UNIVERSITY OF JAMMU

NOTIFICATION

(18/Oct/Adp/73)

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 (Mechanical 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 25)** 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
Mechanical	**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/18/10827-10838
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. Mechanical Engineering First Semester Examination to be held in the Year December 2018,2019,2020,2021

B.E. Mechanical Engineering 1st Semester

Contact Hrs.: 26

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	0	50	100	150	4	100
BSC-113	Basic Science Course	Engineering Chemistry (Lab)	-	-	3	50	-	50	1.5	100
HMC-101	Humanities & Social Science & Management Courses	Communication Skill	2	-	-	25	50	75	2	100
HMC-111	Humanities & Social Science & Management Courses	Communication Skill (Lab)	-	-	2	25	-	25	1	100
ESC-103	Engineering Science Course	Engineering Mechanics	3	1	0	50	100	150	4	100
ESC-113	Engineering Science Course	Engineering Mechanics (Lab)	-	-	2	50		50	1	100
ESC-112	Engineering Science Course	Workshop Technology	1	-	3	50	-	50	2.5	100
TOTAL			**12**	**4**	**10**	**350**	**350**	**700**	**21**	

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: MECHANICAL/CIVIL ENGINEERING

COURSE TITLE: COMMUNICATION SKILLS CREDITS: 2

COURSE No.: HMC-101

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

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

CLASS: B.E. 1ST SEMESTER

BRANCH: MECHANICAL/CIVIL ENGINEERING

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

COURSE No.: HMC-111

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

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

CLASS: B.E. 1ST SEMESTER

BRANCH:CIVIL/MECHANICAL ENGINEERING

COURSE TITLE: ENGINEERING MECHANICS **CREDITS: 4**

COURSE No.: ESC-103

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:-

1. Analyze the system of units and the conversion of units from one to another.
2. Demonstrate knowledge on basic calculation of forces and their resultant and resolution.
3. Approach to a conclusion of forces causing equilibrium.
4. Be proficient in the use of integral and moment methods for calculating centre of gravity.
5. Develop a stable, environment friendly structure for various engineering purpose using various modern tools.

SECTION-A

(STATICS)

Scope and basic concepts (Rigid body, force, units, etc), concept of free body diagram, Resultant of Co-planar concurrent forces in a plane and space, moment of force, Principle of Moments, Coplanar applications. Equilibrium and its equations for planar and spatial systems, Analysis of trusses, Method of Joints & Sections.

Theory of friction, its laws and applications (inclined plane)., Centroids and center of gravity, centroids of lines and composite areas, centroids determined by integration.

Moment of inertia, Area M.O.I, Transfer theorems, Polar M.O.I, Product of inertia, Principal M.O.I.Transfer theorems and axes M.O.I of composite bodies. Moment of inertia of standard sections and composite sections.

SECTION-B

(DYNAMICS)

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, Newton's Laws. D'Alembert's Principle.

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

Kinetics of Particle: Translation, Analysis of a particle as a rigid body.

Kinetics of rigid bodies: Equations of plane motion, fixed axis rotation, Rolling bodies, General plane motion, Impulse and momentum in plane motion, Angular momentum.

RECOMMENDED BOOKS:

1. Engineering Mechanics (Statics & Dynamics) — Beer and Johnson
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.
5. Engineering Mechanics (Statics and Dynamics) — Sarbjeet Singh and Pardeep Singh
6. Engineering Mechanics (Statics and Dynamics) — A.K Tayal

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: CIVIL/MECHANICAL ENGINEERING

COURSE TITLE: ENGINEERING MECHANICS LAB **CREDIT: 1**

COURSE No.: ESC-113

DURATION EXAM: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
0	0	2	0	50

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

CO 1	Apply the fundamentals of statics and motion principles of various engineering problems related to statics and motion.
CO 2	Have the knowledge of finding the stable structures of various engineering purposes and bending of beams by using bending moment apparatus.
CO 3	Solve engineering problems related to motion.
CO 4	Demonstrate the knowledge on basic calculation of forces and their resultant and resolution.
CO 5	Solve the engineering problems related to friction and analyze it in real life situation.

ENGINEERING MECHANICS PRACTICAL:

1. To verify Parellogram law of forces.
2. To verify LAMIS THEOREM.
3. To verify bending Moment.
4. To find out the coefficient of friction between Glass and wooden surface on an incline plane.
5. To find out the velocity ratio, and Mechanical Advantage of Single/Double purchase Winch Crab
6. To find the coefficient of friction between Glass and steel roller on an inclined plane.
7. To find the velocity ratio, and Mechanical advantage of a worm & Worm Wheel.
8. To find the reactions at supports in case of simply supported beam.

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

CLASS: B.E. 1ST SEMESTER

BRANCH: CIVIL/MECHANICAL ENGINEERING

COURSE TITLE: WORKSHOP TECHNOLOGY **CREDITS: 2.5**

COURSE No.: ESC-112

DURATION EXAM: 3 HRS

L	T	P	MARKS	
			THEORY	PRACTICAL
1	0	3	0	50

Course Objectives:-

1. To train the students in various manufacturing practices and to impart basic knowledge of workshop technology .
2. To develop right attitude, team work, precision and safety at work place.
3. To explain the construction, function, use and application of different working tools, Equipment and machines
4. To have practical exposure to various manufacturing practices such as welding ,fitting, carpentry, pattern making, casting, smithy and machining.

Course Outcomes:-

At the end of the course, the student will demonstrate the ability to :-

1. Understanding different manufacturing techniques and their relative Advantages/disadvantages with respect to different applications.
2. Selection of a suitable technique for meeting a specific fabrication need.
3. Acquire a minimum practical skill with respect to the different manufacturing methods and develop the confidence to design& fabricate small components for their project work and also to participate in various national and international technical competitions.
4. Introduction to different manufacturing methods in different fields of engineering.
5. Practical exposure to different fabrication techniques
6. Creation of simple components using different materials. Exposure to some of the advanced and latest manufacturing techniques being employed in the industry.

Shop Practice :-

Unit I CARPENTRY:-

1. Different joints :- a) Middle/cross lap joint
   b) Mortise and Tenon T –joint
2. Pattern making of open bearing

Unit II CASTING:-

1. Casting of open bearing (single piece pattern)
2. Casting of split piece pattern

Unit III SMITHY:-

1. Cubical block from a cylindrical section
2. L – shaped hook from cylindrical section

Unit IV WELDING:-

1. Preparation of single V – Butt joint by gas and arc welding processes
2. Preparation of Double V-Butt joint , T-joint and corner joint by gas and arc welding

Unit V FITTING:-

1. Assembly of snap fitting of MS-Flat pieces (Male and Female)
2. Assembly and fitting of two L- shaped rectangular MS flat pieces

Unit VI MACHINE SHOP:-

1. Operation like turning, step turning on MS round
2. Operation like taper turning , Knurling on MS round
3. Introduction to CNC machines

Books Recommended :-

- Workshop Technology by Hajra and Chowdhary
- Manufacturing Technology Vol I & II by Rao. P.N
- Manufacturing Technology by Gowri .P. Hariharan and A. Suresh Babu

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

B.E. Mechanical Engineering 2nd Semester

Contact Hrs.: 24

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
ESC-201	Engineering Science Course	Computer Programming	3	1	-	50	100	150	4	100
ESC-211	Engineering Science Course	Computer Programming (Lab)	-	-	2	50	-	50	1	100
ESC-202	Engineering Science Course	Engineering Graphics	1	-	3	50	100	150	2.5	100
NCC-201	Non-Credit Course	Mentoring and Professional Development	-	-	2	Satisfactory / Un-Satisfactory			Non-Credit	-
NCC-202		Environmental Sciences								
NCC-203		Indian Constitution								
TOTAL			**10**	**4**	**10**	**300**	**400**	**700**	**18**	

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: CIVIL/MECHANICALENGINEERING

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

COURSE No.: ESC-201

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

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

CLASS: B.E. 2ND SEMESTER

BRANCH: CIVIL/MECHANICALENGINEERING

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

COURSE No.: ESC-211

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

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

CLASS: B.E. 2ND SEMESTER

BRANCH:CIVIL/MECHANICAL ENGINEERING

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

COURSE No.: ESC-202

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.

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

CLASS: B.E. 2ND SEMESTER

BRANCH: MECHANICAL/CIVIL ENGINEERING

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

COURSE No.: NCC-201 **L T P**

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

Detailed Syllabus

iv. 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)

v. 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%.

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

CLASS: B.E. 2ND SEMESTER

BRANCH: MECHANICAL/CIVIL ENGINEERING

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

COURSE No.: NCC-202 **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.

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

CLASS: B.E. 2ND SEMESTER

BRANCH: MECHANICAL/CIVIL ENGINEERING

COURSE TITLE: INDIAN CONSTITUTION CREDIT: Non-Credit

COURSE No.: NCC-203	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%.