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 31/10 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 be 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

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**	

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-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 circuitsï 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 Machineryò, New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, ñPerformance and design of DC machinesò, CBS Publishers, 2004.
3. M. G. Say, ñPerformance and design of AC machinesò, CBS Publishers, 2002.
4. P. S. Bimbhra, ñElectrical Machineryò, Khanna Publishers, 2011. 5. I. J. Nagrath and D. P. Kothari, ñElectric Machinesò, 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	**L**	**T**	**P**	**MARKS**	
TITLE: ELECTRICAL CIRCUIT ANALYSIS				**External**	**Internal**
DURATION OF EXAM: 3 HOURS	**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 Newtonôs and Lagrangeôs formulas. Numerical differentiation, numerical integration: Trapezoidal rule and Simpsonôs 1/3rd rule.
Numerical solutions of algebraic and Transcendental equations by RegulaFalsi, Newton-Raphson and direct iterative methods, solution of differential equations by Taylorôs method, Picardôs method, Euler and modified Eulerôs 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, ñA text book of Engineering Mathematicsò, Laxmi Publications, 2008.
2. B.S. Grewal, ñHigher Engineering Mathematicsò, Khanna Publishers, 2010.
3. Dr.Bhopinder Singh,ôôENGINEERING MATHEMATICS IIIò
4. Dr.Bhopinder Singh,ôôA textbook on Complex analysis and Numerical Methodsò, 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
COURSE NO. NCC-304
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			External	Internal
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 Newtonôs 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, Mohrôs 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 Hoursô 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 sumpnerôs 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 Practicalôs / 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 Practicalôs / Experiments will be performed based on the course content requirements.

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 Machineryò, McGraw Hill Education, 2013.
2. M. G. Say, ñPerformance and design of AC machinesò, CBS Publishers, 2002.
3. P. S. Bimbhra, ñElectrical Machineryò, Khanna Publishers, 2011.
4. I. J. Nagrath and D. P. Kothari, ñElectric Machinesò, McGraw Hill Education, 2010.
5. A. S. Langsdorf, ñAlternating current machinesò, McGraw Hill Education, 1984.
6. P. C. Sen, ñPrinciples of Electric Machines and Power Electronicsò, 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, ñSignals and systemsò, Prentice Hall India, 1997.
2. J. G. Proakis and D. G. Manolakis, ñDigital Signal Processing: Principles, Algorithms,and Applicationsò, Pearson, 2006.
3. H. P. Hsu, ñSignals and systemsò, Schaumôs series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, ñSignals and Systemsò, 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 ï 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 ï 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 Poissonôs & 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 ICôs.
CO3	Design seven segment decoder using logical gates.
CO4	Design and implementation of various sequential circuits using digital ICôs

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 ICôs & gates.
4. To implement half adder, half subtractor, full adder, full subtractor using different ICôs & gates.
5. Implementation of multiplexer, Demultiplexer using ICôs & gates.
6. Design of BCD to seven segment display using logical gates & ICôs.
7. To design & verification of truth table of SR, JK, MS-JK Flip Flops.
8. To design various asynchronous counters using flip flops, gates & ICôs.
9. To design various synchronous counters using flip flops, gates & ICôs.
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.

4thSemester 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 equipmentôs. 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.)