems

Approaches to system design, phase lead, and phase lag design using Bode-plot and root locus techniques. Introduction to P, PI and PID controllers. **(6 hours)**

Module 6: State space analysis and nonlinear systems

Types of non linearities, analysis of non-linear systems- Linearization method, phase plane method, describing functions and its application to system analysis. **(6 hours)**

RECOMMENDED BOOKS:

1. Modern Control Engineering — K.Ogatta
2. Automatic Control Systems — B.C. Kuo
3. Control System Engineering — Nagrath and Gopal
4. Linear Control System — B.S.Manke

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. Use of calculator and semi log graph paper is allowed.

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

CLASS: B E 4TH SEMESTER **CREDIT-4**
BRANCH: ELECTRICAL ENGINEERING
COURSE TITLE: SIGNALS AND SYSTEMS
COURSE CODE: PEE-403
DURATION OF EXAM-3 HOURS

			MARKS	
L	**T**	**P**	**External**	**Internal**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Understand the concepts of signal and systems.
CO2	Understand the concepts of continuous time and discrete time systems.
CO3	Analyse systems in complex frequency domain.
CO4	Understand sampling theorem and its implications

Detailed Syllabus

SECTION A

Module 1: Introduction to Signals and Systems

Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, random and characteristics signals, energy and power signals some special time-limited signals; continuous and discrete time signals, continuous (CT, DT). **(10 hours)**

Module 2: Behaviour of continuous time signals

Impulse response and step response, convolution, input-output behaviour with aperiodic convergent inputs, cascade interconnections. Characterization of causality and stability of LTI systems. System representation through differential equations and difference equations. State-space Representation of system. **(10 hours)**

SECTION B

Module 3: Fourier, Laplace and z- Transforms

Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, Fourier domain duality. The Discrete- Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). The z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis. **(12 hours)**

Module 4: Sampling and Reconstruction

The Sampling Theorem and its implications. Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold. Relation between continuous and discrete time systems. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems. **(6 hours)**

Text/References:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and systems", Prentice Hall India, 1997.
2. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing: Principles, Algorithms,and Applications", Pearson, 2006.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, "Signals and Systems", John Wiley and Sons, 2007.

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. Use of calculator is allowed.

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

CLASS: B.E. 4th SEMESTER **CREDIT-3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC-402
COURSE TITLE: DIGITAL ELECTRONICS
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Understand and examine various number systems to be used in digital design
CO2	Minimize the expressions using karnaugh map and implement them using logic gates in different logic families.
CO3	Analyse and design various combinational.
CO4	Analyze and design various sequential circuits.

Detailed Syllabus

SECTION-A

Module 1: Number System, Radix conversion, Arithmetic with base other than ten, Binary codes –weighted/Non weighted codes, Error detecting & correcting code (Hamming code), alphanumeric code, Subtraction of signed/unsigned number. (**8 Hours)**

Module 2: Logic Gates, Boolean algebra, Simplification of Boolean expressions, Minimization techniques, Karnaugh map (up to five variables) , Quine Mc-Clusky method, Simplification of Logic families – RTL, DTL, TTL, ECL & MOS families and their characteristics. (**8 Hours)**

SECTION-B

Module 3:Combinational logic circuits:Half and Full adders, Subtractors, BCD Adder, Comparators, Multiplexer, Realization of function using MUX, Demultiplexer, Decoder, Encoder, Code converters, General problems, PLA, Design of combinational circuit using PLA & PAL. (**8 Hours)**

Module 4: Introduction to sequential logic circuits, Synchronous and Asynchronous operation, Flip-Flops- R-S, J-K, D, T & Master-Slave flip-flop, Conversion of flip-flops, Shift registers, Analysis of asynchronous & synchronous sequential counter.

(**8 Hours)**

Books Recommended:

01. Digital Electronics R.P Jain
02. Digital Electronics & Microcomputer R.K. Gaur
03. Computer System Architecture M.M. Mano
04. Digital Electronics Jamini& K.M. Backward

NOTE: There shall be total 8 questions, four from each section. Five questions have to be attempted by the students selecting atleast two questions from each section.UseofCalculator is allowed.

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

CLASS: B.E. 4th SEMESTER **CREDIT:-3**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC-403
COURSE TITLE: ELECTROMAGNETIC WAVES
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Attain knowledge about the vector analysis, coordinate system, electric and magnetic fields and calculation of flux density, potential and energy densities.
CO2	Analyse the Maxwell's equations and the wave propagation equation in free space and in different media
CO3	Able to compute dominant modes, degenerate modes for particular waveguide.
CO4	Understand the principle of pattern multiplication and apply this to find the radiation pattern of antenna array

Detailed Syllabus

SECTION - A

Module 1: Electrostatics

Revision of vector analysis with rectangular, cylindrical, Spherical & polar coordinates, Electrostatic Potential, Potential gradient, Method of images, Energy density in electrostatics field, Electric field in dielectric media, Capacitance, Solution of Electrostatic problems using Poisson's & Laplace equation. **(6 Hours)**

Module 2: Magnetostatics

Magnetic flux density, & Magnetic potential, Torque on a closed circuit, Energy density in the magnetic field. **(3 Hours)**

Module 3: Maxwell Equation Uniform Plane Wave

Application of Maxwell equation to circuits, Wave motion in perfect dielectric, Plane wave in lossy dielectric, Propagation in good conduction, Standing wave ratio, Polarization, Reflection of uniform plane wave. **(6 Hours)**

SECTION – B

Module 4: Waveguides

Parallel plane waveguide: Transverse Electric (TE) mode, transverse Magnetic(TM) mode, Cut-off frequency, Phase velocity and dispersion. Transverse Electromagnetic (TEM) mode, Analysis of waveguide-general approach, Rectangular waveguides.**(8 hour)**

Module 5: Antennas

Radiation parameters of antenna, Potential functions, Solution for potential functions, Radiations from Hertz dipole, Near field, Far field, Total power radiated by a dipole, Radiation resistance and radiation pattern of Hertz dipole, Hertz dipole in receiving mode. **(7 Hours)**

BOOK RECOMMENDED:

01.	Engineering Electromagnetic	Jseph A. Edminister
02.	Introduction to Electromagnetic	Griffith
03.	Engineering Electromagnetic	Jr. Hyat
04.	Network Line & Filter	J. D. Ryder
05.	Antenna & Wave Propagation	K. D. Prasad

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at leasttwo questions from each section. Use of Calculator is allowed.

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

CLASS: B.E. 4th SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-411
TITLE: ELECTRICAL MACHINES-II LAB

L	T	P	MARKS
			PRACTICAL
0	0	2	75

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Familiarize with different cut-sectional model of AC Machines.
CO2	Determine the voltage regulation3-phase Synchronous Generator by various methods.
CO3	Understand the characteristics of Induction and Synchronous Machines.
CO4	Perform the various tests on Induction Motor.

LIST OF EXPERIMENTS:

1. To Study the cut-sectional model of AC Machines.
2. Determination of voltage regulation of a 3-phase synchronous generator/alternator by E.M.F., M.M.F. & A.S.A. method (Non-Salient Pole type).
3. Determination of positive, negative and zero sequence Reactance of 3-phase synchronous machine.
4. Determination of V curves of a 3- phase synchronous Motor.
5. Power Angle characteristics of a 3-phase synchronous machine..
6. Study of parallel operation & synchronization of 3-phase synchronous generators.
7. Speed control of 3-phase Induction motor by varying supply frequency & of 3-phase slip Ring Induction motor by Rotor Impedance Control.
8. Determination of complete Torque/Slip or Torque/Speed characteristics of a 3-phase Induction-motor.
9. Starting of 3-phase Induction Motor.
10. Determination of parameters of Induction Motor using No-load and Blocked Rotor Test.

Note: Each student has to perform atleast eight experiments out of which 40% shall be simulation based. Additional Practicals / Experiments will be performed based on the course content requirements.

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

CLASS: B.E. 4TH SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-412
TITLE: CONTROL SYSTEM LAB

L	T	P	MARKS
			PRACTICAL
0	0	2	75

COURSE OUTCOMES:- At the end of the semester the Student will be able to	
CO1	Calculate the frequency response of first and second order system.
CO2	Verify the torque/speed characteristics of servo motors.
CO3	Study of synchro, transmitter and receiver.
CO4	Study PID controller.

LIST OF EXPERIMENTS:

1. To study the characteristics of the synchro transmitter and receiver
2. To study the torque synchro pair operation
3. To study the performance of various types of controllers used to control the temperature of an oven
4. To study the open loop system and its subsystems of an dc motor
5. To study the closed loop system and its subsystems of an dc motor
6. To study the bode plot of a plant
7. To study lag network design
8. To study lead network design
9. To study low frequency response of a motor
10. To study stepper motor motion using microprocessor interface

Note: Each student has to perform at least six experiments out of which 40% shall be simulation based. Additional Practicals / Experiments will be performed based on the course content requirements.

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

CLASS: B.E. 4TH SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC-413
COURSE TITLE: DIGITAL ELECTRONICS LAB
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS PRACTICAL
0	0	2	50

COURSE OUTCOMES: - Student will be able to	
CO1	Implementation and verification of Boolean expressions using logic gates.
CO2	Design and implementation of various combinational circuits using digital IC's.
CO3	Design seven segment decoder using logical gates.
CO4	Design and implementation of various sequential circuits using digital IC's

LIST OF PRACTICAL :

1. Verification of truth tables of logical gates AND / OR / NOT, NAND, NOR, EXOR, EXNOR, gates.
2. Implementation of Boolean expression using AND, OR, NOT, NAND, & NOR logic.
3. Implementation of Decoder, Encoder using IC's & gates.
4. To implement half adder, half subtractor, full adder, full subtractor using different IC's & gates.
5. Implementation of multiplexer, Demultiplexer using IC's & gates.
6. Design of BCD to seven segment display using logical gates & IC's.
7. To design & verification of truth table of SR, JK, MS-JK Flip Flops.
8. To design various asynchronous counters using flip flops, gates & IC's.
9. To design various synchronous counters using flip flops, gates & IC's.
10. To design & verify the Truth tables of shift Registers.

Note: Each student has to perform atleast eight experiments and additional Practicals / Experiments will be performed based on the course content requirement.

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

CLASS: B.E. 4th SEMESTER **CREDIT-1**
BRANCH: ELECTRICAL ENGINEERING
COURSE TITLE: MINI PROJECT
COURSE NO: PEE-413

L	T	P	MARKS
			PRACTICAL
0	0	2	50

The mini-project is a team activity having 3-4 students in a team. This is electrical product design work with a focus on electrical circuit design. Mini Project should cater to a small system required in laboratory or real life. It should help students to familiarize with electrical components, devices and equipment's. After interactions with course coordinator and based on comprehensive literature survey/need analysis, the student shall identify the title and define the aim and objectives of Mini-Project. Complete Mini project and Documentation in the form of Mini Project Report is to be submitted at the end of Semester.

To evaluate a Mini project following is the scheme proposed:

Distribution of Marks:

Attendance: 10 marks (20%)
Report file: 15 marks (30%)
Actual work done: 15 marks (30%)
Viva-voce: 10 marks (20%)

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

CLASS: B.E. 4th SEMESTER **CREDIT: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE TITLE: MOOCs
COURSE NO: PEE-414

L	T	P	MARKS
			PRACTICAL
0	0	2	50

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 4 th semester.
To evaluate a MOOCS course following is the scheme proposed:

Breakup of Marks:

Attendance- 10 marks
Students will have to visit the lab as per the time table and pursue their respective online course.

Report file-15 marks
A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MOOC platform should also be included in the final report. A copy of the certificate if awarded
Should also be appended to the report.

Presentation- 15 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- 10 marks
The students awarded with the certificate will be given 10 marks.(Copy to be attached in the report.)

ANNEXURE-I

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E 5th Semester Electrical Engineering

For Examination to be held in the Year December 2020,2021,2022,2023

Contact Hours/Week: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PEE-501	Professional Core Course	Power System-I	2	1	0	50	100	150	3	100%
PEE-502	Professional Core Course	Electrical Measurement and Instruments	2	1	0	50	100	150	3	100%
EEE-502	Professional Elective Course	Elective-I	2	1	0	50	100	150	3	100%
EEC-501	Professional Core Course	Microprocessor (8085) & Peripheral Interfacing	2	1	0	50	100	150	3	100%
BCE-511	Engineering Science Course	Basic Civil Engineering	3	1	0	50	100	150	3	100%
NCC -503	Non Credit Course	Essence of Indian Traditional Knowledge	2	0	0	Satisfactory/unsatisfactory Non Credit				100%
MOC-503	Massive Open Online Course	SWAYAM/ NPTEL	3	0	0	100	-	100	3	100%
PIT -503	Professional Core Course	Industrial Training	0	0	0	50		50	1	100%
PEE-511	Professional Core Course	Power System I Lab	0	0	2	50	-	50	1	100%
PEE-512	Professional Core Course	Electrical Measurement Lab	0	0	2	50	-	50	1	100%
EEC-511	Professional Core Course	Microprocessor Lab	0	0	2	50	-	50	1	100%
TOTAL			**15**	**5**	**6**	**550**	**500**	**1050**	**22**	

**** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.***

Elective-I	
EEE-502 (A)	Electrical Machine Design
EEE-502 (B)	Power Plant Engineering
EEE-502 (C)	Renewable Energy

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-501

COURSE TITLE: POWER SYSTEM-I

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand different types of distribution system and electrical design aspects of transmission lines.
CO2	Analysis the performance of transmission lines and role of insulators.
CO3	Analysis the corona effect and mechanical design aspects of transmission lines.

Detailed Syllabus

Section- A

D.C & A.C. Distribution Systems: Introduction to a Power System (an overall view). Distribution Systems- Feeder, Distribution, service mains. Classification of distribution system. Various types of D.C. & A.C. distributors, Voltage drop calculations. **(08 hours)**

Overhead AC Transmission Lines Parameters: Types and bundling of conductors, Resistance calculations, skin effect, proximity effect. Inductance and Capacitance of single phase and 3- phase, single circuit and double circuit lines. Interference of power Lines with communication lines: Electrostatics & electromagnetic effects. **(10 hours)**

Section- B

Insulators for overhead Lines: Performance of transmission lines, Representation & performance of short, medium and long lines, A, B, C, D constants, surge impedance, Ferranti effect. Materials for insulators, types of insulators, potential distribution over a string of suspension insulators, methods for equalizing the potential. **(08 hours)**

Corona: Visual & critical disruptive voltage conditions effecting corona, power loss due to corona, practical considerations. Mechanical design of transmission line, Calculation of sag and tension, Equivalent span length and sag, effect of ice & wind loading, Conductor vibration& vibration dampers. . **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -C.W. Stevenson
2. Transmission & distribution of Electric Energy - H. Cotton & H. Barber
3. Electric Power System - C.L. Wadhwa

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-502

COURSE TITLE: ELECTRICAL MEASUREMENT AND INSTRUMENTS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Measure various electrical parameters like resistance, potential & current.
CO2	Understand the construction & working of AC & DC bridges, Potentiometer & its application.
CO3	Understand the construction , working of different measuring instruments and different energy measuring methods.

Detailed Syllabus

Section- A

Measurement of Resistance:-Measurement of low resistance, Potentiometer method, Kelvin double bridge. Measurement of medium résistance, Ammeter-voltmeter method, Substitution method, Wheatstone bridge, and applications. Measurement of high resistance, Loss of charge method, Meggar Method**,** Galvanometer: D' Arsonval Galvanometer; Construction, working principle, equation of motion, critical résistance **(10 hours)**

A.C. & DC Bridges and Potentiometer: Measurement of Inductance using: Maxwell's Inductance-Capacitance bridge. Anderson's bridge, Measurement of capacitance using De-Sauty's bridge, Schering bridge. Measurement of frequency using Wein's bridge. Crompton's Potentiometer, Vernier Potentiometer, Uses of DC Potentiometers.A.C. Potentiometer: Drysdale polar Potentiometer, Uses of A.C. Potentiometers. **(12 hours)**

Section- B

Measuring Instruments: Classification, effects utilized in measuring instruments. Indicating Instruments: Deflection, controlling & damping forces, various dampings. Ammeters & Voltmeters: Moving coil, moving iron, & electrodynamics type ammeter & voltmeters, electrostatic voltmeter, Errors in Ammeters & Voltmeters Extension of instrument range: Ammeter Shunts, Voltmeter multipliers, C.T. & P. **(12 hours)**

Measurement of Energy: Energy meters for A.C. Circuits, Theory of Induction type meters, Single phase Induction type watt-hour meters, construction, theory & operation. **(06 hours)**

BOOKS RECOMMENDED:

1. Electrical Measurements & Measuring Instruments - Golding Widdis
2. A Course in Electrical & Electronics Measurement & Instrumentation - A.K. Sawhney

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (A) (ELECTIVE-I)

COURSE TITLE: ELECTRICAL MACHINE DESIGN

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machine.
CO2	Understand the design of transformer.
CO3	Understand the principles of A.C. electrical machine design and carry out a basic design of an ac machine by using CAD.

Detailed Syllabus

Section- A

Introduction: Major considerations in electrical machine design, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines. **(07 hours)**

Transformers :-Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, design for minimum cost, design for minimum loss, temperature rise in transformers, design of cooling tank, methods of cooling transformers. **(10 hours)**

Section- B

Induction Motors:-Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, and turn per phase and stator conductors, stator core and teeth. **(08 hours)**

Synchronous Machines:-Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding. **(08 hours)**

Computer aided Design (CAD):-Limitations (assumptions) of traditional designs, need for CAD analysis. **(03 hours)**

BOOKS RECOMMENDED:

1. A Course in Electrical Machine Design - A. K. Sawhney
2. Theory & Performance & Design of A.C. Machines - M.G. Say
3. A Text Book of Electrical Engineering Drawings - K. L. Narang
4. Computer Aided Design of Electrical Machines - K. M. V. Murthy

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (B) (ELECTIVE-I)

COURSE TITLE: POWER PLANT ENGINEERING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand layout, construction and working of the components inside a thermal power plant.
CO2	Understand layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
CO3	Understand layout, construction and working of the components inside nuclear and hydro power plants.

Detailed Syllabus

Section- A

Coal Based Thermal Power Plants:-Introduction, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles. **(08 hours)**

Diesel, Gas Turbine and Combined Cycle Power Plants:-Introduction, Layout of Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems **(06 hours)**

Section- B

Nuclear Power Plants:-Introduction, Atomic Nuclei, Atomic Number and Mass Number, Isotopes, Atomic Mass Unit, Radioactivity and Radioactive Change Rate of Radioactive Decay, Mass – Energy Equivalence, Binding Energy, Nuclear Reaction, types of Nuclear Reactions, Initiation of Nuclear Reaction, , Nuclear Fission, The Fission Chain Reaction, moderation. **(09 hours)**

Hydro Power Plant:-Introduction, Potential of hydropower in India. General hydrology-hydrological cycle, precipitation, run-off and its measurement, hydrography, flow duration and mass curve. Site investigations. Classification of hydroelectric power plants. Dams, spillways, Canals, penstocks, surge tanks, draft tubes etc; Power – house structure. **(09 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Power Plant Engineering - Thomas C. Elliott
4. Power Plant Engineering - Black & Veatch

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (C) (ELECTIVE-I)

COURSE TITLE: RENEWABLE ENERGY

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the concepts, construction and working of solar energy
CO2	Understand the concepts, construction and working of wind energy
CO3	Understand the concepts, construction and working of Biomass energy and small hydro

Detailed Syllabus

Section- A

Solar Energy: - Primary and Secondary Solar energy and Utilization of Solar Energy. Characteristic advantages and disadvantages. Solar concentrators and tracking; Dish and Parabolic trough concentrating generating systems, Central tower solar thermal power plants; Solar Ponds. **(08 hours)**

Wind Electricity Generation:-Introduction ,Types of turbines, Coefficient of Power, Wind electric generators, Power curve; wind characteristics and site selection; Wind farms for bulk power supply to grid; Potential of wind electricity generation in India and its current growth rate. **(08 hours)**

Section- B

Biomass Energy:-Biomass: Sources and Characteristics; Wet biogas plants; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems; Maintenance of gasifiers. Types of biogas plants, biogas generation, advantages and disadvantages, applications of gasifiers. **(09 hours)**

Hydro Energy:- Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection and civil works; Speed and voltage regulation; tariff collection; Potential of small hydro power in India **(07 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Non-conventional energy resources - Shobh Nath Singh
4. Non-conventional energy resources - R.P.Jain

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEC-501

COURSE TITLE: MICROPROCESSOR (8085) & PERIPHERAL INTERFACING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To study the architecture and pin diagram of microprocessor 8085.
CO2	To study arithmetic and logic instructions along with advance programming techniques for storing data in momery or register.
CO3	Programming and the interfacing of various I/P and O/P devices along with peripheral IC's with 8085 so as to work in real time mode.

Detailed Syllabus

Section- A

Microprocessor 8085: Microprocessor 8085 pin diagram, Architecture, Addressing modes, Instruction set, Instruction format, Timing diagram, Programming techniques with additional instructions, looping, Counting design of counters & time delays, debugging & memory mapping. **(10 hours)**

Stack & Subroutines, Advanced subroutines concept, Call & Ret instructions, Advanced programming (Code conversions, BCD addition/subtraction, Multiplication etc.), 8085 interrupts & process. **(08 hours)**

Section- B

Interfacing : Interfacing I/O devices, Basic interfacing concept, interfacing with scanned multiplexed displays & LCD's, Interfacing output displays, Interfacing i/p devices, Memory mapped i/o design, Memory wait states & access time. **(06 hours)**

Data communication: Serial I/O data communication, Basic concepts in serial I/O, 8085 serial I/O lines – SID & SOD, Synchronous & asynchronous data communication, Software controlled asynchronous serial I/O. **(06 hours)**

Interfacing to 8085 Microprocessor: PPI – 8155 I/O & timer, PPI – 8255 (mode-0, 1, 2 & BSR), PID 8279 keyboard/display interface, PIC 8259, DMA controller 8257/8237. **(05 hours)**

BOOKS RECOMMENDED:

1. Microprocessor Architecture Programming & App. - Ramesh Gaonkar
2. Introduction to Microprocessor - Aditya P. Mathur
3. The Intel Microprocessor - Brey
4. Fundamental of Microprocessor & Microcomputers - B. Ram
5. Microprocessor and Interfacing - D.V. Hall

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: BCE-511

COURSE TITLE: BASIC CIVIL ENGINEERING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Explain various traditional and emerging materials in the field of civil engineering construction and the process of manufacture of cement.
CO2	Explain the basic concepts and various type of Foundations.
CO3	Interpret the basic concepts of stress, strain, different types of loading. Draw shear force and bending moment diagrams and analysis of transmission towers

Detailed Syllabus

Section- A

Building stone: - Origin, Classification and Engineering Properties. Essential requirements and selection of good building stones for various works in Civil Engineering. Dressed stones and their role in Export market.

Portland cement:-Methods of manufacture of Portland cement, various types of Cement and their use. Engineering Properties of Cement, Storage and Testing. **(08 hours)**

Foundations: - Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Piers, Machine Foundations, Causes of failure. Excavation of Foundations in water logged sites. Pile Foundation, Concrete Piles, Pile Driving. **(08 hours)**

Section- B

Strength of Material: Simple Stresses and Strains, Hooks law. Strain Energy, Stresses due to different type of loadings, gradually& suddenly applied loads. Shear force and Bending Moment for simply supported, cantilevers, fixed beam, and continuous beams. Stresses in beams, Theory of simple bending, Neutral axis, and Bending stress distribution. **(08 hours)**

Towers: Analysis and design of Transmission line and Towers, Types of Bracing patterns-sag and Tension calculations, Substation structures, Tower foundations- Design of Foundations for towers, Structural Design of Supports for foundation Excavation and design of ground Anchors. **(07 hours)**

BOOKS RECOMMENDED:

1. Building Material - Sushil Kumar
2. Building Material - Prabin Singh
3. Analysis of Structures - O.P.Jain
4. Transmission line structures - Santha Kumar

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 0**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: NCC-503

COURSE TITLE: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**0**	**0**	**Satisfactory/unsatisfactory**	

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	The students shall be able to know about the Vedic philosophy in detail and its relevance in present scenario.
CO2	The students will be able to strengthen their mind and body through the knowledge of yoga.

Detailed Syllabus

Unit 1

Vedic Philosophy: Concept of Vedas, Ethics & Values, Educational system, Knowledge of science, trade/commerce & medicines as per Vedas, Environmental ethics: Preservation & Purification, Harnessing of natural resources in alienation with nature as per Vedas.

Unit 2

Yoga Philosophy: Parts of Yoga, Importance of Yam and Niyam, Stress management through yoga, Purification of mind and body through yoga .

Note for Teacher: The course should aim at enlightening students with the importance of ancient traditional knowledge.

Evaluation of the course: There will be internal evaluation based on two internal sessional and viva -voce.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: MOC -503

COURSE TITLE: SWAYAM/NPTEL

DURATION OF EXAM: 3 HOURS

L	T	P	Marks Internal
3	0	0	100

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course 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 teacher in charge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: - In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PIT-503

COURSE TITLE: Industrial Training

CREDIT: 1

L	T	P	Marks Practical
0	0	0	50

The students are required to take practical training during summer vacations for about 4 to 6 weeks duration in PSUs/Private Industries/DRDO/ISRO/BARC/Power Grid Corporation /Power Stations/Electric sub-stations/ Practical Training Centre etc. After completion of the training, the students should submit a training report along with the certificate issued by the Concerned Department for evaluation purpose.

Guidelines for evaluation of Practical Training:

The evaluation shall be done by the departmental committee by the end of 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

1. Report = 32 40%
2. Viva-Voce = 24 30%
3. Miscellaneous Marks = 24 30%

Due weightage will be given, those who have undertaken outside the state &based on the profile of the Industry.

Award of the Marks: Marks (1), (2) & (3) will be awarded by the committee constituted for the purpose.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -511
COURSE TITLE: POWER SYSTEM-I LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Understand the D.C distribution system
CO2	Determine the various parameters of transmission lines.
CO3	Understand types of overhead line conductors, insulators and corona formation

Lab Experiments:

Experiment 1 Various types of d.c distributors can be studied by using DC Network Analyzer.

Experiment 2 To study the radial distribution fed at one end and calculates the various load currents using trainer module.

Experiment 3 To study the ring main d.c distribution fed at one end and calculates the various load currents using trainer module.

Experiment 4 To determine A, B, C, D Parameters of single phase transmission line using single phase transmission line trainer kit.

Experiment 5 To determine voltage distribution and string efficiency of suspension insulator with and without guard ring.

Experiment 6 Study of all types of overhead line conductors.

Experiment 7 Study of all types of Insulators.

Experiment 8 Study of Corona formation of high voltage overhead lines.

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

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -512
COURSE TITLE: ELECTRICAL MEASUREMENT LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Perform experiments to determine the value of R,L,C and frequency using different bridges.
CO2	Understand various measuring instruments like multimeters, M.C,M.I and dynamometer type instruments.
CO3	To experimentally calibrate energy meter and conversion of galvanometer to voltmeter and ammeter.

Lab Experiments:

Experiment 1 Measurement of resistance using Kelvin's bridge.
Experiment 2 Measurement of resistance using Wheatstone bridge.
Experiment 3 Measurement of inductance using Andersons Bridge.
Experiment 4 Measurement of capacitance using Schering Bridge.
Experiment 5 Measurement of frequency using Weins Bridge.
Experiment 6 Measurement of unknown self-inductance using Maxwell Inductance Bridge.
Experiment 7 To study various types of Multi meters.
Experiment 8 Demonstration of M.C, M.I and Dynamometer type instruments.
Experiment 9 Calibration of single phase energy meter (direct loading).
Experiment 10 Calibration of single phase energy meter (Phantom loading).
Experiment 11 Conversion of galvanometer to voltmeter
Experiment 12 Conversion of galvanometer to ammeter

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

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC -511
COURSE TITLE: Microprocessor LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Write assembly language programs using 8085.
CO2	Perform basic and advanced programming with 8085 instructions.
CO3	Perform programming by interfacing the peripheral ICs with 8085.

Lab Experiments:

Experiment 1 Programs of data transfer group and block transfer of data from Source memory to destination memory.

Experiment 2 Programs on Arithmetic, Logical group of instruction, Multiplication of two unsigned 8 bit number & factorial of a number.

Experiment 3 Programs on time delay & counters.

Experiment 4 Advanced programming such as binary to ASCII, vice versa & BCD addition.

Experiment 5 Study of 8253-Timer & counter interfacing card.

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

ANNEXURE II

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E 6th Semester Electrical Engineering

For Examination to be held in the Year May 2021,2022,2023,2024

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PEE-601	Professional Core Course	Power System-II	2	1	0	50	100	150	3	100%
PEE-602	Professional Core Course	Power Electronics	2	1	0	50	100	150	3	25%
PEE-603	Professional Core Course	Power System Protection	2	1	0	50	100	150	3	100%
EEE-602	Professional Elective Course	Elective-I	2	1	0	50	100	150	3	100%
HMC-601	Humanities and Social Sciences including Management courses	Managerial Economic	3	1	0	50	100	150	4	100%
MOC-603	Massive Open Online Course	Swayam / NPTEL	3	0	0	100	-	100	3	100%
PEE-611	Professional Core Course	Power System-II Lab	0	0	2	50	-	50	1	100%
PEE-612	Professional Core Course	Power Electronics Lab	0	0	2	50	-	50	1	100%
PEE-613	Professional Core Course	Power System Protection Lab	0	0	2	50	-	50	1	100%
PEE-614	Professional Core Course	MATLAB	0	0	2	50	-	80	1	100%
TOTAL			**14**	**5**	**8**	**550**	**500**	**1050**	**23**	

Contact Hours/Week :27

**** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.***

Elective I	
EEE-602 (A)	Power Quality & Facts
EEE-602 (B)	Power System Dynamics & Control
EEE-602(C)	Digital Control System

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-601

COURSE TITLE: POWER SYSTEM-II

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand about the construction and working of different types of underground cables
CO2	Apply symmetrical components technique for symmetrical and unsymmetrical fault analysis
CO3	Understand the concept of per unit representation of power system, over voltages and insulation.

Detailed Syllabus

Section- A

Underground Cables: Construction of cable, insulating materials, types of cables- Mass impregnated, oil filled & gas filled Paper cables, Solid dielectric cables, Gas filled cables, Super conducting cables, Electrostatic stresses in a cable, grading of cables, Insulation resistance of cables, capacitance of single core and three core cables, heating of cables, current carrying capacity of cable. **(08 hours)**

Fault analysis: Symmetrical components, sequence impedance's, sequence networks, unsymmetrical faults: single- line to ground, line-to- line, double line ground faults on unload alternator and on power system, 3 phase short circuits, short circuit capacity of a bus, selection of circuit breakers. **(10 hours)**

Section- B

Per Unit Representation of Power System: Single line diagram, impedance & reactance diagram of a power system, per unit system of calculations of a power system. **(06 hours)**

Over voltages and insulation requirements

Generation of over voltages, lightening phenomenon, protection of power system against over voltage, ground wires, lightening arrestors, concept of insulation coordination, basic impulse insulation level, standard impulse test wave, volt-time curve, location and ratings of lightening arrestors. **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -W.D. Stevenson
2. Power System Analysis - B.R.Gupta
3. Electric Power System - C.L. Wadhwa
4. Power System Engg -Nagrath & Kothari

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-602

COURSE TITLE: POWER ELECTRONICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand fundamental concepts of power electronics, characteristics, series parallel operation, protection and firing circuits of SCR and operation of various thyristor devices
CO2	Analyse various single phase and three phase controlled rectifier circuits with different loads and various commutation techniques.
CO3	Understand the concept of choppers, inverters and cycloconverters.

Detailed Syllabus

Section- A

Introduction: Power electronics system and devices, applications, advantages and disadvantages. Solid state devices SCR**:** Basic theory of Operation, Characteristics: Static & Dynamic, ratings, protection of SCR against overcurrent, overvoltage, high dv/dt , di/dt, snubber circuit, series and parallel operation, gate protection, firing circuit of SCR, SCR gate characteristics, two transistor analogy of SCR, Family of SCR: TRIAC, LASCR, DIAC, PUT, SUS, GTO and UJT.

(09 hours)

Phase controlled rectifiers: Single and three phase, half and full wave, fully controlled and half controlled rectifiers with R L E loads with / without freewheeling diode. **(06 hours)**

Commutation and AC Phase control: Methods of forced commutations: (Class A-F), Operation of Single phase, Half and Full wave AC controller with R & R-L Load, Integral cycle control. **(05 hours)**

Section- B

Choppers: Principle and basic chopper circuits, classification, Steady–state Analysis of chopper circuits, control strategies, Commutation in Chopper circuits. **(07 hours)**

Inverters: Single phase voltage source inverters, voltage control of single phase inverter. **(04 hours)**

Cycloconverters: classification, single phase to single phase cyclo converters with resistive inductive load. **(06 hours)**

BOOKS RECOMMENDED:

1. Elements of Power Electronics -P.S.Bimbra
2. Power Electronics - M.Ramamoorty

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-603

COURSE TITLE: POWER SYSTEM PROTECTION

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand the different components of a protection system.
CO2	Understand the protection schemes for different power system equipment.
CO3	Evaluate fault current and understand over current protection system and circuit breakers

Detailed Syllabus

Section- A

Introduction : Introduction and Components of a Protection System ,Principles of Power System Protection, Relays, Instrument transformers, Circuit Breakers . **(08 hours)**

Protection: Equipment protection schemes, Directional, Distance, and Differential protection. Transformer and Generator protection. Bus bar protection, Bus bar arrangement schemes**.** **(12 hours)**

Section- B

Faults: Faults and Over-Current Protection, Review of Fault Analysis, Sequence Networks. Introduction to Overcurrent Protection and overcurrent relay co-ordination. **(08 hours)**

Circuit Breaker: Principle of arc interruption, recovery and restriking voltage, RRRV, current chopping, vacuum interrupter, SF6, rating and testing of CBs. **(08 hours)**

BOOKS RECOMMENDED:

1. Protective Relaying: Principles and Applications -N.G.Hingorani
2. Electric Power Quality - R.C.Dugan
3. FACTS Controllers in Power Transmission and Distribution - K.R.Padiyar

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (A) (Elective I)

COURSE TITLE: POWER SYSTEM DYNAMICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the problem of power system stability and its impact on the system.
CO2	Analyse linear dynamical systems and use of numerical integration methods.
CO3	Analyse different models of power system components and methods of stability analysis .

Detailed Syllabus

Section- A

Introduction to Power System Operations: Introduction to power system stability. Power System Operations and Control. Stability problems in Power System. Impact on Power System Operations and control. **(08 hours)**

Analysis of Linear Dynamical System and Numerical Methods Analysis of dynamical System, Concept of Equilibrium, Small and Large Disturbance Stability. Modal Analysis of Linear System. Analysis using Numerical Integration Technique. **(10 hours)**

Section- B

Modelling of other Power System Components: Modelling of Transmission Lines and Loads. Transmission Line Physical Characteristics. Transmission Line Modelling. Load Models - induction machine model. Frequency and Voltage Dependence of Loads. **(10 hours)**

Stability Analysis: Angular stability analysis in Single Machine Infinite Bus System. Angular Stability in multi machine systems – Intra-plant, Local and Inter-area modes. Frequency Stability: Centre of Inertia Motion. Load Sharing: Governor Droop. Single Machine Load Bus System: Voltage Stability. Introduction to Torsional Oscillations and the SSR phenomenon. **(08 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -K.R.Padiyar
2. Power System Analysis - P.Kundur
3. Power System Dynamics - Sauer

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (B) (Elective I)

COURSE TITLE: POWER QUALITY AND FACTS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the characteristics of ac transmission and the effect of shunt and series reactive compensation.
CO2	Understand the working principles of FACTS devices and their operating characteristics.
CO3	Understand the voltage source converters based controller and power quality problems

Detailed Syllabus

Section- A

Transmission Lines : Series/Shunt Reactive Power Compensation Basics of AC Transmission**.** Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Series and Shunt Compensation. **(08 hours)**

Thyristor-based (FACTS) Description and Characteristics of Thyristor-based FACTS devices: Static VAR Compensator (SVC), Thyristor Controlled Series Capacitor (TCSC), fault current limiter **(08 hours)**

Section- B

Voltage Source Converter based (FACTS) controllers: Voltage Source Converters (VSC): Six Pulse VSC, STATCOM: Principle of Operation, Reactive Power Control: Type I and Type II controllers, Static Synchronous Series Compensator (SSSC) and Unified Power Flow Controller (UPFC): Principle of Operation and Control. **(08 hours)**

Power Quality Problems in Distribution Systems: Power Quality problems in distribution systems: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions, Wave-form Distortions: harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement. Unified power quality conditioner (UPQC),: Working principle , capabilities and control strategies. **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -K.R.Padiyar
2. Electrical Power Systems Quality -R.C.Dugan
3. Electric Power Quality - G.T.Heydt

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023, 2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (C) (ELECTIVE-I)

COURSE TITLE: DIGITAL CONTROL SYSTEMS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Obtain discrete representation of LTI systems, analysis of z – transform and stability of discrete system.
CO2	Analyse state space approach for discrete-time systems
CO3	Understand the design of digital control system and discrete output feedback control.

Detailed Syllabus

Section- A

Discrete Representation of Continuous Systems: Basics of Digital Control Systems. Discrete representation of continuous systems. Sample and hold circuit. Mathematical Modelling of sample and hold circuit. Effects of Sampling and Quantization. Choice of sampling frequency. ZOH equivalent. **(08 hours)**

Discrete System Analysis: Z-Transform and Inverse Z Transform for analysing discrete time systems. Pulse Transfer function. Pulse transfer function of closed loop systems. Mapping from s-plane to z plane. Solution of Discrete time systems. Time response of discrete time system. **(06 hours)**

Stability of Discrete Time System: Stability analysis by Jury test. Stability analysis using bilinear transformation. Design of digital control system with dead beat response. **(04 hours)**

Section- B

State Space Approach for discrete time systems: State space models of discrete systems, State space analysis. Lyapunov Stability. Controllability, reach-ability, Reconstructibility and observability analysis. Effect of pole zero cancellation on the controllability & observability. **(08 hours)**

Design of Digital Control System: Design of Discrete PID Controller, Design of discrete state feedback controller. Design of set point tracker. Design of Discrete Observer for LTI System. Design of Discrete compensator. **(06 hours)**

Discrete output feedback control: Design of discrete output feedback control. Fast output sampling (FOS) and periodic output feedback controller design for discrete time systems. **(04 hours)**

BOOKS RECOMMENDED:

1. Digital Control Engineering - K. Ogata
2. Digital Control Engineering - M. Gopal
3. Digital Control of Dynamic Systems - G. F. Franklin
4. Digital Control System - B.C. Kuo

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: HMC-601

COURSE TITLE: MANAGERIAL ECONOMICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand about business environment of a country after acquiring good knowledge about micro economic concepts such as demand & utility analysis, consumer behavior, demand forecasting techniques and shall be a good decision maker.
CO2	Suggest producing the product at minimum cost by studying in detail about the cost curves and market structures.
CO3	Have knowledge of macroeconomics concepts such as, index numbers, business cycle, banking, inflation etc. and will be able to apply them in day to day life.

Detailed Syllabus

Section- A

Meaning and Importance of Managerial Economics: Introduction, Meaning, Scope of Managerial Economics, Role and responsibilities of managerial economist, Relationship of managerial economics with other disciplines: Importance of Managerial Economics in decision making, the basic process (steps) of decision making **(05 hours)**

Demand Analysis*:* Introduction, Meaning of demand and Law of Demand, factors affecting demand; exceptions to the law of demand; Elasticity of Demand (Price, income and cross elasticity of demand) **(06 hours)**

Consumer Behaviour: Cardinal utility analysis: 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).

(05 hours)

Demand Forecasting: Introduction, Meaning and importance of demand Forecasting: Methods or Techniques of Demand Forecasting, Survey Methods, Statistical Methods, Demand Forecasting for New Products. **(04 hours)**

Section- B

Production and cost Analysis: Meaning of Production function, Isoquants (meaning and properties)law of variable proportions, law of returns to scale, Cost Analysis: Concept of Fixed, Variable, Total, Average & Marginal Costs &their relationships in short run. **(06 hours)**

Market structure and pricing decisions - Introduction, Perfect Competition, monopoly (Price-Output Determination under Perfect Competition and monopoly in short run and long run); kinked demand curve analysis of price stability(Sweezy'smodel) . **(05 hours)**

Macro-Economic Environment: Index Numbers-Meaning, construction and difficulties in measurement of Index number and its uses: meaning and phases of Trade /business cycle. **(05 hours)**

Banking and inflation-Functions of central bank and methods of credit control: functions of Commercial bank and methods of credit creation, Inflation(Types, effects and methods to control inflation). **(06 hours)**

BOOKS RECOMMENDED:

1. Modern Economic Theory - K.K.Dewett
2. Advance Economic Theory - H. L. Ahuja
3. Macro-Economic Theory - M.L.Jhinagn
4. Business Economics/Advanced Eco. Theory -P.N.Chopra
5. Managerial Economics -D,N,Dwivedi
6. Modern microeconomics A.Koutsoyianni

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: MOC-603

COURSE TITLE: SWAYAM/NPTEL

DURATION OF EXAM: 3 HOURS

			Marks
L	T	P	Internal
3	0	0	150

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course 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 teacher in charge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: - In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -611
COURSE TITLE: POWER SYSTEM-II LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Measure the capacitance and charging current in three core underground cable and study of various underground cables.
CO2	Find the fault location using Murray loop bridge and determine the positive, negative and zero sequence impedance of 3 phase transformer.
CO3	Calculate fault currents for transmission lines.

Lab Experiments:

Experiment 1 To study the various types of underground cables.

Experiment 2 To measure the core capacitance, core to earth capacitance and charging current in three core underground cable.

Experiment 3 To find cable fault location using Murray loop bridge.

Experiment 4 To determine the positive, negative and zero sequence impedance of 3 phase transformer using 3 phase transformer.

Experiment 5 To analyse and calculate different fault currents that occurs due to the introduction of faults (L-G, L-L, L-L-G) in short transmission lines using 3 phase fault analysis trainer kit.

Experiment 6 To analyse and calculate different fault currents that occurs due to the introduction of faults(L-G, L-L, L-L-G) in medium transmission lines using 3 phase fault analysis trainer kit.

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

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -612
COURSE TITLE: POWER ELECTRONICS LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Study the different characteristics of IGBT.
CO2	Perform the operation of half and fully controlled bridge rectifier with different loads.
CO3	Study the commutation techniques, operation of AC voltage regulator and cycloconverters.

Lab Experiments:

Experiment 1 To study the V-I Characteristics of IGBT(Insulated Gate Bipolar Transistor).

Experiment 2 To study the Transfer Characteristics of IGBT(Insulated Gate Bipolar Transistor).

Experiment 3 To study the operation of fully controlled bridge Rectifier with R Load.

Experiment 4 To study the operation of fully controlled bridge Rectifier with R-L load.

Experiment 5 To study the operation of Half controlled bridge Rectifier with R-load.

Experiment 6 To study the operation of Half controlled bridge Rectifier with R-L load.

Experiment 7 To study various Forced Commutation Techniques in all the four Classes A, B, C & D.

Experiment 8 To study single phase AC Voltage Regulator.

Experiment 9 To study the operation of Cyclo converter.

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

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -613
COURSE TITLE: POWER SYSTEM PROTECTION LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	To Study the characteristic , working and testing of different relays.
CO2	To study the characteristic of fuse wires and MCBs of different ratings.
CO3	To measure the PT Ratio and phase error using test set and dielectric strength of transformer oil.

Lab Experiments:

Experiment 1 To study the characteristic of static over current relay.

Experiment 2 To study the characteristics of electromechanical over current relay.

Experiment 3 To study the working of Bucholz relay.

Experiment 4 To study the different types of single phase relay test set

Experiment 5 To study the characteristics of fuse wires of different ratings.

Experiment 6 To study the characteristics of MCBs of different ratings.

Experiment 7 To measure PT Ratio & Phase Error by using the PT Test set.

Experiment 8 To measure the dielectric strength of oil using oil testing set.

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

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -614
COURSE TITLE: MATLAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	To study the MATLAB fundamentals
CO2	To study the characteristic of Plotting Commands
CO3	To study and measure the analysis of Direct Current and transient analysis

Lab Experiments:

Experiment 1 To study the Matrix operations

Experiment 2 To study the Array operations

Experiment 3 To study the Complex numbers

Experiment 4 To study the Graph functions

Experiment 5 To study the X-y plots and annotations

Experiment 6 To study the Logarithmic and polar plots

Experiment 7 To study the Nodal analysis

Experiment 8 To study the Loop analysis

Experiment 9 To study the Maximum power transfer

Experiment 10 To study the RC Network

Experiment 11 To study the RL Network

Experiment 12 To study the RLC Circuit

NOTE: **Additional Lab experiments/practical's will be performed based on the course contents requirement.**

UNIVERSITY OF JAMMU **Annexure-1**

COURSE SCHEME

B.E 7TH SEMESTER ELECTRICAL ENGINEERING

For Examination to be held in the Year Dec. 2021, 2022, 2023, 2024

Contact Hours/ Week: 28 Hours

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PEE-701	Professional Core Course	Power System-III	2	2	0	50	100	150	3	100%
PEE-702	Professional Core Course	Electronics Measurement	2	2	0	50	100	150	3	100%
EEE-701	Professional Elective Course	Elective-I	2	2	0	50	100	150	3	100%
HMC-701	Humanities	Elective-II	2	2	0	50	100	150	4	100%
SIT-702	Summer Industry Internship	Industrial Training	–	–	–	50	–	50	1	100%
SEM-702	Seminar	Seminar	0	0	4	50	-	50	1	100%
PEE-711	Professional Core Course	Power System III Lab.	0	0	2	50	–	50	1	100%
PEE-712	Professional Core Course	Electronics Measurement Lab.	0	0	2	50	–	50	1	100%
ECO-711	Open Elective Course	Matlab Programming	0	0	2	50	-	50	1	100%
CSO-713		Programming Lab								
ITO-714		Linux Shell Programming								
MEO-715		Theory of Machine Lab								
CEO-716		Basic Civil Testing Lab								
NCC-702	Non-Credit Course	Energy Resources	2	0	0	Satisfactory/Unsatisfactory			-	100%
TOTAL			**10**	**8**	**10**	**450**	**400**	**850**	**18**	**100%**

Elective-I	
EEE-701 (A)	Electrical Utilization
EEE-701 (B)	Energy Economics
EEE-701 (C)	Power System operation & control

Humanities (Elective-II)	
HMC-701 (A)	Industrial Engineering & Production Management
HMC-701 (B)	Business Environment and Project Management

Note:- The students will have a choice to choose between Elective Courses and open elective courses of their choice.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CREDITS: 3

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-701
TITLE: Power System-III
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS THEORY	MARKS SESSIONAL
2	2	0	100	50

Course Outcomes: Student will be able to	
CO1	Compute Y bus and Z bus matrices for power system networks.
CO2	Formulate the power flow problem and solving the same by using different methods.
CO3	Acquire the knowledge of transient stability.
CO4	Acquire knowledge of optimal power system.

SECTION-A

Module1: Network Equations: Introduction, Formation of Y bus and Z bus matrices. (6 hrs)

Module2: Load flow studies: Introduction, Gauss- Siedel method, Netwon-Raphson method, Decoupled load flow studies, comparison of load flow methods. (10 hrs)

SECTION-B

Module3: Power System stability: Introduction to stability, Simplified synchronous machine model and system equivalent, Power Angle curve, Swing equation, Equal area criterion, Numerical integration of Swing Equation, Multi Machine Stability, Methods for improving transient stability. (9 hrs)

Module4: Optimum Power System: Introduction, Optimal operation of generators on a bus bar, Optimal unit commitment, Optimal generation scheduling, Surge performance of transmission lines. (9 hrs)

RECOMMENDED BOOKS:

1. Power System Analysis — Stevenson
2. Power System Analysis — Nagrath & Kothari
3. Electrical Power — Bhatnagar/ Soni
4. Electrical power system — C.L Wadhwa
5. Power System Analysis & Design — B.R Gupta

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

Examination to be held in the Dec 2021, 2022, 2023, 2024

CREDITS: 3

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-702

TITLE: ELECTRIONICS MEASUREMENT
DURATION OF EXAM: 3 HOURS

			MARKS	
L	**T**	**P**	**THEORY**	**SESSIONAL**
2	**2**	**0**	**100**	**50**

Course Outcomes: Student will be able to	
CO1	**Acquire knowledge about magnetic measurement and signal analysers.**
CO2	**Acquire knowledge about oscilloscopes**
CO3	**Know about different types of phase and frequency meters**
CO4	**Acquire knowledge about Transducers and High voltage Measurement.**

SECTION-A

Module 1: Magnetic Measurements: Determination of B-H curve Determination of hysteresis loop, Measurement of Iron losses, Iron loss curves, separation of losses (4 hrs)

Module 2: Signal Analyzers: Introduction, Wave Analyzers:- Frequency selective wave analyzer, Heterodyne wave Analyzer, Harmonic Distortion Analyzers, Total Harmonic distortion, Spectrum Analyzers:- Basic Spectrum analyzer, spectral Displays, Spectra of different signals. (6 hrs)

Module 3: Oscilloscopes: Introduction: CRO, Cathode ray tube, Block diagram of CRO, Electostatic deflection ,Oscilloscope amplifiers, delay line, sweep modes, vertical input and sweep generator signal synchronization, Dual trace Oscilloscopes, , Measurement of frequency & phase. (8 hrs)

SECTION-B

Module 4: Power Factor Meters: Single-phase and three phase Electrodynamometer power factor meter, Moving iron power factor meters. Frequency meters; Mechanical resonance type frequency meter. Weston type frequency meter, Ratiometer type frequency meter, Saturable core type frequency meter. (6 hrs)

Module 5: Transducers: Introduction, Principles of operation, Classification of transducers, Summary of factors influencing the choice of transducers, Strain Gauge theory, LVDT, Thermocouple, photoelectric transducers. (6hrs)

Module 6: High Voltage Measurements: Measurement of direct, alternating and impulse voltages by electrostatic voltmeters, sphere gap, uniform field gap, ammeter in series with high voltage resistors and voltage divider. (5hrs)

Recommended Books:

1. Electrical Measurements — Golding
2. Electronics Measurements — Petit &Terman
3. Electronic Instrumentation — J.A. Alloca
4. Electronic Instrumentation — B.H. Oliver & J.M. Cage
5. Electrical and Electronic Measurement — A.K Sawhney

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

Examination to be held in the May 2022, 2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EEE- 701(A)

TITLE: ELECTRICAL UTILIZATION
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS: THEORY	MARKS: SESSIONAL
2	2	0	100	50

COURSE OUTCOMES: Student will be able to	
CO.1	Choose a right electric drive for a particular application.
CO.2	Figure-out the different schemes of traction and its main components.
CO.3	Understand various types of Heating and welding systems and maintain various electric heating and welding equipments used in industries.
CO.4	Design Illumination systems for various applications.

SECTION-A

Module 1: Electrical Utilization: (a) Braking of Motors. (b) Choice of Motors (8 hrs)

Module 2: Traction: Various system of electric traction, feeding of distribution systems, traction motors, series parallel control of train movement, mechanical consideration, trolleys and trams. Electrical cranes and passenger lifts. (9hrs)

SECTION-B

Module 3: Heating and welding: Resistance ovens, inductor and dielectric heating, Arc furnaces, Electrical Welding and methods of control. (9 hrs)

Module 4: Illumination: Nature and production of light. Photometric definitions. Incandescent lamps, arc and discharge lamps. Design of illumination schemes for indoor and outdoor uses. Flood lighting. (9 hrs)

RECOMMENDED BOOKS:

1. Utilization of Electrical Energy H. Pratap
2. Utilization of Electrical Energy J.B. Gupta

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. Use of calculator is allowed

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EEE- 701(B) **MARKS**

	L	T	P	THEORY	SESSIONAL
TITLE: ENERGY ECONOMICS					
DURATION OF EXAM: 3 HOURS	**2**	**2**	**0**	**100**	**50**

Course Outcomes: Student will be able to	
CO1	**Understanding of economic and ability to apply economic and financial evaluation of energy projects.**
CO2	**Learn different economic models and statistical approaches can be deliberated**
CO3	**Familiar with tools of Decision making and uncertainty in the technology implementation**
CO4	**To provide relevant inputs on energy economy-environment interaction related policy studies.**

SECTION-A

Module 1: Introduction: System economics, Reference energy systems, Econometrics, Statistical approach, Langrangian multiplier, Input–output economics, Macroeconomic growth models. (8 hrs)

Module 2:- Economics fundamentals: Simple Payback Period, IRR, NPV, Life Cycle Costing, Cost of Saved Energy, Cost of Energy generated, Examples from energy generation and conservation, Energy Chain, Primary energy analysis and Life Cycle Assessment . (9 hrs)

SECTION B

Module 3:- Energy and Economics:- Introduction , sector wise consumption of energy resources: Electricity-Fuel-Transportation, Energy Scenario and supply position of different energy sectors: Indian and International Level – Coal, Oil, Natural Gas, RE, Hydro, Nuclear (9 hrs)

Module 4: Demand Forecasting: Simple and advanced Techniques, Econometric Approach to Energy Demand Forecasting, End-Use Method of Forecasting, Input–Output Model, Scenario based approach, ANN based approach, Hybrid Approach, Energy Demand Analysis. (8 hrs)

RECOMMENDED BOOKS:

1. Bhattacharyya, Subhes C. Energy economics: concepts, issues, markets and governance. Springer Science & Business Media, 2011, ISBN 978-0-85729-268-1.
2. Financial evaluation of renewable energy technologies, a book by TC Kandpal, 1982.
3. Zweifel, Peter, Aaron Praktiknjo, and Georg Erdmann. Energy economics: theory and applications. Springer, 2017
4. Aris Spanos, “Statistical Foundations of Econometric Modelling” Cambridge University Press.

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

Examination to be held in the Dec 2021, 2022, 2023, 2024

CREDITS:3

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EEE-701(C)

TITLE: POWER SYSTEM OPERATION & CONTROL
DURATION OF EXAM: 3 HOURS

			MARKS	
L	**T**	**P**	**THEORY**	**SESSIONAL**
2	**2**	**0**	**100**	**50**

Course Outcomes: Student will be able to	
CO1	**Understand characteristics of power generation units.**
CO2	**Understand solution of unit commitment.**
CO3	**Understand economic dispatch problems.**
CO4	**Understand the power system control and demand side management**

SECTION-A

Module 1: CHARACTERISTICS OF POWER GENERATION UNITS: Characteristics of steam units, Characteristics of hydro-units, Input Output and incremental fuel cost characteristics. (5 hrs)

Module 2: UNIT COMMITMENT: Constraints in unit commitment, solution of the unit commitment Problem by Priority list method and Forward Dynamic Programming Approach. (5 hrs)

Module 3: ECONOMIC DISPATCH: Economic dispatch problem, thermal System dispatching with network losses considered, Base point and participation factors, Line Loss formula (derivation not included). (7 hrs)

SECTION-B

Module 4: POWER SYSTEM CONTROLS: Generator voltage control, Turbine governor control, and load Frequency control, co-ordination of economic dispatching with load frequency control. (9 hrs)

Module5: DEMAND SIDE MANAGEMENT: Introduction, Scope of Demand side management(DSM), DSM Planning and Implementation, Load Management as a DSM Strategy, Application of Load Control, Tariff, Options for DSM, Customer Acceptance, implementation issues, Implementation Strategies, DSM and Environment, International experience with DSM. (9 hrs)

RECOMMENDED BOOKS:

1. Power generation operation and control by A.J.Wood and B.F.Wollenberg, John Wiley & Sons.
2. Power System Engineering by Nagrath& Kothari, TMH.
3. Power System Analysis and Design by B.R.Gupta,
4. Power System Optimization by D.P Kothari, J.S Dhillon

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

Examination to be held in the Dec 2021, 2022, 2023, 2024

CREDITS: 4

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: HMC- 701 (A)

COURSE TITLE: INDUSTRIAL ENGINEERING AND PRODUCTION MANAGEMENT

DURATION OF EXAM: 3 HOURS

	L	T	P	MARKS: THEORY	MARKS: SESSIONAL
	2	2	0	100	50

	At the end of the course, Students will be able to:
CO1	Understand the concept of management and its evolution
CO2	Understand authority relationships. & departmentation.
CO3	Analyse about the concept of HRM, wage payment, job evaluation & job Satisfaction
CO4	Manage about production, planning, control & process design
CO5	Suggest appropriate plant locations and manage layouts according to the need of the organizations and shall be Able to control inventory properly.

SECTION-A

Module 1: Management: Meaning, Characteristics, Objectives, 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. (6 hrs)

Module 2: MBO – Definition, Features, Process, Advantages & Limitations of MBO, Human Resource Management: Concept, Importance, Difference between personnel management and human resource management, Recruitment-Concept, Sources, Importance; Selection: Selection process. (5hrs)

Module 3: 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. (5hrs)

Module 4: 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. (5hrs)

SECTION- B

Module 5: Production Planning and Control: Meaning, Definition, Objectives, Stages, Functions/ scope and factors affecting Production Planning and Control. Advantages of Production Planning and Control, Production Planning System, Role of production planning and control in manufacturing industry. **Just in Time (JIT**) **Production:** Concept, Characteristics, Goals, Components and Elements of JIT Production. (5hrs)

Module 6: Inventory Control: Meaning, Objectives, Classification, Functions of Inventories. Inventory Costs: Simple Economic Order Quantity (EOQ) Model, Good inventory management practices, Inventory planning, Inventory management techniques. (5hrs)

Module 7: Plant Location and layout: Importance, Nature of Plant location, Choice of Site for Plant Location. Plant Layout: Definition, Objectives, Types of layout, Factors influencing Plant Layout, Steps in Plant Layout.

Quality Control: Objectives, Significance, Methods of Quality Control. (5hrs)

Module 8: Production and Process Design: Product Selection, concept and need of Product Design and development, sources of product innovation, characteristics of a good design, Reverse Engineering, Concurrent Engineering, Process Design- Meaning, needs, factors and types, Process Planning Procedure. (6 hrs)

BOOKS RECOMMENDED:

1. George Terry & Stephen G. Franklin –Principles of Management.
2. Harold Koontz & Heinz –Essentials of Management
3. S. A .Sherlekar –Principles of Business Management
4. M. Mahajan –Industrial Engineering & Production Management
5. Dr. Neeru Vasisth –Principles of Management
6. Dr. B. P. Singh & Dr. T. N. Chhabra –Business Organisation & Management

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

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER **CREDITS: 4**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: HMC- 701 (B) **MARKS**

COURSE TITLE: BUSINESS ENVIRONMENT AND PROJECT MANAGEMENT	**L**	**T**	**P**	**THEORY**	**SESSIONAL**
DURATION OF EXAM: 3 HOURS	**2**	**2**	**0**	**100**	**50**

	At the end of the course student will be able to:
CO1	**Understand in detail entrepreneurial skills and hence may opt entrepreneurship as a career option.**
CO2	**Understand problems of women/social entrepreneurs & legal forms of industrial ownership.**
CO3	**Apply proper knowledge about lean start ups, business pitching, project initiation, execution and implementation.**
CO4	**Start their own SSI unit with adequate knowledge of schemes and policies for entrepreneurship development.**
CO5	**deal with entrepreneurship management for small businesses & able to know about capital resources for small businesses and new ventures with social responsibilities.**

SECTION-A

Module 1: Entrepreneurship: Definition and Types of entrepreneurs; Qualities of an entrepreneur; factors affecting entrepreneurship; Role of an entrepreneur in economic development; Difference between entrepreneur and manager; Barriers to entrepreneurship. (5 hrs)

Module 2: New Generations of Entrepreneurship: Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, steps for promoting women entrepreneurship; Social Entrepreneur: Problems and steps for promoting social entrepreneurship.
(6 hrs)

Module 3: Legal Forms of Industrial Ownership: Sole Proprietorship, Partnership, Joint Stock Company (Features, Merits and Demerits); Introduction to business models (4 hrs)

Module 4: Entrepreneurial Behaviour: Entrepreneurial behaviour- Definition, characteristics; Reasons for promoting entrepreneurs; Entrepreneurship and Innovation, Theory of Entrepreneurship: Innovation theory, Psychological theories (Maslow , Mc Clelland and – Achievement motivation); Social change theory; Cultural theory. (5hrs)

SECTION-B

Module 5: Lean Startups: Introduction to lean startups, Business pitching: Definition, types and importance. venture capital financing; angel investors. Securing investors and structuring deals.
(4 hrs)

Module 6: Starting a New project/ Venture: Scanning the environment, product development and selection, project report preparation, project resourcing, project planning and scheduling using networking techniques of PERT/CPM(concepts only). (5 hrs)

Module 7: Small Scale Industries and policies for entrepreneurship development: Definition of small scale industries; objectives. Role of SSI in economic Development of India. SSI registration, NOC from pollution Board; Machinery and equipment selection; Schemes and Policies for entrepreneurship development.
(6 hrs)

Module 8: Entrepreneurial Development Programme : Definition and objective of EDPs, features and functions of a sound EDP**,** Role of support institutions in fostering entrepreneurial development-DIC; SIDO; SIDBI & NSIC (5hrs)

RECOMMENDED BOOKS:

1. Fundamentals of Entrepreneurship, H. Nandan.
2. Alexander Osterwalder& Yves Pigneur, Business model generation
3. Small scale industries and Entrepreneurship, Vasant Desai.
4. Management of small scale Industries; Vasant Desai.
5. Entrepreneurial Development, S S Khanka
6. Entrepreneur Revolution: How to Develop your Entrepreneurial Mindset and Start a Business that works, Daniel Priestley

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

Examination to be held in the Dec 2021, 2022, 2023, 2024

NON- CREDIT

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: NCC-702
TITLE: ENERGY RESOURCES

L	T	P	MARKS: THEORY	MARKS: SESSIONAL
2	0	0		SATISFACTORY/ UNSATISFACTORY

Course Outcomes: Student will be able to	
CO1	Understand the global energy scenario and role of energy in economic development
CO2	Understand about different energy resources available and their consumption and economics
CO3	Working of different energy sources to convert it in other energy and various mechanism used like electricity etc.
CO4	Understand about the cogeneration, Tri-generation and waste heat recovery system

SECTION-A

Module 1: Classification of Energy Sources: Principle fuels for energy conversion: Fossil fuels, Nuclear fuels. Conventional & Renewable Energy (4 hrs)

Module 2: Electricity generation using Renewable Energy Sources: Basic Principles and Applications. Conversion of Electromagnetic energy and natural energy sources like solar radiation, Wind, Ocean waves etc. to electricity. Conversion of chemical energy into electrical energy (fuel cell). (6 hrs)

Module 3: Energy Crisis: Electricity Act-2003 & its features. Framework of Central Electricity Authority (CEA), Central & States Electricity Regulatory Commissions (CERC & ERCs) (6 hrs)

SECTION-B

Module 4: Turbines: Steam turbines, Hydraulic turbines, Wind Turbines. (3 hrs)

Module 5: Co-generation & Tri-generation: Definition, need, application, advantages, classification, saving Potential. (8 hrs)

Module 6: Waste Heat Recovery: Concept of conversion efficiency, energy waste, waste heat recovery classification, advantages and applications, commercially viable waste heat recovery devices. (8 hrs)

Recommended Books:

1. Non Conventional Energy Sources: G.D Rai
2. Direct Energy Conversion : W.R.Corliss
3. Electrical power Generation: J.B Gupta
4. Practical Heat Recovery : Boyen J.L, John Wiley,

NOTE:- There will be internal evaluation based on the two sessional tests each of 30 marks. The out come of the sessional test will be in the satisfactory/unsatisfactory form.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER **CREDITS: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: SIT-702
TITLE: INDUSTRIAL TRAININGING **MARKS**

L	T	P	INTERNAL
0	0	0	50

COURSE OUTCOMES: Students will be able to	
CO.1	**Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.**
CO.2	**Understand the engineering code of ethics and be able to apply them as necessary.**
CO.3	**Demonstrate knowledge of practical application of training.**
CO.4	**Submit a training report along with the certificate issued by the concerned department.**

The students are required to take practical training during summer vacations for about 4 to 6 weeks duration in PSUs/Private Industries/DRDO/ISRO/BARC/Power Grid Corporation /Power Stations/Electric sub-stations/ Practical Training Centre etc. After completion of the training, the students should submit a training report along with the certificate issued by the Concerned Department for evaluation purpose.

Guidelines for evaluation of Practical Training:

The evaluation shall be done by the departmental committee by the end of 7th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

1. Report = 20 40%
2. Viva-Voce = 15 30%
3. Miscellaneous Marks = 15 30%

Due weight-age will be given to those who have undertaken outside the state &based on the profile of the Industry.

Award of the Marks:

Marks (1), (2) & (3) will be awarded by the committee constituted for the purpose

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER **CREDITS: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: SEM-702
TITLE: SEMINAR

			MARKS
L	**T**	**P**	**INTERNAL**
0	**0**	**4**	**50**

COURSE OUTCOMES: Students will be able to	
CO.1	**Select a topic relevant to the field of electrical engineering system.**
CO.2	**Undertake a review of the literature on the chosen topic.**
CO.3	**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 proper survey of literature, 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 at the starting of 7th Semester. The committee shall have a convener and at least two members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 50 marks

1. Project Report = 15 marks
2. Presentation = 25 marks
3. Attendance = 10 marks.

Award of Marks:

- Marks Under (1) will be awarded by the Seminar Incharge.
- Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER **CREDITS: 1**
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-711 **MARKS**

L	T	P	PRACTICAL
0	0	2	50

TITLE: POWER SYSTEM-III LAB

Course Outcomes: Student will be able to	
CO1	**Formulate Y bus and Z bus.**
CO2	**Understand the load flow analysis by GS and NR technique.**
CO3	**Understand transient stability analysis.**
CO4	**Apply equal area criteria for any power system network.**

LIST OF PRACTICALS:

1) To formulate Y bus using appropriate algorithm for at least 4 bus system
2) To develop a program for the formation of Z bus
3) Load flow analysis of a given power system by GS technique
4) Load flow analysis of a given power system by NR technique
5) To study transient stability analysis.
6) To find the critical clearing angle by applying equal area criteria for any power system network

NOTE:

1. At least four practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: PEE-712
TITLE: ELECTRONIC MEASUREMENT LAB

			CREDITS: 1
			MARKS
L	T	P	PRACTICAL
0	0	2	50

Course Outcomes: Student will be able to	
CO1	Measure phase and frequency using CRO
CO2	Measure displacement using LVDT
CO3	Employ strain gauge for measuring pressure
CO4	Determine the temperature using thermocouple

LIST OF PRACTICALS:

1) To observe waveform of a signal on CRO and measure its amplitude and frequency.
2) To measure frequency of an unknown signal using Lissajous patterns on CRO.
3) To study LVDT and plot its response to an application.
4) To study Strain Gauge and plot its response to an application.
5) To plot the characteristics of a Thermistor and calibrate it for temperature measurement.
6) To plot the characteristics of a Thermocouple and calibrate it for temperature measurement.
7) To study the working of a Digital Multimeter.

NOTE:

4. At least five practicals should be performed.
5. Additional labs/ experiment will be performed based on course content requirements.
6. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7th SEMESTER **CREDIT: 1**
BRANCH: ELECTRICAL/MECHANICAL/COMPUTER SCIENCE/CIVIL/IT ENGINEERING
COURSE NO.: ECO-711
COURSE TITLE: MATLAB PROGRAMMING

Hours/ Week			MARKS
L	T	P	PRACTICAL
0	0	2	50

COURSE OUTCOMES

At the end of the course the student will be able to: -	
CO1	Perform various arithmetic calculations.
CO2	Find importance of this software for generating equations of vectors and other mathematical expressions.
CO3	Articulate importance of software's in creating and printing simple,2D &3D plots and execution functions
CO4	Do various library blocks and their interconnections

LIST OF EXPERIMENTS:

1. Study of arithmetic, exponential, Logarithmic, Trigonometric, complex number calculation.

2. To generate equation of straight line, Geometric series, points on circle, multiply, divide and exponential vectors.

3. To create and print simple plots and execution of functions.

4. To generate matrices and vectors, array operations, inline functions anonymous functions etc.

5. To generate functions like execution a function, global variable, structures.

6. To generate 2D, 3D plots.

7. Study of various library blocks and their interconnections.

NOTE:

1. At least five practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7th SEMESTER **CREDIT: 1**
BRANCH: ELECTRICAL/MECHANICAL/E&C/CIVIL/IT ENGINEERING **MARKS**
COURSE NO.: CSO-713 **L T P PRACTICAL**
COURSE TITLE: PROGRAMMING LAB **0 0 2 50**

Course Outcomes: After Completion of this course the student will be able to: -	
CO1	**Remember the role of languages like C++/ Java/Python/HTML & DHTML/Android**
CO2	**Understand the syntax and Develop the programs on specific language.**
CO3	**Implement various programs using C++/Java/Python/HTML.**

Lab Experiments:

Experiment 1	WAP To use different arithmetic operation in java/C++/Python or use different tags in HTML.
Experiment 2	WAP to perform manipulation on strings in java / C++ / Python.
Experiment 3	WAP to demonstrate Exception handling in java / C++.
Experiment 4	Program to create frame and table using HTML
Experiment 5	Design a website on your own using HTML and CSS
Experiment 6	Develop an application representing a simple calculator
Experiment 7	Develop an application for working with notification
Experiment 8	Develop an application for connecting to internet and sending e-mail.
Experiment 9	Develop an application for working with device camera

NOTE:

1. At least seven practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CREDIT:1

CLASS: B.E. 7th SEMESTER

BRANCH: EE/ECE/CSE/ME/CIVIL ENGINEERING

COURSE NO.: ITO-714

COURSE TITLE: LINUX SHELL PROGRAMMING

			Marks
L	**T**	**P**	**Practical**
0	**0**	**2**	**50**

COURSE OUTCOMES

At the end of the course the student will be able to: -	
CO1	Understand Linux commands to manage files and file systems
CO2	Write a shell programs to solve a given problems
CO3	Write Regular expressions for pattern matching and apply them to various filters for a specific task
CO4	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem

LIST OF EXPERIMENTS:

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, Vi editors, wild card characters used in Linux.
2. Write a shell programs to perform operations using case statement such as
    a. 1)Addition 2)subtraction 3)multiplication 4)Division
3. Write a shell scripts to see current date, time username and directory
4. Write a shell programs to find maximum of three numbers
5. Write a script to check whether the given no. is even/odd
6. Write a script to calculate the average of n numbers
7. Write a script to check whether the given number is prime or not
8. Write a script to calculate the factorial of a given number
9. Write a script to calculate the sum of digits of the given number
10. Write a shell script to print file names in directory showing date of creation & serial no. of file.

NOTE:

1. At least seven practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7th SEMESTER **CREDIT:1**

BRANCH: ELECTRICAL/E&C/COMPUTER SCIENCE/CIVIL/IT ENGINEERING

COURSE TITLE: THEORY OF MACHINE LAB

COURSE NO.: MEO-715

DURATION OF EXAMINATION: 3 HOURS.

			MARKS
L	**T**	**P**	**PRACTICAL**
0	**0**	**2**	**50**

COURSE OUTCOMES **At the end of the course student will be able to:**	
CO 1:	**Understand the kinematics of Quick Return Motion.**
CO 2:	**Know about gyroscopic effect.**
CO 3:	**Familiar with various cases of vibrating motion.**
CO 4:	**Describe the mechanics behind the Governors**

LIST OF EXPERIMENTS:

1. Find displacement, velocity and acceleration of slider of the Quick-return motion mechanism.
2. To analyze the motorized gyroscope.
3. To analyze static and dynamic balancing apparatus.
4. To analyze the torsional vibration (undamped) of single rotor shaft system.
5. To analyze various types of cams and followers.
6. To analyze various types of gear trains.
7. To analyze various types of Governors with the help of stroboscope and to determine sleeve displacement, speed of Governor and corresponding radius of Governor in case of:
   i) Watt Governor ii) Porter Governor iii) Proell Governor
8. To analyze Gearbox.
9. To analyze various types of brake systems.
10. To study the phenomenon of whirling of shafts.
11. To study the Coriolis components of acceleration.

NOTE:

1. At least seven practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the Dec 2021, 2022, 2023, 2024

CLASS: B.E. 7th SEMESTER **CREDIT:1**

BRANCH: ELECTRICAL/MECHANICAL/E&C/COMPUTER SCIENCE/IT ENGINEERING

COURSE TITLE: BASIC CIVIL TESTING LAB

COURSE NO.: CE0- 716

DURATION OF EXAMINATION: 3 HOURS.

			MARKS
L	**T**	**P**	**PRACTICAL**
0	**0**	**2**	**50**

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	**Perform tests on bricks and aggregates**
CO2	**Determine the physical properties of cement.**
CO3	**Determine the Workability and Compressive strength of concrete.**
CO4	**Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil**

LIST OF EXPERIMENTS:

1. To determine water absorption and compressive strength of bricks

2. To determine the consistency and initial and final setting time of a given sample of cement using Vicat's apparatus.

3. To determine the Soundness and Compressive strength of cement.

4. To determine the fineness modulus and bulk density of fine and coarse aggregates.

5. To determine flakiness index and Impact value of coarse aggregates.

6. To determine Workability and Compressive strength of concrete

7. To determine the tensile strength of the steel.

8. To determine the Specific gravity and Atterberg limits of Soil.

9. To determine the compaction characteristics of soil by proctor's test.

10. To determine C_d for Venturimeter

11. To determine C_d for Orificemeter

12. To determine C_d for a Notch.

NOTE:

1. At least Eight practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

Annexure-11

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E 8TH SEMESTER ELECTRICAL ENGINEEGING

Examination to be held in the Year May 2022, 2023, 2024, 2025

B.E Electrical Engineering 8TH SEMESTER Scheme- I Contact Hours/ Week: 20 Hours

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
EEE-801	Professional Elective Course	Elective-I	2	1	0	50	100	150	3	100%
MOC-802	Massive Open Online Course	SWAYAM/NPTEL/Any Other MOOC Platform	2	0	0	50	–	50	2	100%
ECO-801 CSO-803 ITO-804 MEO-805 CEO-806 HEO-806	Open Elective	Embeded System Web Technology Python Programming Advanced Manufacturing Processes Essential of Civil Engineering International Economics	2	1	0	50	100	150	3	100%
NCC-802/NCC-806	Non-Credit	Electrical & Hybrid Vehicles/ Disaster Management	2	0	0	Satisfactory/ Unsatisfactory Non- Credit				100%
PRJ-802	Project	Project	0	0	6	150	100	250	6	100%
TOTAL			**8**	**2**	**6**	**300**	**300**	**600**	**14**	**100%**

**** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.***

Elective-I	
EEE-801 (A)	Electrical Drives
EEE-801 (B)	High Voltage Engineering
EEE-801 (C)	EHV AC/DC

Note:- The students will have a choice to choose between Elective Courses and open elective courses of their choice.

OR

B.E Electrical Engineering 8th Semester Scheme-II

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
MOC-802	Massive Open Online Course	SWAYAM/ NPTEL/Any Other MOOC Platform	2	0	0	50	_	50	2	100%
PII-802	Professional Industry Internship	Industry Internship	0	0	2	300	250	550	12	100%
		TOTAL	**2**	**0**	**2**	**350**	**250**	**600**	**14**	**100%**

The students are required to take practical training during 8th semester about 4- 6 months duration in PSUs/Private Industries /Power Grid Corporation /Power Stations/Electric sub-stations/ Practical Training Centre etc. After completion of the training, the students should submit a training report along with the certificate issued by the Concerned Department for evaluation purpose.

Examination to be held in the May 2022,2023, 2024, 2025

CLASS: B.E. 8TH SEMESTER **CREDITS: 3**
BRANCH: ELECTRICAL ENGINEERING **MARKS**
COURSE CODE: EEE-801(A)
TITLE: ELECTRICAL DRIVES
DURATION OF EXAM: 3 HOURS

L	T	P	THEORY	SESSIONAL
2	1	0	100	50

Course Outcomes: Student will be able to	
CO1	Understand the electric drive system.
CO2	Understand the electric drive control and motor rating and duty.
CO3	Understand the principles of speed-control of dc motors and induction motors.
CO4	Understand the power electronic converters and special purpose drives

SECTION-A

Module 1: **Introduction to an electric drive system**: Dynamic equation of an electric drive, torque equation, multi quadrant operation, types of loads, energy loss during transient and load equalization (8 hrs)

Module 2: **Control of Electric Drives:** Speed control, closed loop position and speed control. Selection of motor rating thermal model of motor, classes of duty and determination of motor rating for different classes duty. (9 hrs)

SECTION-B

Module 3: **DC Motor Drives:** Starting, braking, transient analysis, speed control, controlled rectifier converters for DC drives and chopper fed DC drives. (8 hrs)

Module 4:**Induction Motor Drives:** Starting, braking, transient analysis, speed control, ac controller fed induction motor, voltage source inverter, current source inverter and cylco-converter fed induction motor drive. (9 hrs)

RECOMMENDED BOOKS:

1. G. K. Dubey, “Power Semiconductor Controlled Drives”, Prentice Hall, 1989.
2. R. Krishnan, “Electric Motor Drives: Modeling, Analysis and Control”, Prentice Hall, 2001.G. K. Dubey, “Fundamentals of Electrical Drives”, CRC Press, 2002
3. Electrical Drives by S.K Pillai
4.

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

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EEE-801(B)
TITLE: HIGH VOLTAGE ENGINEERING
DURATION OF EXAM: 3 HOURS

MARKS				
L	**T**	**P**	**THEORY**	**SESSIONAL**
2	**1**	**0**	**100**	**50**

Course Outcomes: Student will be able to	
CO1	**Understand discharge in gases**
CO2	**Understand breakdown of solids and liquids.**
CO3	**Understand lightning phenomenon.**
CO4	**Understand impulse generator**

SECTION-A

Module 1:DISCHARGES IN GASES: General characteristics of gaseous insulation, basic processes of ionization in a gas, discharges in uniform and non-uniform fields, Paschen's law, commonly used gases for insulation and their properties. (8 hrs)

Module 2: BREAKDOWN OF SOLIDS AND LIQUIDS: Different mechanisms of breakdown of solids, Intrinsic breakdown, theories of intrinsic breakdown, different theories of breakdown in liquids, commonly used solid and liquid insulating materials and their properties. (9 hrs)

SECTION-B

Module 3:LIGHTNING PHENOMENON: Charge accumulation in clouds – formation of lightning stroke, characteristics of lightning stroke, current and voltage magnitudes, protection of transmission lines and substations against lightning, lightning arrestors, switching surges, Insulation co-ordination. (9 hrs)

Module 4: IMPULSE GENERATOR: Definition of impulse wave, single stage and multistage impulse generators and equivalent circuits, determination of front and tail resistance to produce a given wave shapes. (8 hrs)

RECOMMENDED BOOKS:

1. High Voltage Engineering byM.S.Naidu&V.Kamaraju.
2. Power System Transients and High Voltage Principles –by B.Thapar, B.R.Gupta&L.K.Khera.
3. High Voltage Engineering – by C.L.Wadhwa.
4. A course in Electrical power by Soni, Gupta, Bhatnagar.
5. D.C.transmission by E.W.Kimbark, Wiley Publication

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

Examination to be held in the May 2022,2023, 2024, 2025

CREDIT:3

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: EEE-801(C)

TITLE: EHV AC/DC
DURATION OF EXAM: 3 HOURS

			MARKS	
L	**T**	**P**	**THEORY**	**SESSIONAL**
2	**1**	**0**	**100**	**50**

Course Outcomes: Student will be able to	
CO1	**Understand the concept of EHV AC Transmission and voltage onconductors**
CO2	**Understand the concept of radio interference and audible noise**
CO3	**Understand the concept of HVDC system**
CO4	**Understand different types of Converters**

SECTION-A

Module 1: Introduction to EHVAC Transmission- Role of EHVAC transmission and Indian Scenario, standard transmission voltages, average values of line parameters, power handling capacity and line loss. (4 hrs)

Module 2 : Voltage Gradients of Conductors- Electrostatics, surface voltage gradient on conductors, Corona (5 hrs)

Module3: Radio Interference and Audible Noise- Nature of RI and its unit of measurement, generation of RI, propagation of RI waves, Audible noise: Generation and characteristics, limit for audible noise. (6 hrs)

SECTION-B

Module4:HVDC System Control- Introduction to HVDC and Indian Scenario, Principles of DC Link control, Converter control characteristics, Firing angle control, Current and Extinction angle control, Starting and stopping of dc link (9 hrs)

Module5: Line commutated and Voltage Source Converters-Introduction, Line commutated converter: Analysis of graetz bridge neglecting overlap, Voltage Source Converters : Basic two level (Graetz Bridge) Converter Corona , Radio interference and audible noise. (9 hrs)

RECOMMENDED BOOKS:

1. EHV-AC Transmission — Beghamudrae
2. EHV-AC, HVDC Transmission & Distribution Engineering — S.Rao
3. HVDC Power Transmission Systems — K.R. Padiyar

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

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS:2

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING **MARKS**
COURSE CODE: MOC-802

	L	T	P	
				50
TITLE: SWAYAM/NPTEL/Any other MOOC Platform	**2**	**0**	**0**	

The student shall select a MOOC of duration 4-6 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 MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC 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.

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 8th SEMESTER

BRANCH: CSE/EE /ME/CIVIL/IT ENGINEERING

	L	T	P	Marks: Theory	Marks: Sessional
COURSE TITLE: EMBEDED SYSTEM	**2**	**1**	**0**	**100**	**50**

COURSE NO.: ECO-801

DURATION OF EXAMINATION: 3 HOURS.

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	**Understand the concept of Microcontroller 8051, learn to write simple programs.**
CO2	**Understand the concept and applications of DC motor and indicators and use in project work.**
CO3	**Understand the concept of hardware details of ARM7.**
CO4	**Write the algorithm and design a system based on 8051.**

SECTION–A

Module 1: Definition of Embedded system, macro and micro embedded systems: Architecture of 8031/8051/8751. Comparison of Microprocessors and Microcontroller Data types and Directives. Pin description 0f 8051, I/O port functions, Time Delay Generation and calculation. Addressing modes, Logic instructions and programs, single bit instructions and programs, (11 hrs)

Module 2: Programming using 8051 timers, counter programming, simplex, half duplex, full duplex transmission, synchronous and asynchronous communication. (6hrs)

SECTION–B

Module 3: Architecture: Block Diagram and Pin Diagram of ARM7, Instruction Set, Addressing Modes ARM Processor. System Design based on 8051/ARM Processor. (7hrs)

Module 4: Peripheral Interfaces: LCD, Seven Segment Display, Sensor: IR, temperature. Relays, analog to digital converter, digital to analog converter interfaces with 8051 and ARM7. (8hrs)

RECOMMENDED BOOKS:

1. The 8051 Microcontroller (architecture, Programming and Applications) Kenneth J. Ayala------Penram International
2. The 8051 Microcontroller and Embedded Systems Muhammed Ali Mazidi& Janice GillispieMazdi
3. ARM system development guide Andrew-n-sloss & Dominic Symes Publisher –Morgan Aausamann

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

Examination to be held in the May 2022,2023, 2024, 2025

CLASS: B.E. 8th SEMESTER **CREDITS: 3**

BRANCH: ECE/EE /ME/ CIVIL/IT ENGINEERING

COURSE CODE: CSO-803

COURSE TITLE: WEB TECHNOLOGY

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Theory	Sessional
2	1	0	100	50

Course Outcomes: Student will be able to	
CO 1	Remember the role of languages like HTML, DHTML, CSS and android
CO2	Analyze a web page and identify its elements and attributes.
CO3	Implement web pages using HTML, DHTML and Cascading Style Sheets.
CO4	Develop Web applications using HTML/CSS/Javascript.

SECTION-A

Module 1: Introduction to WWW: Protocols and programs, Secure connections, Application and development tools, The web browser, What is server, Choices, Dynamic IP. Web Design: Web site design principles, Planning the site and navigation. **(6 Hours)**

Module 2: Introduction to HTML: The development process, HTML tags and simple HTML forms, Web site structure. Introduction to XHTML: XML, Move to XHTML, Meta tags, Character entities, Frames and frame sets, Inside browser. **(7 Hours)**

Module 3: Style Sheets: Need for CSS, Introduction to CSS, Basic syntax and structure, Using CSS, Background images, Colors and properties, Manipulating texts, Using fonts, Borders and boxes, Margins, Padding lists, Positioning using CSS, CSS2. **(7 Hours)**

Javascript:- Client side scripting, What is Javascript, How to develop Javascript, Simple Javascript, variables, Functions, Conditions, Loops and repetition. **(3 Hours)**

SECTION-B

Module 4: Advance script: Javascript and objects, Javascript own objects, The DOM and web browser environments, forms and validations.

Module 5: DHTML: Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages & disadvantages ,Purpose of it ,ajax based web application, alternatives of ajax. **XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and schemas, Well formed, using XML with application XML, XSL and XSLT, Introduction to XSL, XML transformed simple example, XSL elements, Transforming with XSLT. **(7 Hours)**

PHP: Starting to script on server side, Arrays, Function and forms, Advance PHP.

Module 6: Databases: Basic command with PHP examples, Connection to server, Creating database, Selecting a database, Listing database, Listing table names, Creating a table, Inserting data, Altering tables, Queries, Deleting database, Deleting data and tables, PHP myadmin and database bugs. **(10 Hours)**

BOOKS RECOMMENDED:

1. "HTML Black Book" Steven Holzner, Dremtech press.
2. Web Technologies, Black Book. Dreamtech Press
3. Web Applications: Concepts and Real-World Design Knuckles, Wiley-India
4. Internet and World Wide Web How to program P.J. Deitel & H.M. Deitel Pearson.

NOTE: There will be eight questions of 20 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.

Examination to be held in the May 2022,2023, 2024, 2025

CLASS: B.E. 8th SEMESTER **CREDITS: 3**

BRANCH: ECE/EE/ CSE/ME/CIVIL ENGINEERING

COURSE CODE: ITO-804

COURSE TITLE: PYTHON PROGRAMMING

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To Understand basics of python.
CO2	To develop console application in python
CO3	To develop database application in python
CO4	Apply the concept of file handling in python and basic machine learning application

SECTION–A

Introduction to Python Programming Language: -Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, string Operations, String Slices, String Operators, Numeric Data Types, Built In Functions.**(10 hours)**

Data Collections and Language Component: -Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections. **(5 hours)**

Functions and Modules :- Introduction Defining Your Own Functions Parameters Function Documentation Keyword and Optional Parameters Passing Collections to a Function Variable Number of Arguments Scope Functions - "First Class Citizens" Passing Functions to a Function Mapping Functions in a Dictionary Lambda Modules Standard Modules – sys Standard Modules – math Standard Modules – time The dir Function **(6 hours)**

SECTION- B

Object and Classes: -Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods Special Methods Class Variables, Inheritance, Polymorphism.**(6 hours)**

I/O and Error Handling InPython: Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Working with Directories, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions. **(10 hours)**

Text Book:

1. Think Python, by Allen B. Downey ,second edition ,O'Reilly, Sebastopol, California.
2. Online Version www.greenteapress.com/thinkpython2.pdf.
3. How to think like a computer Scientist, by Brad Miller and David Ranum.
4. Python Programming: An Introduction to Computer Science, by John Zelle.

Online Version:www.interactivepython.org/runstone/static/thinkscpy/index.html.

NOTE: There will be eight questions of 20 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.**

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 8th SEMESTER

BRANCH: CSE/ECE/EE/CIVIL/IT ENGINEERING

	L	T	P	Marks Theory	Marks Sessional
COURSE TITLE: ADVANCED MANUFACTURING PROCESSES	**2**	**1**	**0**	**100**	**50**

COURSE CODE: MEO-805
DURATION OF EXAMINATION: 3 HOURS.

Course Outcomes: At the end of the course student will be able to:	
CO 1:	**Understand the fundamentals of non - conventional machining processes.**
CO 2:	**Understand the working and uses of various mechanical machining processes such as AJM, USM etc.**
CO 3:	**Understand the purpose of chemical and electrochemical machining.**
CO 4:	**Understand the purpose of electric discharge machining.**
CO 5:	**Understand the fundamentals of electron beam and laser beam machining.**

SECTION – A

Module 1: Introduction to Advanced Manufacturing Processes: Mechanical Processes, Abrasive Jet Technology, Ultrasonic Machining, Water Jet Machining. Fundamental principles, processes parameters, characteristics, Tool design, Metal removal rate-analysis, Part design, Analysis of the processes. (9 hrs)

Module 2: Chemical and Electro-chemical machining: Introduction, Principles & Scheme, Process parameters, Material removal rate, dynamic and hydro-dynamic & hydro-optimization, electrolytes. (8 hrs)

SECTION - B

Module 3: EDM: Introduction, basic principles & scheme, circuitry controls, material removal rate, machining accuracy, optimization, selection of tool material and tool design, Di-electric, analysis. Laser Beam Machining & Electron beam machining background, production of laser, machining by Laser and other applications, Electron beam action, Dimensionless analysis to establish correlation behavior EBM parameters. (10 hrs)

Module 4: High Velocity forming of metals, explosive forming principles and applications, Electro-hydraulic and other applications, Analysis of the process. (8 hrs)

RECOMMENDED BOOKS:

1. Non-traditional machining methods: ASME.
2. New Technology by Bhattayacharya; I.E. (India)
3. Ultrasonic cutting by Rozenberg; Consultants Bureau; N.Y.

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

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 8th SEMESTER

BRANCH: CSE/ECE/EE/ME/IT. ENGINEERING

	L	T	P	Marks: Theory	Marks: Sessional
COURSE TITLE: ESSENTIAL OF CIVIL ENGINEERING	**2**	**1**	**0**	**100**	**50**

COURSE CODE: CEO-806

DURATION OF EXAMINATION: 3 HOURS.

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	**Able to identify the properties of building materials.**
CO2	**Acquaint with the masonry construction and finishes**
CO3	**Carry out surveying in the field for engineering projects.**
CO4	**Plan and schedule the Project by various network techniques of construction planning**

SECTION – A

Module:1 Brick: Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Timber: Classification of timber, structure of timber, seasoning of timber, defects in timber and prevention of timber.

Aggregates: Classification of aggregates and various tests conducted on aggregates (9 Hours)

Module: 2 Masonry Construction Introduction: various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, Defects in brick masonry, composite stone and brick masonry.

Foundations: Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Pile Foundation and its types, Pile Driving, Cofferdams. (9 Hours)

SECTION – B

Module: 3 Introduction to surveying, 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.

Levelling: Instruments used and field book recording, Methods of Levelling, height of Instrument method and Rise and Fall method, Temporary and permanent adjustments in levels. (9 Hours)

Module:4 Network techniques in construction management 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, classification of activities, Determination of Slack and float, Critical Path. (9 Hours)

BOOKS RECOMMENDED:

1. BUILDING MATERIAL & CONSTRUCTION BY SUSHIL KUMAR
2. BUILDING MATERIAL BY PRABIN SINGH
3. SURVEYING VOL.- I BY B.C PUNMIA.
4. PERT & CPM - Principles & Applications BY L SRINATH

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

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 3

CLASS: B.E. 8th SEMESTER

BRANCH: CSE/ECE/EE/CIVIL/ME/IT. Engineering
COURSE INTERNATIONAL ECONOMICS
COURSE CODE: HEO-806
DURATION OF EXAMINATION: 3 HOURS.

	L	T	P	Marks Theory	Marks Sessional
	2	1	0	100	50

CO1	**Understand the concept of international trade in general as well as with the classical and modern theories.**
CO2	**Analyze the concept of foreign exchange and foreign trade multiplier in detail and hence shall be able to understand the international market conditions.**
CO3	**Compete in international corporate world by understanding the various concepts of terms of trade like tariffs, quotas, balance of payment and international organisations, etc.**

SECTION-A

Module 1: Concept of International Trade Meaning, Significance and scope of International Economics, concepts of internal, interregional and international trade and their comparison, Theories of international trade: Absolute Cost Advantage, Comparative Cost Advantage, Opportunity cost theory (features, assumptions and limitations) (6 hrs)

Module 2: Theories of International Trade: Modern Theories of International Trade: General equilibrium theory, Heckscher- Ohilin Theory, Rybznski Theorem, The Stopler – Samuelson Theorem, Factor Price-Equalization Theorem.

Module 3: Foreign Exchange and Foreign Trade Multiplier: Foreign Exchange: Meaning and problems of foreign exchange, Methods of foreign payment, Demand and Supply of foreign currency, Foreign Trade-Multiplier, Exchange control (concept, features, objectives, and methods). (6 hrs)

SECTION-B

Module 4: Terms of trade: Meaning, Different Terms of Trade Indexes (Net Barter, Gross Barter, Income, Single and Double Factoral), Factors influencing Terms of Trade; Prebisch-Singer Thesis; Doctrine of reciprocal demand-importance and limitations . (7 hrs)

Module 5: Trade barriers: Tariffs and Quotas (Meaning, classifications and their impact), theory of optimum tariff, devaluation (concept, merits, demerit and limitations) (5 hrs)

Module 6: Balance of payment and International organisations: Concept and components of balance of trade and balance of payment, equilibrium and disequilibrium in BOP, consequences of disequilibrium in BOP, Various measures to correct deficit in BOP. International organisations: IMF, World bank, World Trade organisations- objectives, functions. (6 hrs)

International Economics -H.G Mannur

1. International Economics -Paul R. Krugman and Maurice Obstfeld
2. International Economics - Dominick Salvatore
3. International Economics - Sodersten Bo
4. International Economics - Os Shrivastva

NOTE: There will be eight questions of 20 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.

Examination to be held in the May 2022,2023, 2024, 2025

NON-CREDIT

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: NCC-802

MARKS

TITLE: ELECTRIC & HYBRID VEHICLES

L	T	P	Satisfactory/ unsatisfactory
2	0	0	

Course Outcomes: Student will be able to	
CO1	Understand the fundamental concepts, principles, analysis and design of hybrid and electric vehicle
CO2	Understand the concepts of hybrid electric drive trains
CO3	Understand the different possible ways of energy storage.
CO4	Understand the different energy management strategies

SECTION-A

Module 1: Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles. (6 hrs)

Module 2: Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematical models to describe vehicle performance. (6 hrs)

Module 3: **Hybrid Electric Drive-trains:** Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. (6 hrs)

SECTION-B

Module 4: Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis. (8hrs)

Module 5: Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies, implementation issues of energy management strategies. (9 hrs)

RECOMMENDED BOOKS:

1. C. Mi, M. A. Masrur and D. W. Gao, “Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives”, John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, “Hybrid Electric Vehicles: Energy Management Strategies”, Springer, 2015.
3. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design”, CRC Press, 2004.
4. T. Denton, “Electric and Hybrid Vehicles”, Routledge, 2016

NOTE:- There will be internal evaluation based on the two sessional tests, each of 30 marks . The out come of the sessional test will be in the satisfactory/unsatisfactory form.

Examination to be held in the May 2022,2023, 2024, 2025

NON-CREDIT

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: NCC-806

TITLE: DISASTER MANAGEMENT

L	T	P	MARKS
2	0	0	Satisfactory/ unsatisfactory

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Identify various types of disasters, their causes and Impacts
CO2	To understand the disaster management principles, objectives and approaches
CO3	To understand various elements of disaster management.
CO4	To study the modern techniques used in disaster mitigation and management.

Module 1: Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster dimensions. Important phases of Disaster Management Cycle.

Module 2: Disaster classification- Natural disaster (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

Module 3: Disaster Management: principles, objectives, and approaches. Element of disaster management; role of NGOs, community – based organizations and media; central, and state.

Module 4: Disaster Mitigation: Hazard assessment, Vulnerability assessment, and Risk assessment. Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

BOOKS RECOMMENDED:

Disaster Management	BY Harsh K Gupta
Disaster Management Techniques and Guidelines	BY B K Singh
Disaster Risk Reduction in South Asia	BY PradeepSahni
Disaster management, A P H Publishers	BY Sharma.S.R

NOTE:- There will be internal evaluation based on the two sessional tests, each of 30 markswza` . The out come of the sessional test will be in the satisfactory/unsatisfactory form.

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 6

CLASS: B.E. 8TH SEMESTER MARKS

BRANCH: ELECTRICAL ENGINEERING
COURSECODE: PRJ-802
TITLE: PROJECT

			MARKS	
L	**T**	**P**	**INTERNAL**	**EXTERNAL**
0	**0**	**6**	**150**	**100**

The students will complete their assigned project work initiated during the beginning of 8th semester and submit a detailed project report in the department at the end of semester.

The project load shall be of 6 hrs/Group/week.

Guidelines for evaluation of Project work in 8thsemester:

Sub-distribution of marks:

- For Internal Examiner : 150
- For External Examiner : 100

Sub distribution of internal Marks:

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

1. Viva-Voce = 45 30%
2. Presentation = 45 30%
3. Report = 60 40%

Total = 150

OR

SCHEME -II

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS:2

CLASS: B.E. 8TH SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE CODE: MOC-802

L	T	P	Marks
2	0	0	50

TITLE: SWAYAM/NPTEL/Any other MOOC Platform

The student shall select a MOOC of duration 4-6 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 MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC 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.

Examination to be held in the May 2022,2023, 2024, 2025

CREDITS: 12

CLASS: B.E. 8TH SEMESTER

BRANCH: ELECTRICAL ENGINEERING
COURSECODE: PII-802
TITLE: INDUSTRY INTERNSHIP
DURATION OF EXAM: 3 HOURS

			MARKS	
L	**T**	**P**	**INTERNAL**	**EXTERNAL**
0	**0**	**2**	**300**	**250**

The student will complete their industry internship initiated in the beginning of 8th semester and submit a detailed report regarding their Work/Project individually to the department for the evaluation of same.

The department shall appoint the mentor to each student for monitoring his industry internship progress. The load of mentor shall be of 2 hrs per student per week.

Guidelines for evaluation of Project work in 8th semester:

Sub-distribution of marks:

- For Internal Examiner : 300
- For External Examiner : 250

Sub distribution of internal Marks:

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

1. Viva-Voce = 90 30%
2. Presentation = 90 30%
3. Report = 120 40%

Total = 300

Note: The concern industry/agency/organisation will access the performance of the candidate and will award the marks accordingly out of 250 external marks.

Annexure- III

B. E 5th Semester Examination to be held in the year December 2021, 2022, 2023

Class : B.E. 5th Sem.
Credits: 3
Branch : Electrical Engineering
Course No.: MOC-503
Course Title : SWAYAM / NPTEL

Modifications to be done in the existing Syllabus

Existing	Revised
Note : - *In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester*	**Note :-** *The course is declared pass in the semester only after production of NPTEL/SWAYAM 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 given to the candidate by the NPTEL/SWAYAM and the student will be deemed to have failed in the course.* *The student has to appear again in the NPTEL/SWAYAM examination conducted for the same course or any other course as per the next semester schedule of NPTEL/SWAYAM and pass the examination.*

B. E 6th Semester Examination to be held in the year May 2022, 2023, 2024

Class : B.E. 6th Sem.
Credits : 3
Branch : Electrical Engineering
Course No.: MOC-603
Course Title : SWAYAM / NPTEL

Modifications to be done in the existing Syllabus

Existing	Revised
Note : - *In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester*	**Note :-** *The course is declared pass in the semester only after production of NPTEL/SWAYAM 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 given to the candidate by the NPTEL/SWAYAM and the student will be deemed to have failed in the course.* *The student has to appear again in the NPTEL/SWAYAM examination conducted for the same course or any other course as per the next semester schedule of NPTEL/SWAYAM and pass the examination.*