ADIKAVI NANNAYA UNIVERSITY

RAJAHMAHENDRAVARAM

UNIVERSITY COLLEGE OF ENGINEERING

Course Structure &Syllabus

Department of Science & Humanities

I B.Tech Mechanical Engineering

(For the admitted batch of 2019 – 2020)

(As per Model Curriculum for Undergraduate Degree Courses in Engineering
& Technology, January, 2018, AICTE, New Delhi)

ADIKAVI NANNAYA UNIVERSITY

RAJAHMAHENDRAVARAM

UNIVERSITY COLLEGE OF ENGINEERING

1st Year B.Tech Mechanical Engineering (2019-20 AB)
I & II Semester Course Structure and Syllabus

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ADIKAVINANNAYA UNIVERSITY, RAJAHAMAHENDRAVARAM
UNIVERSITY COLLEGE OF ENGINEERING
I Year B.Tech Mechanical Engineering
Semester I

Course Code	Course	L	T	P	Max. Marks		Total Marks	Credits
		Hours per Week			Internal	External		
HSMC-ME101	English I	3	0	0	25	75	100	3
BSC-ME102	Mathematics I	3	1	0	25	75	100	4
BSC-ME103	Physics	3	1	0	25	75	100	4
ESC-ME104	Engineering Graphics	1	0	4	25	75	100	3
LC-ME105	English Communication Skill Lab	0	0	2	50	50	100	1
LC-ME106	Physics Lab	0	0	3	50	50	100	1.5
MC-ME107	Environmental Science	3	0	0	25	75	100	0
	Induction Programme	2 Weeks Duration						
TOTAL		13	2	9	225	475	700	16.5

Semester-II

Course Code	Course	L	T	P	Max. Marks		Total Marks	Credits
		Hours per Week			Internal	External		
HSMC-ME201	English II	3	0	0	25	75	100	3
BSC-ME202	Mathematics II	3	1	0	25	75	100	4
BSC-ME203	Chemistry	3	1	0	25	75	100	4
ESC-ME204	Programming For Problem solving	3	0	0	25	75	100	3
ESC-ME205	Engineering Mechanics	3	0	0	25	75	100	3
LC-ME206	Chemistry lab	0	0	3	50	50	100	1.5
LC-ME207	Programming for Problem solving Lab	0	0	3	50	50	100	1.5
LC-ME208	Engineering workshop Lab	0	0	3	50	50	100	1.5
MC-ME209	Professional Ethics and Human Values	3	0	0	50	50	100	0
TOTAL		18	2	9	325	575	900	21.5

Induction Programme (Mandatory) – 2 Weeks Duration

Induction Programme for students to be offered at the start of the first year. It is observed that there is a necessity for a student to adapt to the new environment of a college and to create a bonding between the teacher and a student.

Hence, it is introduced in the curriculum to get them acquainted with the culture of the institution. The programme also is intended to inculcate communication skills among students. The students are also orientated towards universal human values for their holistic development.

As students arrive from different lingual, cultural and social backgrounds, the programme is designed to hone the basic skills necessary for their engineering programme. The Induction programme arranged for three weeks for students comprises of Physical activities; Learning an art form; Literature & Cinema; Social Awareness; Lecture & Visits; Universal Human Values; Familiarization to Department/ Branch, College & Innovations.

The Induction Programme includes:
- Physical Activity

- Creative Arts

- Universal Human Values

- Literary Activities

- Proficiency Modules

- Guest Lectures by Eminent People

- Visits to local areas – Familiarization to Dept./ Branch & Innovation

Course Code	HSMC-ME101
Category	**Humanities and Social Science including Management Courses**
Course Title	**English I**
Scheme and Credits	**L T P Credits** **3 0 0 3**
Prerequisites (if any)	**Basic knowledge of grammar (+2 level)**

Course Description

The syllabus is intended to enhance the communication skills of the students in the mode of Activity Based Language Teaching and Learning. The syllabus is designed to impart not just grammatical knowledge but also provide a platform for developing communication skills through activity and interaction so as to enable the learner to become proficient in all aspects of English Language that is Listening, Speaking, Reading and Writing.

Course Objectives:

- To encourage the all round development of students by focusing on communication skills.
- To develop and nurture the Language skills of the students through individual and group activities.
- To develop grammar and pronunciation of the English of the students.
- To develop reading skills among students

Course Outcomes:

- Understand basic grammar principles and be able to synthesize and transform sentences.
- Show enhanced communication ability in English.
- Understand the processes at work behind word formation in English thereby leading to better use of vocabulary in speech and written modes.
- Understand the theory of communication and utilize the knowledge to interact in the language.
- Analyze and decipher the symbolic and metaphorical usage of language in poetry and fiction.

HSMC-ME101: ENGLISH I

Theory: 3 Hrs/Week   **Credits: 3**
Int Marks: 25   **Ext Marks: 75**

UNIT-I
Listening: Listening to short audio texts and identify the topic and supporting ideas
Speaking: Self introduction
Reading: Skimming and Scanning
Writing: Paragraph Structure and types
Grammar: Content words and function words, basic sentence structure, wh-questions, word order in sentences
Vocabulary: Introduction to word formation
Poem: Once upon a time by Gabriel Okara

UNIT-II

Listening Listening for comprehension and summarizing what is listened to.
Speaking: Group Discussions
Reading: Identifying the structure of the text, transition words and linkers
Writing: Punctuation, use of phrases and clauses in sentences
Grammar: Articles, use of prepositions
Vocabulary: Root words from other languages
Short Story: A Horse and Two Goats by R.K. Narayan

UNIT III
Listening: Making predictions while listening to conversations
Speaking: Role plays – asking for and giving information/ directions
Reading: Intensive Reading / Detailed reading – recognizing, inferring and interpreting specific contexts; strategies to use text clues for reading comprehension
Writing: Principles of Good Writing, Introduction to Essay Writing
Grammar: Verb – tenses, subject-verb agreement
Vocabulary: Prefixes and Suffixes
Speech: *Fringe Benefits of failure by JK Rowling*

UNIT IV
Listening: Identifying key terms and concepts
Speaking: Formal oral presentations on topics from academic contexts – without PPT
Reading: Use of graphic elements in text, understanding patterns
Writing: Types of essays – paragraph organisation, creating coherence, summarization/ précis writing
Grammar: Noun –pronoun agreement, subject – verb agreement
Vocabulary: Synonyms, antonyms
Letter: On saving Time by Seneca

REFERENCE BOOKS:

1. Krishna Swamy N., *Modern English Grammar*, MacMillan India Ltd.
2. *Oxford Advanced Learner's Dictionary of Current English*,8th ed. Oxford: Oxford UP,2010
3. Bailey, Stephen, *Academic Writing: A handbook for international students*, Routledge, 2014
4. Chase, Becky Tarver, *Pathways: Listening, Speaking and Critical Thinking,* Heinley ELT; 2nd Edition, 2018

Course Code	BSC-ME102			
Category	Basic Science Course			
Course Title	Mathematics – I			
Scheme and Credits	L	T	P	Credits	Semester – I
	3	1	0	4	
Prerequisites (if any)				

Course objectives:

1. The course is designed to equip the students with necessary mathematical skills and techniques that are essential for an engineering course.

2. The skills derived from the course with help the students from a necessary base to develop analytic and design concepts.

Course Outcomes:

At the end of the course, student will able to:

1. Solve linear differential equations of first, second and higher order.

2. Calculate total derivative, Jocobian and Minima of function of two variables.

3. The fallouts of Rolle's theorem that is fundamental to application of analysis to engineering problems.

BSC-ME102: MATHEMATICS I

Theory: 4 Hrs/Week   **Credits: 4**
Int Marks: 25   **Ext Marks: 75**

UNIT-I
Differential Equations of first order and first degree
Linear and Bernoulli's Equation, Exact, Reducible to Exact(i.e Integrating factor $\frac{1}{Mx+Ny}, \frac{1}{Mx-Ny}, e^{\int f(x)dx}, e^{\int g(x)dx}$) ,Orthogonal Trajectories

Applications: Newton's law of cooling, Law of natural growth and decay;

UNIT-II
Linear Differential Equations of Higher Order
Non-Homogeneous equations of higher order with constant coefficients of R.H.S terms of the type eax, sin ax, cos ax, polynomials in x, eaxV(x) and x V(x); Method of Variation of parameters: Legendre's equation, Cauchy-Euler equation.

UNIT-III
Partial Differentiation
Introduction, Partial Differentiation, Homogeneous functions, Euler's Theorem; Total derivative, Chain Rule, Jacobian, Taylor's and Maclaurin's series expansion of function of two variables; Functional dependence & independence.
Applications: Maxima and minima of functions of two variables without constraints and Lagrange's method with constraints.

UNIT-IV
Differential Calculus
Mean value Theorems: Rolle's Theorem, Lagrange's Mean value theorem, Taylor's and Maclaurin Theorems with Reminders, indeterminate forms and L'Hospital's Rule; Maxima and Minima.
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Text Books:

1. Dr. B.S.Grewal, Higher Engineering Mathematics, Khanna publishers, 43rd Edition.
2. Dr. S.K.Vali, Dr.G.Venkata Rao, Engineering Mathematics- I, Cengage Publications.

Reference Books:

1. N.P.Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. G.B.Thomas and R.L.Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

Course Code	BSC-ME103
Category	Basic Science Course
Course Title	Physics

Scheme and Credits	L	T	P	Credits	Semester – I
	3	1	0	4	

Prerequisites (if any)	Knowledge of theoretical, experimental Physics from +2 level and Mathematics.

Course Objectives:

- To knowledge the designing of Electrical and Magnetic response of naturally abundant and artificially made materials.
- To introduce basic concepts of Optical Interference, Diffraction and Polarization to design instruments with higher resolution and apply the concepts of coherent sources, its realization and utility in optical instrumentation.
- To knowledge the basic physics of polarization and lasers that are trusted Non-linear coherent sources establishing for the fitness of Instrumentation, establishing a structure property relationship for materials.
- Convening the physics knowledge base in establishing a structure property relationship for materials and to deeper understanding of vectorial concepts of EM fields paves the student to gear – up for a deeper understanding.
- To Gain knowledge about structure of solids and crystal lattices of semiconductors. To Compare the energies of the conduction bands and valence bands in metals, insulators, and semiconductors in understanding the physics of electronic transport as underlying mechanism for appliances.

Course Outcomes:
At the end of the course the student is able to
- Understand applications of optics using basic fundamentals of Physics and formulate and solve the engineering problems on light and optics, Electromagnetism, wave mechanics
- Explain the Modern Physics Concepts
- Correlate Advanced Topics in Physics with Engineering Applications
- Identify the appropriate solid state materials for engineering applications formulate and solve the engineering on light and optics, Electromagnetism, wave mechanics
- Familiarise with Basic Elements of Quantum Theory and knowledge about dual nature of wave function, Applications of Schrodinger wave equation, intrinsic and extrinsic semiconductors, Semiconductor conductivity
- Correlate Advanced Topics in Physics with Engineering Applications and Get acquainted with Current Trends in Physics. Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation.

BSC-ME103: PHYSICS

Theory: 4 Hrs/Week   **Credits: 4**
Int Marks: 25   **Ext Marks: 75**

UNIT I

Electro Magnetism and Magnetic materials: Introduction - Gauss and Stokes Theorems- Fundamental laws of Electromagnetism: Gauss law of Electrostatics-Gauss law of M   agneto statics- Faraday's law- Ampere's law,   Modified form of Ampere's law- Maxwell's equations, Applications.

Magnetic Permeability- Magnetization- Origin of Magnetic moment- Classification of Magnetic materials- Dia, Para, Ferro, Anti ferro and Ferri magnetic materials- Hysterisis curve, Applications.

UNIT II

Coherent waves and Optics in Communication Interference: Introduction-Interference due to reflected light rays - Newton's rings expt -Michelson's Interferometer.

Diffraction: Fraunhofer Diffraction due to single slit- The Rayleigh criterion for resolution- Diffraction gratings and their resolving power.

Polarization and Geometric properties :   reflection and refraction, Brewster's angle, Malus law, Double refraction, Nicol Prism and Total internal reflection,

LASERS: Introduction- Coherence, Principle and working of Laser, amplification of light by population inversion, different types of lasers: gas lasers (He-Ne), solid-state lasers(ruby). Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, applications of lasers in science, engineering and medicine.

Fiber Optics: Introduction-Principle of Optical fibre, Acceptance angle, Acceptance cone, Numerical aperture, Block diagram of Optical fiber communication. Applications of optical fibres

UNIT III

Wave nature of particles and the Schrodinger's equation Quantum Mechanics:Introduction to Quantum Mechanics- Wave nature of particles, de-Broglie's hypothesis - Time-dependent and time-independent Scrodinger's wave equations for wave function, Particle in a one- dimensional box.

Band Theory of Solids: Free electron theory of metals- Fermi level- Density of states- Bloch' theorem for particles in periodic potential, Kronig- Penney Model - origin of energy bands in solids.

UNIT IV

Semiconductor physics Intrinsic and Extrinsic Semiconductors- Carrier concentration- equation of conductivity- Drift and Diffusion currents, Hall Effect, p-n junction diode, LED: device structure, materials, characteristics, and figures of merit. Photo diode, Solar cell.

Text books:
1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley Halliday and Resnick, Physics
2. A text book of Engineering Physics by M.N. Avadhanulu and P.G. Kshirasagar (S. Chand Publications)
3. Solid State Physics by A.J. Dekker (Mc Millan India Ltd).
4. Engineering Physics by M.R. Srinivasan (New age International Publishers)

Course Code	**ESC-ME104**				
Category	**Engineering Science Course**				
Course Title	**Engineering Graphics**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester-I**
	1		**4**	**3**	
Prerequisites (if any)	-				

Course objectives:
- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes:
At the end of the course, the student will be able to:
- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

ESC-ME104: ENGINEERING GRAPHICS

Theory: 5 Hrs/Week   **Credits: 3**
Int Marks: 25   **Ext Marks: 75**

UNIT – I

Introduction: Lines, Lettering and Dimensioning.
Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.
Curves: Parabola, Ellipse and Hyperbola by general and special methods, tangents & normal for the curves.

UNIT – II

Scales: Plain scales, diagonal scales and vernier scales
Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either two of the reference planes (HP,VP or PP)

UNIT – III

Projections of Straight Lines: Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT
Projections of Planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT – IV

Projections of Solids: Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.
Isometric Views: Introduction to Isometric projection, Isometric scale and Isometric view.
Isometric views of simple planes. Isometric view of Prisms, Pyramids, cylinder and cone. Isometric view of an object when projections are given.

Text Book
Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.
Reference Books
  1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
  2. Engineering Drawing 2nd Edition– K .Venugopal, V. Prabhu Raja, New Age

Course Code	LC-ME105
Category	**Laboratory Course**
Course Title	**English Communication Skills Lab**
Scheme and Credits	<table><tr><td>**L**</td><td>**T**</td><td>**P**</td><td>**Credits**</td><td rowspan="2">**Semester-I**</td></tr><tr><td>**0**</td><td>**0**</td><td>**2**</td><td>**1**</td></tr></table>
Prerequisites (if any)	

Laboratory Outcomes:

The English Communication Skills Lab is designed to assist the English theory curriculum. The students will learn:

- Learn and practice accurate pronunciation.
- Learn phonetic symbols through visual and audio aids.
- Use the lab as a platform for group discussions and mock interviews.

LC-ME105: ENGLISH COMMUNICATION SKILLS LAB

Lab: 3 Hrs/Week   **Credits: 1**
Int Marks: 50   **Ext Marks: 50**

List of Experiments:

1. *Letters and sounds of English:*

   Letters and sounds, Speech organs

2. *Interaction I:*

   Greeting and Taking leave, introducing oneself to others

3. *The sounds of English:*

   Consonants, consonant clusters and Vowels

4. *Pronouncing words:*

   Silent letters, plural markers and past tense markers

5. *Interaction II:*

   Making request and response, ask for and give/ refuse permission

6. *Stress and Intonation*

7. *Interaction III:*

   Invite, accept and declining invitations, Make complaints and respond to them, express sympathy

8. *Presentation skills:*

   Oral and PPT Presentations

9. *Interaction IV:*

   Apologize and respond, advice and suggest, telephone skills

10. *Group Discussions*

List of Augmented Experiments:

1. Common errors in English
2. Listening Skills
3. Writing Skills
4. Reading Skills
5. Public Speaking
6. Interview Skills
7. Business Communication
8. Functional English
9. Preparation for GRE/ TOEFL
10. Preparation for IELTS/ CAT/ GMAT

*Student will have to choose and perform one of the Augmented Experiments

Course Code	LC-ME106				
Category	Laboratory Course				
Course Title	Physics Lab				
Schemeand Credits	L	T	P	Credits	Semester – I
	0	0	3	1.5	
Prerequisites (if any)	Knowledge of theoretical, experimental Physics from +2 level and Mathematics.				

Course Objectives:

- To be highly skilled, interdisciplinary professionals who can identify and solve engineering problems from unusually broad physical perspectives.
- To be able to use engineering and communications skills in other areas such as research, consulting, law, medicine, business, public policy, etc.
- To engage vigorously in further studies in interdisciplinary graduate programs and a wide variety of other lifelong learning opportunities.
- To pursue careers that in corporate ethical and professional responsibility, as well as good citizenship.

Course Outcomes:

At the end of the laboratory session the student acquire

- an ability to apply knowledge of mathematics, science, and engineering.

- an ability to design and conduct experiments, as well as to analyze and interpret data.

- an ability to design a system, component, or process to meet desired needs within realistic constraints.

- an ability to identify, formulate, and solve engineering problems.

- an ability to communicate effectively.

- a recognition of the need for, and an ability to engage in life-long learning.

Lab: 3 Hrs/Week **Credits:1.5**
Int Marks: 50 **Ext Marks: 50**

List of Experiments

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying
4. Circular Coil.
5. Determination of Refractive Index of Ordinary ray μo and Extraordinary μe ray.
6. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
7. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
8. Photoelectric cell-Characteristics.
9. Laser- Diffraction.
10. Charecteristics of a Zener Diode.
11. Energy band gap of a semiconductor.
12. Determination of Acceleration due to gravity – Compound Pendulum
13. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance
14. Plank's Constant
15. Sonometer – Verification of laws of stretched string

Reference books:
1. Engineering Physics by M.N. Avadhanulu& P.G.Kshirasagar; S.Chand &Company Ltd.
2. Modern Engineering Physics by A.S. Vadudeva
3. University Physics by Young and Freedman
4. Nonconventional Energy by Ashok V. Desai

Course Code	MC-ME107				
Category	**Mandatory Course**				
Course Title	**Environmental Science**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester – I**
	3	**0**	**0**	**0**	
Prerequisites (if any)	**Basic knowledge from +2 level**				

Course Objectives:
- Understand and define terminology commonly used in environmental science.

- Briefly summarize and describe global, regional, and landscape scale environmental processes and Systems

- Students will be able to list common and adverse human impacts on biotic communities, soil, water, and air quality and suggest sustainable strategies to mitigate these impacts

- 4. Students will be able to read, critically evaluate presented information and data using scientific principles and concepts, synthesize popular media reports/articles discussing environmental issues and verbally discuss and defend their Introduction to Environmental Science , interdisciplinary perspective.

Course Outcomes:

- Getting more knowledge on the concepts and methods from ecological and physical sciences and their application in environmental problem solving.

- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.

- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

- Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

- Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.

MC-ME107: ENVIRONMENTAL SCIENCE

Theory: 3 Hrs/Week   **Credits: 0**

Int Marks: 25   **Ext Marks: 75**

UNIT – I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT – II

Natural Resources: Natural resources and associated problems, **Forest resources:** Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people, **Water resources**: Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems. **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources. **Food resources:** World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. **Energy resources:** Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. **Land resources:** Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Individual's role in conservation of natural resources.

UNIT – III

Biodiversity and its conservation:
Definition & classification: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, Biodiversity at national and local levels. India as a mega-diversity nation - Hot-sports of biodiversity, Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV

Social Issues and the Environment: Urban problems related to energy - Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible Solutions. Public awareness.

Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism.

Text Books:
1. Environmental Studies by R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
2. A Textbook of Environmental Studies by Shaashi Chawla, TMH, New Delhi.
3. Environmental Studies by P.N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai.

Course Code	HSMC-ME201				
Category	**Humanities and Social Science including Management Courses**				
Course Title	**English II**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester-II**
	3	**0**	**0**	**3**	
Prerequisites (if any)					

Course Description

The syllabus is designed to provide basic LSRW skills in English. The syllabus covers various theoretical and practical aspects of each of the four language skills aforementioned in a lucid manner. Divided into four unit, each deals with the specific skills and its related activities.

Course Objectives:

- To motivate students to communicate effectively in both written and oral modes.
- To expose students to reading techniques that help in quick and effective reading of texts.
- To encourage the all round development of students by focusing on communication skills.
- To develop and nurture the Language skills of the students through individual and group activities.
- To develop grammar and pronunciation of the English of the students.

Course Outcomes:

- Understand the principles behind pronunciation and communication.
- Write letters, complaints and emails.
- Prepare reports and short essays.
- Show enhanced communication ability in English.
- Understand the theory of communication and utilize the knowledge to interact in the language.
- Analyze and decipher the phonemic script of English for accurate pronunciation.

HSMC-ME201: ENGLISH II

Theory: 3 Hrs/Week   **Credits: 3**

Int Marks: 25   **Ext Marks: 75**

UNIT I

Listening: Listening for presentation strategies

Speaking: Formal presentation using PPT (without graphic elements)

Reading: Reading for presenting – strategies to select, compile and synthesize information for presentation.

Writing: Paraphrasing; using quotations in writing; using academic style; using suitable claims, examples and evidence for presenting views, opinion and position

Grammar: Phrasal Verbs, Phrasal prepositions

Vocabulary: Standard abbreviations

Novel: *Time Machine by H.G. Wells*

UNIT II

Listening: Following an argument/ logical flow of thought, understanding spoken discourse

Speaking: Group Discussion – agreeing or disagreeing using claims.

Reading: Understand formal and informal styles; differentiate between facts and opinions

Writing: Formal letter writing and e-mail writing, Writing one's CV/ Resume and cover letter

Grammar: Correcting common errors in English usage

Vocabulary: Language for different functions – stating a point, expressing opinion, agreeing/ disagreeing

Drama: *Hayavadana (ACT II) by Girish Karnad*

UNIT III

Listening: Identifying views and opinions expressed by different speakers while listening to discussions

Speaking: Group discussion – reaching consensus in group work (academic context)

Reading: Identifying claims, evidences, views, opinions and stance/ position

Writing: Writing reports, articles, minutes of meetings, event reports

Grammar: Active and Passive voice – use of passive verbs in academic writing

Vocabulary: Language for different functions II – Interrupting, defying and clarifying

Autobiography: *Wings of Fire by Abdul Kalam*

UNIT IV

Listening: Understanding inferences; processing of information using specific context clues and processing of explicit and implicit information inferable from the text or from previous/ background knowledge.

Speaking: Formal team presentations using PPT

Reading: Reading for inferential comprehension and implicit information

Writing: Structure and contents of a project report; identifying sections in project report; understanding the purpose of each section; significance of references

Grammar: Direct and indirect speech, reporting verbs

Vocabulary: Vocabulary for competitive exams

Travelogue: *Butter chicken in Ludhiana by Pankaj Mishra*

REFERENCE BOOKS:

1. Krishna Swamy N., *Modern English Grammar*, MacMillan India Ltd.
2. *Oxford Advanced Learner's Dictionary of Current English*,8th ed. Oxford: Oxford UP,2010
3. *Skillful Level 2 Reading and Writing Student's Book Pack (B1)* Macmillan Educational

Course Code	**BSC-ME202**				
Category	**Basic Science Course**				
Course Title	**Mathematics – II**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester – II**
	3	**1**	**0**	**4**	
Prerequisites (if any)					

Course objectives:

- The course is designed to equip the students with necessary mathematical skills and techniques that are essential for an engineering course.

- The skills derived from the course with help the students from a necessary base to develop analytic and design concepts.

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

- Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations.

- Determine double integral over a region and triple integral over a volume.

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.

- Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Greens, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.

BSC-ME202: MATHEMATICS II

Theory: 4 Hrs/Week   **Credits: 4**
Int Marks: 25   **Ext Marks: 75**

Unit-I

Matrices Rank of matrix – Echelon form – Normal form, Solution of linear system of equations - Gauss Elimination, Gauss – Jordan and Gauss – Seidel Methods, Consistency of linear system of equations,

Eigen Values – Eigen Vectors and Quadratic forms: Eigen values and Eigen Vectors, Properties of Eigen values (without Proof), Cayley- Hamilton theorem (without proof), Diagonalization, Quadratic form, reduction of Quadratic forms to canonical form, Nature of a quadratic form, Complex matrices.

Unit-II

Multiple Integrals *Double and triple integrals- change of variables-change of order of integration*
Applications: Finding, areas and volumes.

Unit-III

Special Functions Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals.
Applications: Evaluation of integrals.

Unit-IV

Vector Calculus
Vector Differentiation: Gradient- Directional Derivatives, Divergence- Curl - Laplacian and second order operators -Vector identities.
Applications: Equation of continuity, potential surfaces.
Vector Integration: Line integral – Work done – Surface and volume integrals, Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.
Applications: Work done, Force.

Text Books:

1. Dr. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Dr. G.Venkata Rao, Dr.A.V.Papa Rao, Engineering Mathematics – III, Cengage Publications.

Reference Books:

1. Greenberg, Advanced Engineering Mathematics, 2nd edition, Pearson edn.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India
3. Peter O'Neil, Advanced Engineering Mathematics,7th edition, Cengage Learning.
4. Dass H.K., Rajnish Verma. Er, Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.
5. N.P.Bali, Engineering Mathematics, Lakshmi Publications.

Course Code	BSC-ME203				
Category	Basic Science Course				
Course Title	Chemistry				
Scheme and Credits	L	T	P	Credits	Semester – II
	3	1	0	4	
Prerequisites (if any)	Knowledge of theoretical chemistry from +2 level				

Course objectives:

The purpose of this course is to emphasize the relevance of fundamentals of chemical sciences in the field of engineering and to provide basic knowledge polymers, electrochemistry, batteries, corrosion and the role of water as an engineering material in domestic-industrial use.

- This course will also impart the knowledge of stereochemistry, understanding the chemical reaction pathway mechanisms.

- To enhance the thinking capabilities in the modern trends in Engineering & Technology.

- This is the basic source to design a new material as well as utilizing the available resources

Course Outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry

- Usage of plastics not only in household appliances and also used as composites in automotive industries, bio plastic in surgeries. The students able to design FRP, Biodegradable polymers and Usage of conducting polymers as battery cells

- Creating awareness on problems created by corrosion of metals and its control methods.

- The students able to construct the Electro chemical cell and develop different types of battery cells like organic, inorganic, fuel cells.

- The course will enable the student to: The impurities present in raw water, problems associated with hard water in industries and how to avoid them are understood. The students would be aware of different types of sterilization methods to get the drinking water.

- The students would be able to design, develop advanced engineering materials like Nano materials.

BSC-ME203: CHEMISTRY

Theory: 4 Hrs/Week   **Credits: 4**
Int Marks: 25   **Ext Marks: 75**

UNIT-I

High Polymers: Definition -Types of Polymerization (Addition & Condensation) –Mechanisms- Stereo Polymers – Physical and Mechanical properties of polymers .

Plastics : Thermo plastics and Thermo setting plastics – Compounding and Fabrication of plastics – preparation and properties of Polyethylene, PVC and Bakelite .

Elastomers: Rubber, Natural Rubber and Elastomers – Vulcanization – Styrene butadiene rubber- Thiokol rubber – applications - Fiber reinforced plastics – Biodegradable polymers – Conducting polymers.

UNIT-II

Corrosion: Causes and effects of corrosion – theories of corrosion (dry/ chemical and wet / electrochemical corrosion) – Factors effecting corrosion – Corrosion control methods – Cathode protection – Sacrificial Anodic, Impressed current methods – Surface coating – Methods of application on metals (Hot dipping, Galvanizing, tinning, Cladding, Electroplating, Electro less plating)

Thermodynamics: Thermodynamic functions: energy, entropy and free energy. Free energy and emf.Elctrode potentials - Nernst equation and applications. Galvanic cells - Electrochemical series- Primary, Secondary and Fuel Cells.

UNIT-III

Fuels: Coal – Proximate and ultimate analysis – Numerical problems based on analysis – Calorific value (Bomb Calorimeter) –   HCV and LVC - Refining – Cracking – Petrol – Diesel – Octane and Cetane numbers - Knocking and anti-knocking, Synthetic Petrol (Fisher-Tropsh Method).

Types of Organic reactions : Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings.

Introduction to Stereo chemistry : Structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity.

UNIT-IV

Water Technology: Determination of hardness of water by EDTA method – Potable water – Municipal water treatment - Sterilization and Disinfection – Boiler feed water – Boiler troubles – Priming and foaming, scale and sludge formation, corrosion, caustic embrittlement, turbine deposits.Desalination of brakish water -Reverse osmosis and Electro Dialysis.

Nanotechnology: Nanomaterials– Properties of nanomaterials –Engineering applications

Text Books:
1. Jain and Jain (Latest Edition), Engineering Chemistry, DhanpatRai Publishing company Ltd.,
2. N. Y. S. Murthy, "A Text Book of Engineering Chemistry" Maruthi Publications.
3. C. Parameswara Murthy Text Book of Engineering Chemistry, B. S. Publications.

Course Code	ESC-ME204
Category	Engineering Science Course
Course Title	Programming for Problem Solving
Scheme and Credits	L T P Credits Semester-II 3 0 0 3
Prerequisites (if any)	

Course Objectives:

The course is designed to provide complete knowledge of programming languages. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes:

- After the completion of this course, the students will be able to develop applications.
- Write programs that perform operations using derived data types.
- Design, implement, test, debug, and document programs in C.
- Program with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
- Program low-level input and output routines in C
- Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options
- Write programs that perform explicit memory management.
- Understand and use the common data structures typically found in C programs — namely arrays, strings, lists.

Theory: 3 Hrs/Week	Credits: 3
Int Marks: 25	Ext Marks: 75

UNIT-I

Introduction to C: Basic Structure of C Program, Constants, Variables and data types, Operators and expressions, Arithmetic precedence and associativity, Type Conversions . Managing Input and Output Operations, Formatted Input and Output statements.
Decision making, Branching, Looping: Decision making with if statement ,Simple if statement , The if.....else statement, Nesting of if......else statement, the else.......if ladder, switch statement ,the (?:) operator, the GOTO statement ., The while statement ,the do statement, the for statement , Jumps in Loops. Examples on Decision making, Branching
,Looping.

UNIT-II

Arrays and strings : One, Two-dimensional Arrays, Character Arrays .Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings, Sparse matrices, Storage classes & C-pre processors. Examples on Arrays & strings.

UNIT-III

Functions: Definition of Functions, Return Values and their types,Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return values, Arguments with Return values, No Argument but Returns a Value, Functions that return Multiple Values .Nesting of functions ,recursion, passing arrays to functions, passing strings to functions, The scope, visibility and lifetime of variables.
Pointers: Accessing the address of a variable, declaring pointer variables ,initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointers,pointers as function arguments, functions returning pointers , pointers to functions, pointers to structures,Memory allocations in C -program Applications.

UNIT-IV

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members , structure initialization, copying and comparing structure variables, arrays of structures, within structures, structures within structures, structures and functions and unions,size of structures and bit-fields –program applications .
File Handling: Defining and opening a file, closing a file, Input /Output operations on files, Error Handling during I/O operations, random access to files and command Line Arguments- program Applications.

Text Books:
1. C & Data Structures (A practical approach) - by G.S. Baluja and G.K.baluja, Dhanapatrai & Co publishers.

Course Code	ESC-ME205				
Category	Engineering Science Course				
Course Title	Engineering Mechanics				
Scheme and Credits	L	T	P	Credits	Semester-II
	3	0	0	3	
Prerequisites (if any)	-				

Course Objectives:

The objectives of this course are to:

- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
- Perform analysis of bodies lying on rough surfaces.
- Locate the Centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections
- Explain kinetics and kinematics of particles, projectiles, curvilinear motion, Centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation, rotation and plane motion.

Course Outcomes:

At the end of the course, students will be able to:

- Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
- Solve problem of bodies subjected to friction.
- Find the location of Centroid and calculate moment of inertia of a given section.
- Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
- Solve problems using work energy equations for translation, fixed axis rotation and plane motion.

ESC-ME205: ENGINEERING MECHANICS

Theory: 3 Hrs/Week   **Credits: 3**
Int Marks: 25   **Ext Marks: 75**

UNIT I

Introduction to Engineering Mechanics:
Basic concepts: System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant-Moment of Forces and its Application; Couples and Resultant of Force System.
Friction: Introduction, Limiting Friction and impending motion, Coulomb's Laws of Friction, Coefficient of Friction, Cone of Friction.

UNIT II

Equilibrium of System of Forces:
Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems, Lami's Theorem, Graphical methods for the Equilibrium of Coplanar Forces, Converse of the Law of Triangle of Forces, and Converse of the Law of Polygon of Forces Condition of Equilibrium.

UNIT III

Centroid & Centre of Gravity: Centroid of simple figures from basic principle, Centroid of composite sections, Centre of Gravity of Simple body, Centre of Gravity of Composite bodies.
Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and Composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere.

UNIT IV

Kinematics & Kinetics: Rectilinear, Curvilinear Motions; Velocity and Acceleration, Motion of Rigid body and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies
Work-Energy Method: Work energy principle and its application in plane motion of connected bodies.

Text Books:
1.Engineering Mechanics –S.Timoshenko & D.H.Young, Mc Graw Hill publications.

2.Engineering Mechanics – Dr.R.K.Bansal ,Laxmi Publications.

Reference Books:
1.Shanes and Rao (2006), Engineering Mechanics, Pearson Education.
2.Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson Education.
3.Reddy Vijaykumar K. and K. Suresh Kumar(2010), Singer‴s Engineering Mechanics.
4.Khurmi R.S. (2010), Engineering Mechanics, S. Chand & Co.
5.Tayal A.K. (2010), Engineering Mechanics, Umesh Publications.

Course Code	**LC –ME206**
Category	**Laboratory Course**
Course Title	**Chemistry Lab**
Scheme and Credits	**L** **T** **P** **Credits** **Semester – II** **0** **0** **3** **1.5**
Prerequisites (if any)	**Knowledge of theoretical, experimental Physics from +2 level and Mathematics.**

Laboratory Outcomes:

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.

The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as afunction of time.

- Measure molecular/system properties such as surface tension, viscosity, Conductance of solutions, hardness of water, etc.

- Synthesize a small polymer molecule.

LC -ME206: CHEMISTRY LAB

Lab: 3 Hrs/Week   **Credits: 1.5**
Int Marks: 50   **Ext Marks: 50**

List of Experiments:

1. Determination of Sodium Hydroxide with HCl (Na_2CO_3 Primary Standard)
2. Determination of Fe(II)/Mohr's Salt by Permanganometry
3. Determination of Oxalic Acid by Permanganometry
4. Determination of Hardness of Water sample by EDTA method
5. Determination of Chromium (VI) by Mohr's Salt Solution
6. Conductometric Titration between Strong Acid and Strong Base
7. Conductometric Titration between Strong Acid and weak Base
8. Determination of Surface tension of Lubricants
9. Determination of Viscosity of Lubricants
10. Preparation of Phenol Formaldehyde Resin

REFERENCE BOOKS:

1. Vogel's Quantitative Chemical Analysis – V – Edition – Longman
2. Experiments in Applied Chemistry (For Engineering Students) – Sinita Rattan – S. K. Kataria&Sons, New Delhi

Course Code	LC-ME207
Category	Laboratory Course
Course Title	Programming for Problem Solving Lab

Scheme and Credits	L	T	P	Credits	Semester-II
	0	0	3	1.5	

Prerequisites (if any)	

Course Objectives:

The course is designed to provide complete knowledge of programming languages. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes:

After Completion of the course student should able to

- Know concepts in problem solving
- To do programming in C language
- To write diversified solutions using C language
- Understand functions in C++ programming

LC-ME207: PROGRAMMING FOR PROBLEM SOLVING LAB

Lab: 3 Hrs/Week   **Credits: 1.5**
Int Marks: 50   **Ext Marks: 50**

LIST OF PROGRAMS:-

1.) a) Write a program to find area of triangle.
b) Write a program to find largest of three numbers.
 2.) a) Write a program to find swapping of two variables.

   b) write a program to find arithmetic operations by using Switch statement.

3.) a) Write a program to find given number is Palindrome or not.

   b) Write a program to find given number is Armstrong or not.

4.) a) Write a program to generate pascal triangle.

   b) Write a program to generate pyramid triangle.

5.)   Write a program to generate the patterns using nested for loops:

   1) *   2) 1   3) 1   4) A B C D

      * *   1 2   2 3   A B C

      * * *   1 2 3   4 5 6   A B

      * * * *   1 2 3 4   7 8 9 10   A

  6.) a) Write a program to implement accessing array elements.

   b) Write a program to implement insert element into an array.

   c) Write a program to implement delete element from the array.

 7.) a) Write a program to find smallest and largest element in an array.

   b) Write a program to implement addition of two matrices.

 8.)   Write a program to implement multiplication of two matrices.

 9.)   Write a program that manipulates string handling functions .

 10.) a) Write a program to find swapping of two numbers using functions .

    b) Write a program to generate problems to function arguments.

 11.)   Write a program to accessing the student information using arrays of structures.

 12.)   Write a program to manipulate structure within a structure concept.

 13.)   Write a program to manipulate file handling functions.

Course Code	LC-ME208				
Category	Laboratory Course				
Course Title	Engineering Workshop Lab				
Scheme and Credits	L	T	P	Credits	Semester-II
			3	1.5	
Prerequisites (if any)	-				

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes:

At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry , house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.

LC-ME208: ENGINEERING WORKSHOP LAB

Lab: 3 Hrs/Week   **Credits: 1.5**
Int Marks: 50   **Ext Marks: 50**

List of Experiments:

1. Carpentry
      1) T-Lap Joint
      2) Cross Lap Joint
      3) Dovetail Joint
      4) Mortise and Tennon Joint

2. Fitting
      1) V Fit
      2) Square Fit
      3) Half Round Fit
      4) Dovetail Fit

3. House Wiring
      1) Parallel / Series Connection of three bulbs
      2) Stair Case wiring
      3) Florescent Lamp Fitting
      4) Measurement of Earth Resistance

4. Tin Smithy
      1) Taper Tray
      2) Square Box without lid
      3) Open Scoop
      4) Funnel

5. Welding Shop
      Lap Joint
      Butt Joint

Note: At least two exercises to be done from each Experiment.

Textbooks:

1. Elements of Workshop by Hajara Choudary-Vol-1

Course Code	MC-ME 209				
Category	Basic Science Course				
Course Title	Professional Ethics and Human Values				
Scheme and Credits	**L**	**T**	**P**	**Credits**	Semester – II
	3			0	
Prerequisites (if any)	Knowledge of moral values.				

Course Objectives:

- To lay a strong foundation in value based living
- To create awareness in students towards realizing self and the effect of right understanding.
- To inculcate in students, a sense of respect towards harnessing values of life and spirit of fulfilling social responsibilities.
- To enable students to lead a practical life adding value to human relations.

Course outcomes:

- The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.
- The students start finding out that technical education with study of human values can generate more problems than solutions.
- They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable
- The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
- The students become aware of their activities of "I" and start finding their focus of attention at different moments.

MC-ME209: PROFESSIONAL ETHICS AND HUMAN VALUES

Theory: 3 Hrs/Week   **Credits: 0**
Int Marks: 25   **Ext Marks: 75**

UNIT –I

Ethics and Human Values: Understanding Value Education: Need for Value Education, Content of Value Education; Process of Value Education. Self Exploration as the Process for Value Education: Introspection; Process of Self Exploration. Ethics: Ethical Vision and Ethical Decisions Human Values: Classification of Values and Universality of Values .

UNIT – II

Engineering Ethics: Nature of Engineering Ethics, Profession and Professionalism, Professional EthicsCode of Ethics, Sample codes- IEEE, ASCE, ASME and CSI. Engineering as Social Experimentation; Engineering Professionals – Life Skills. Engineers as Managers, Consultants and Leaders; Role of Engineers in promoting ethical climate

UNIT – III

Safety Social Responsibility and Rights: Safety and Risk, Moral Responsibility of Engineers for safety. Case Studies: Bhopal Gas Tragedy, Chernobyl disaster, Fukushima Nuclear disaster. Professional Rights; Gender discrimination, Sexual harassment at work place. Balanced outlook on Law.

UNIT – IV

Global Issues: Globalization and MNCs, Environmental Ethics. Computer Ethics; Cyber crimes. Ethical Living; Concept of Harmony in Life

TEXT BOOKS

1. Govindharajan, M., Natarajan, S. and Senthil Kumar, V.S., Engineering Ethics, Prentice Hall of India, (PHI) Delhi, 2004.

2. Subramaniam, R., Professional Ethics, Oxford University Press, New Delhi, 2013.

REFERENCE BOOKS

1. 1.Charles D, Fleddermann, Engineering Ethics, Pearson/ PHI, New Jersey 2004. (Indian Reprint)

2. Guar, R.R., Sangal, R., and Bagaria, G.P. A Foundation course in Human Values and Professional Ethics, Excel Books, New Delhi, 2010.

ADIKAVI NANNAYA UNIVERSITY

RAJAHMAHENDRAVARAM

UNIVERSITY COLLEGE OF ENGINEERING

Model Question Papers

I B.Tech 1st & 2nd Semesters

(Mechanical Engineering)

(For the admitted batch of 2019 – 2020)

(As per Model Curriculum for Undergraduate Degree Courses in Engineering & Technology, January, 2018, AICTE, New Delhi)

ADIKAVINANNAYA UNIVERSITY, RAJAHAMAHENDRAVARAM
UNIVERSITY COLLEGE OF ENGINEERING

I B.Tech **Mechanical Engineering**

Semester I

Course Code	Course	L	T	P	Max. Marks		Total Marks	Credits
		Hours per Week			Internal	External		
HSMC-ME101	English I	3	0	0	25	75	100	3
BSC-ME102	Mathematics I	3	1	0	25	75	100	4
BSC-ME103	Physics	3	1	0	25	75	100	4
ESC-ME104	Engineering Graphics	1	0	4	25	75	100	3
LC-ME105	English Communication Skill Lab	0	0	2	50	50	100	1
LC-ME106	Physics Lab	0	0	3	50	50	100	1.5
MC-ME107	Environmental Science	3	0	0	25	75	100	0
	Induction Programme	2 Weeks Duration						
TOTAL		13	2	9	225	475	700	16.5

Semester-II

Course Code	Course	L	T	P	Max. Marks		Total Marks	Credits
		Hours per Week			Internal	External		
HSMC-ME201	English II	3	0	0	25	75	100	3
BSC-ME202	Mathematics II	3	1	0	25	75	100	4
BSC-ME203	Chemistry	3	1	0	25	75	100	4
ESC-ME204	Programming For Problem solving	3	0	0	25	75	100	3
ESC-ME205	Engineering Mechanics	3	0	0	25	75	100	3
LC-ME206	Chemistry lab	0	0	3	50	50	100	1.5
LC-ME207	Programming for Problem solving Lab	0	0	3	50	50	100	1.5
LC-ME208	Engineering workshop Lab	0	0	3	50	50	100	1.5
MC-ME209	Professional Ethics and Human Values	3	0	0	50	50	100	0
TOTAL		18	2	9	325	575	900	21.5

Time: 3hrs   Max. Marks: 75

SECTION– A

Answer ALL questions   4x15=60M

1. Explain the central theme of the poem "*Once upon a time*".   15 M

OR

1. Answer the following: [5+5+5]

a) Differentiate between Skimming and Scanning.   5M

b) Write Wh-questions for the following responses.   5M
1. They are students.
2. She can come tomorrow.
3. We should buy tickets.
4. He has visited Italy.
5. I ate a salad.

c) Write a note on the use of irony in the poem "*Once Upon a time*"   5M

2. How does R.K. Narayan present the Indian rural ethos in the story *A Horse and Two Goats*   15M

OR

2. Answer the following: [5+5+5]

a) Punctuate the following sentences correctly   5M
1. There's no room for error, said the engineer so we have to double check every calculation.
2. In baseball, a show boat is a man who shows off
3. Darwin's on the origin of species 1859 caused a great controversy when it appeared
4. Oman is a beautiful country the beaches are warm sandy and spotlessly clean
5. She always enjoyed sweets chocolate marshmallows apples

b) Fill in the blanks with suitable prepositions   5M
1. Would you like to go _____ the cinema tonight?
2. No, thanks. I was _____ the cinema yesterday.
3. My brother's birthday is _____ the 25th of November.
4. My birthday is _____ May.
5. My friend has been living in Canada _____ two years.

c) Fill in the blanks with suitable articles   5M
1. Right now, ___ euro is stronger than the dollar.
2. Did you see _____ movie about Dian Fossey's work with mountain gorillas?
3. Did you know _____ man who was talking to Laura?
4. Look at _____ woman over there! She is a famous actress.
5. Where's _____ electric heater? I can't find it.

3. Write an essay on the benefits of Failure according to JK Rowling.   15
OR

3. Answer the following: [5+5+5]

a) Fill in the blanks with appropriate tense form   5M
1. Both of Ravi's children_____(jog) every morning.
2. We_____(make) tea while Shanta is_____(clean) the house.

3. She_____(grow)very tired after she had walked five miles.
4. We_____ (meet) him at the theatre at 8PM tonight.
5. You_____ (find) mobile phone in my house I think I left it three.

b) Put the word in brackets into the correct form. You will have to use prefixes and/or suffixes.   5M
1. I couldn't find any _____ in his theory. (weak)
2. He wants to be a _____ when he grows up. (mathematics)
3. You need to be a highly trained _____ to understand this report. (economy)
4. There were only a _____ of people at the match. (hand)
5. She arrived late at work because she had_____. (sleep)

c) Write a paragraph on any one of the following: 5M
1. My first day at the University
2. What I know about Ocean
3. My favourite book
4. Games people play

4. What are the qualities of time according to Seneca?   15M

OR

4. Answer the following: [10+5]
b) Write an essay on any one of the following   10M
1. Population Explosion
2. Role of technology in human life
3. Students' role in empowering nation

b)Match the following words with appropriate synonyms: 5M
i) Quaint---   1) travel
ii) Crazy—   2) strange
iii) Traverse—   3) mad
iv) Discovered--   4) favorable
v) Congenial--   5) found

SECTION B

5. Answer any FIVE questions: 3x5 = 15M
a) Write a short note on Presentation Skills.
b) Explain the difference between content words and function words with examples.
c) Elucidate the characteristics of a good paragraph?
d) Define Intensive Reading.
e) What does the poet of *Once upon a time* want to learn from his son?
f) How did Muni calculate his age?
g) What are the disadvantages of Group Discussion?
h) Mention the steps involved in essay writing.

<u>Time: 3hrs</u>   <u>Max. Marks: 75</u>

Section – A

Answer ALL Questions.   **4x 15 = 60M**

1. a). Solve $\dfrac{dy}{dx} - \dfrac{y}{x+1} = e^{3x}(x+1)$

   b).Solve $(1+xy)\,ydx + (1-xy)\,xdy = 0$ **[7+8]**

                       (OR)

   c). Solve $\dfrac{dy}{dx} + x\sin 2y = x^3 \cos^2 y$

   d). If the air is maintained at $30^0 C$ and the temperature of the body cools from $80^0 C$ to
       $60^0 C$ in12 minutes, find the temperature of the body after 24 minutes.   **[7+8]**

2. a). Solve $\dfrac{d^2 y}{d\,x^2} + 3\dfrac{dy}{dx} + 2y = 4\cos^2 x$

   b). Using the method of Variation of parameters, solve $\dfrac{d^2 y}{d\,x^2} + 4y = \tan 2x$ **[7+8]**

                       (OR)

   c). Solve $\dfrac{d^2 y}{d\,x^2} - 3\dfrac{dy}{dx} + 2y = xe^{3x} + \sin 2x$

   d). Solve $(2x+3)^2 \dfrac{d^2 y}{d\,x^2} - (2x+3)\dfrac{dy}{dx} - 12y = 6x$ **[7+8]**

3. a). If $u = Tan^{-1}\left(\dfrac{x^3 + y^3}{x+y}\right)$,prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = \sin 2u$

   b).Find the maximum and minimum values of $x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$ **[7+8]**

                       (OR)

   c). If $u = x\sqrt{(1-y^2)} + y\sqrt{(1-x^2)}, v = \sin^{-1} x + \sin^{-1} y$ show that u, v are functionally related and   find
   the relationship.

   d). Given $x + y + z = a$, fin the maximum value of $x^m y^n z^p$ **[7+8]**

4. a). Verify Rolle`s theorem for $f(x) = (x+2)^3 (x-3)^4 \; in(-2,3)$ (if 0<a<b<1)

   b). Prove that $\dfrac{b-a}{1+b^2} < Tan^{-1}b - Tan^{-1}a < \dfrac{b-a}{1+a^2}$ hence show that

   $\dfrac{\pi}{4} + \dfrac{3}{25} < \tan^{-1}\dfrac{4}{3} < \dfrac{\pi}{4} + \dfrac{1}{6}$ **[7+8]**

                       (OR)

   c). If f(x) and g(x) are respectively e^x and e^{-x}, prove that `C` of Cauchy`s mean value theorem is
   the arithmetic   mean between a and b.

   d).Using Taylor`s theorem prove that $x - \dfrac{x^3}{6} < \sin x < x - \dfrac{x^3}{6} + \dfrac{x^5}{120}, for x > 0$ **[7+8]**

Section – B

5. Answer any FIVE Questions: **5x 3 = 15M**

a) Solve $\left(3x^2 + 6xy^2\right)dx + \left(6x^2y + 4y^3\right)dy = 0$

b) Find the orthogonal trajectories of the family of coaxial circles $x^2 + y^2 + 2\lambda x + c = 2, \lambda$ being the parameter

c) Solve $\dfrac{d^3y}{d\,x^3} - 3\dfrac{d^2y}{d\,x^2} + 3\dfrac{dy}{dx} - y = 0$

d) Solve $x^2\dfrac{d^2y}{d\,x^2} - x\dfrac{dy}{dx} + y = \log x$

e) If $u = \log\left(x^3 + y^3 + z^3 - 3xyz\right)$ show that $\left(\dfrac{\partial}{\partial x} + \dfrac{\partial}{\partial y} + \dfrac{\partial}{\partial z}\right)^2 u = \dfrac{-9}{\left(x+y+z\right)^2}$

f) If $x = u\left(1-v\right), y = uv, prove that JJ^1 = 1$

g) Verify Lagranges`s mean value theorem for the function $f\left(x\right) = \sin x \, in\left[0,\pi\right]$ and determine c lying in o and π

h) Evaluate $\underset{x\to 0}{Lt}\dfrac{\log x}{\cot x}$

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
I B.Tech (Common to Civil & Mechanical w.e.f 2019-20**) I Semester**
BSC-ME103 PHYSICS (MODEL QUESTION PAPER)

<u>**Time: 3hrs**</u>	<u>**Marks: 75**</u>

<div align="center">SECTION– A</div>

Answer ALL questions   4x15=60M

1. a) What are the Fundamental laws of Electromagnetism.Explain.   [8M]
   b) Deduce Maxwell's equations   [7M]
<div align="center">(OR)</div>
   c) Classify the Magnetic materials Dia, Para, Ferro, Anti ferro and Ferri magnetic materials
                                                                                                      [10M]
   d) What is Origin of Magnetic moment.   [5M]

2. a) Explain the intensity variation in a fraunhofer single slit diffraction.   [12M]
   b) Newton rings are observed in the reflected light of wavelength 5900 ºA, The diameter
       of 10th dark ring is 0.5cm.Find the radius of curvature of the lens.   [3M]
<div align="center">(OR)</div>
   c) With neat diagrams, describe the principle, construction and working of Gas laser   [10M]
   d) Write a short note on Acceptance angle, Acceptance cone, Numerical aperture.   [5M]

3. a). Deduce time- independent Scrodinger's wave equation.   [10M]
   b) Write its application with one timensional potential box.   [5M]
<div align="center">(OR)</div>
   c) Give the postulates of Free electron theory of metals.   [5M]
   d) Explain Kronig- Penney Model for Energy bands.   [10M]

4.a) Find the Carrier concentration in intrinsic semi conductors.   [10M]
   b) Write a note on Drift and Diffusion currents   [5M]
<div align="center">(OR)</div>
   c) With the statement and theory, calculate the Hall Coefficient.   [10M]
   d) Explain the structure and characteristics of LED.   [5M]

<div align="center">**SECTION– B**</div>

5. Answer any FIVE questions   **5x3=15M**
   a. Explain Hysterisis curve.
   b. What is Bloch' theorem.
   c. Give some applications of Gauss's law
   d. Explain magnetic force on current
   e. Describe the arrangement of Newton's rings experiment.
   f. Explain Nicol's prism.
   g. Applications of optical fibre communication system .
   h. Write a short note on Solar cell.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
I B.Tech (Common to Civil & Mechanical w.e.f 2019-20) I Semester
ESC-ME104 ENGINEERING GRAPHICS (MODEL QUESTION PAPER)

<u>Time: 3hrs</u>   <u>Max. Marks: 75</u>

SECTION– A

Answer ALL questions   **4x15=60M**

a) The headlight reflector of a four–wheeler has a maximum rim diameter of 115 mm and a Maximum depth of 90 mm .Draw the Shape of the reflector. Draw a tangent and normal at any point on the curve.   [10M]

b) Inscribe a regular pentagon in a circle of 70mm diameter   [5M]

(OR)

c) The distance between two fixed points is 90mm. A point P moves such that the difference of its distances from two fixed points always remains constant and is equal to 60 mm. Draw the loci of P. Draw the tangent and normal at any point on the Hyperbola   [10M]

d) Super scribe/Describe/Circumscribe an equilateral triangle about a circle of 50 mm diameter.   [5M]

2 a) Construct a Vernier scale of RF= 1: 25 to show decimeters, centimeters and   millimeters.

The scale should be capable of reading up to 4 decimeters Mark on your scale

the following distances:

(a) 3.23 dm and (b) 3.65 dm   [10M]

b) Draw the projections of the following, keeping the distance between the projectors as 25mm on the same reference line:
(i) A- 25mm above HP and 50mm behind the VP.
(ii) B- 40 mm below HP and 45mm in front of the VP.
(iii) C- on HP and 25mm behind VP.   [5M]

(OR)

c) A motor car is running at a speed of 60 kph. On a scale of RF = 1 / 4,00,000

show the distance travelled by car in 47 minutes.   [10M]

d) A line CD 30 mm long is parallel to both the planes. The line is 40 mm

above HP and 25 mm in front of Vertical Plane. Draw its Projections.   [5M]

3 a) Draw the projections of a cone, bse 30 mm diameter and axis 50 mm long,

resting on HP on a point of its base circle with

(A) the axis making an angle of 45° with HP and

its top view making an angle of 30° with VP   [7M]

(B) The axis making 45° with HP and 30° with VP.   [8M]

(OR)

b) A right hexagonal prism of side of base 24 mm and axis 56 mm long is
lying on one of the corners of the base. Its axis is inclined an angle of 30° to HP.
Draw the isometric projection of the solid.   [15M]

4 a) The front view and top view of a straight line PQ measures 50mm and 65 mm respectively. The point P is in the HP and 20 mm in front of the VP and the front view of the line is inclined at 45° to the reference line. Determine the true length of PQ, true angles of inclination with the reference planes and the trace. [8M]

  b) A thin rectangular plate of sides 50mm x 25mm has its shorter side in HP and inclined at an angle of 30° to the VP. Project its front view when its top view is a Perfect Square of 25mm [7M]

(OR)

 c) Draw the Projections of a line PQ 100 mm long inclined at 30° to HP and 45° to VP. Point P is 20 mm above HP and in VP. Also determine the apparent lengths and inclinations. [8M]

 d) An isosceles triangular lamina has base 40 mm long and altitude 56 mm. It is so placed on Vertical Plane such that in the front view it is seen as an equilateral triangle of 40mm sides with the side that is contained in Vertical Plane is inclined at 45° to Horizontal Plane. Draw its Top View and front views. Also find the inclination of the lamina to Vertical Plane [7M]

SECTION– B

5. Answer any FIVE   **5x3=15M**

a. What is representative fraction?

b. Define the term horizontal trace.

c. What is meant by oblique plane?

d. Define the term apparent angles of inclination in the projection of straight lines

e. What do you understand by a "Right Regular Prism"

f. What is the difference between right and oblique solids?

g. Define the terms: Isometric axes, Isometric Planes

h. Define first angle projection.

Time: 3hrs   Max. Marks: 75

SECTION – A

Answer ALL questions   4x15=60M

1. a) What is Environmental Science? Define its Scope and Importance
    (OR)
    b) Define Ecosystem. Explain

2. a) Discuss in detail about the water resource of earth. Add a note on the conflicts of Water usage
    (OR)
    b) Explain in detail about the forest resources and their exploitation

3. a) What is Biodiversity? Explain about the services the biodiversity offers to mankind
    (OR)
    b) Why should conversation of biodiversity be done. What are the different conversation methods of biodiversity?

3. a) Discuss in detail about the issues involved in environmental ethics. Add a note on their solutions
    (OR)
    b) What is EIA? Explain.

SECTION – B

5. **Answer any FIVE questions**   5 X 3=15M

   a. Rio Summit

   b. Ecological succession

   c. Mineral Resources

   d. Waste land reclamation

   e. Value of Biodiversity

   f. Hotpots of Biodiversity

   g. Water conversation

   h. Ecotourism

<u>**Time: 3hrs**</u>   <u>**Max. Marks: 75**</u>

SECTION– A

Answer ALL questions   **4x15=60M**

1. Describe the lifestyle of the Murlocks from *Time Machine*?   15M

(OR)

1. Answer the following: [5+5+5]
   a) Correct the following sentences   5M
   1. I will like more tea she said to the server.
   2. After today I will had worked here for ten years.
   3. I haven't not heard from John in six months.
   4. When i am sixteen i am going get my license.
   5. If I was president I will make health care more affordable.

   b) Complete the following sentences with correct phrasal verbs   5M
   1. Don't give_____ singing. You are very talented.
   2. Where is the fitting room? I'd like to try_____ these trousers.
   3. Have you tidied_____ the kitchen, yet?
   4. My little sister woke me_____ in the middle of the night.
   5. Don't put the vase there, it will fall_____.

   c) Write a short note on academic style in writing.   5M

2. Write a character sketch of Padmini from *Hayavadana..*   15M

(OR)

2. Answer the following: [8M+7M]

   a) Write a letter to newspaper editor describing university   8M
   b) How is *Hayavadana* a theatre of roots?   7M

3. What can we learn from "*Wings of Fire"?*   15M

(OR)

3. Answer the following: [5+10]
   a) Rewrite the following sentences in Passive Voice   5M
   1. My sister broke my parents' favourite lamp.
   2. The veteran pitcher threw a ball travelling at incredible speed.
   3. Some of the performances amazed us.
   4. They gave up the search after three hours.
   5. The impatient server cleared the dishes from the table.

   b) Write a press report on a Tech fest organised at your University.   10M

4. Write a note on Pankaj Mishra's style in *Butter Chicken in Ludhiana*   15M

(OR)

4. Answer the following: [5+5+5]
   a) Explain the different methods of Referencing   5M
   b) Change the following sentences from Direct to Indirect Speech   5M
   1. "Do you like fish, Mary?" she asked.
   2. The boy said," I couldn't come because of my father's illness."
   3. "I am leaving" the sailor said
   4. "What are you going to do tomorrow?" she asked me.
   5. She said to me, "Don't worry about it."

c) Write short notes on the various components of a project.   5M

SECTION - B

5. Answer any FIVE questions   **5 X 3 = 15M**

a. Significance of References
b. Prepare your Resume
c. SQ3R
d. Formal and Informal styles
e. Expressions for Interrupting
f. Presentation Skills
g. Guidelines for Report Writing
h. Difference between Summarizing and Paraphrasing

Time: 3hrs   **Max. Marks: 75**

Section – A

1. **Answer ALL Questions.**   4x 15 = 60M

    a) Reduce the following matrix into its normal form and hence find its rank

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

    b).Test for consistency and solve
$$2x - 3y + 7z = 5, 3x + y - 3z = 13, 2x + 19y - 47z = 32 \qquad \textbf{[7+8]}$$

(OR)

    c). Find the eigen values and eigen vectors of $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$

    d). Reduce the quadratic form $x_1^2 + 3x_2^2 + 3x_3^2 - 2x_2x_3$ into canonical form and hence write
    the nature.   **[7+8]**

2. a). *Evaluate* $\int_0^1 \int_{e^x}^e \dfrac{dydx}{\log y}$ by changing the order of integration

   b). *Evaluate* $\int_0^1 \int_0^{\sqrt{(1-x^2)}} \int_0^{\sqrt{(1-x^2-y^2)}} xyz \, dxdydz$ **[7+8]**

(OR)

   c). Find the Volume of the ellipsoid $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$

   d). Evaluate $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dxdy$ by changing to polar co-ordinates. Hence show that

$$\int_0^\infty e^{-x^2} dx = \sqrt{\dfrac{\pi}{2}} \qquad \textbf{[7+8]}$$

3. a). Given $\int_0^\infty \dfrac{x^{n-1}}{1+x} dx = \dfrac{\pi}{\sin n\pi}$ show that $\overline{)n)1-n} = \dfrac{\pi}{\sin n\pi}$, hence evaluate $\int_0^\infty \dfrac{1}{1+y^4} dy$

   b). Express $\int_0^\infty \dfrac{x^c}{c^x} dx$ in gamma functions   **[7+8]**

(OR)

   c). Show that $\Gamma\dfrac{1}{2} = \sqrt{\pi}$

   d). Show that $\int_0^\infty \dfrac{x^{10} - x^{18}}{(1+x)^{30}} dx = 0$ **[7+8]**

4. a). If $u = x + y + z, v = x^2 + y^2 + z^2, w = xy + yz + zx$ prove that $[gradu, gradv, gradw] = 0$

b). Show that $\nabla^2(r^n) = n(n+1)r^{n-2}$ **[7+8]**

(OR)

c). Compute the line integral $\int_c (y^2 dx - x^2 dy)$ about the triangle whose vertices are $(1,0),(0,1)$ and (-1,0)

d). Verify Greens theorem for $\int_c \left[(xy + y^2)dx + x^2 dy\right]$ where c is bounded

by y=x and y=x^2 **[7+8]**

Section – B

5. Answer any FIVE Questions: **5x 3 = 15M**

5. a). Evaluate by Stokes theorem $\int_c (yzdx + zxdy + xydz)$ where c is the curve $x^2 + y^2 = 1, z = y^2$

b). Solve the equations $x_1 + x_2 + x_3 = 1, x_1 + 2x_2 + 3x_3 = 6, x_1 + 3x_2 + 4x_3 = 6$ by   Gauss-Jordan method

c). Verify Cayley-Hamilton theorem for the matrix A=$\begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$

d). $Evaluate \int\limits_0^1 \int\limits_{y^2}^1 \int\limits_0^{1-x} xdzdxdy$

e). Show that $\tau n = \int\limits_0^1 \left(\log\dfrac{1}{y}\right)^{n-1} dy(n > 0)$

f). Show that $\tau m \tau m + \dfrac{1}{2} = \dfrac{\sqrt{\pi}}{2^{2m-1}}\tau 2m$

g). Show that $\int\limits_0^5 \int\limits_0^{x^2} x(x^2 + y^2)dxdy$

Time: 3hrs   Max. Marks: 75

SECTION – A

Answer ALL questions   **4 X 15=60M**

1.   a) Write about the following   **[8 + 7]**
            (i) Difference between Addition and Condensation polymerization
            (ii) Difference between Thermosetting and Thermoplastics

(OR)
        b) Write about the following preparation and properties   **[5+5+5]**
            (i) Styrene butadiene Rubber   (ii) Bakelite   (iii) Thiokol Rubber

2.   a) What is corrosion? Explain the various factors effecting on corrosion.   **[15]**
(OR)
        b) Write about the following   **[5+5+5]**
            (i) Galvanic Cells   (ii) Fuel Cells   (iii) Nernest Equation

3.   a) Explain the Proximate and Ultimate Analysis of Coal   **[15]**
(OR)
        b) Explain the types of Organic Reactions with suitable Examples

4.   a) Write about the following   **[7 + 8]**
            (i) Hardness of water   (ii) Reverse Osmosis Method.
(OR)
        b) Write about the Properties and Applications of Nano Materials.   **[15]**

SECTION – B
5. Answer any FIVE question   **5 X 3=15M**

        a. Write about physical properties of Polymers

        b. Write about Biodegradable polymers

        c. Write about Galvanizing and Tinning

        d. Write about Knocking

        e. Write the Structural and Stereo Chemical isomers

        f. Write about Electrodialysis

        g. Write about Fisher Tropsch Process

        h. Explain about Ring opening and Cyclization reactions

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
I B.Tech (Common to Civil & Mechanical w.e.f 2019-20**) II Semester**
BSC-ME204 PROGRAMMING FOR PROBLEM SOLVING
(MODEL QUESTION PAPER)

Time: 3hrs   Max. Marks: 75

Section-A

 Answer all questions:-   4*15=60M

1) a) Explain control structures with an example.

          (Or)

   b) Explain conditional statements with examples.

2) a) Explain one and two dimensional array with examples

          (Or)

   b) Explain string handling functions with examples.

3) a) Explain parameter passing technique with examples.

          (Or)

   b) Define a pointer. Explain the concept of pointers to function with example.

4) a) Define a structure .Explain the concept of structure within a structure with example.

          (Or)

   b) Define a file.Explain the file handling functions with examples.

Section-B

5. Answer any four of the following :-   5*3=15M

   a.   Write a program to find swapping of two numbers with out using third variable .

   b.   Structure of C-languauge.

   c.   Explain the different data types in C.

   d.   WAP to implement insert an element into an Array.

   e.   Explain the categories of functions in C.

   f.   Explain storage classes in C.

   g.   Explain recursive function with example.

   h.   Difference between structures and Unions.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
I BTech (Common to CIVIL & MECHwef 2019-20**) II Semester**
ESC-ME205 ENGINEERING MECHANICS (MODEL QUESTION PAPER)

Time: 3hrs   Max. Marks: 75

SECTION– A

Answer ALL questions   **4x15=60M**

1. a. Three Forces of Magnitude 150N,300N and 500N are acting at the origin O(0,0,0) and
      are directed from the points A (3,2,4),B (3,-2,-4) and C (-1,-3,-4) respectively to the origin.
      Determine the Magnitude of the resultant.   [8M]
   b. What are laws to add two forces and several concurrent, coplanar forces?
      Explain in detail   [7M]

                                                (OR)

   c. State and Prove Lamis Theorem.   [7M]
   d. Five strings are tied at a point and are pulled in all directions, equally spaced,from one
      another. If the Magnitude of the pulls on three consecutive strings is 70N,40N and 55N
      respectively, find graphically the magnitude of the pulls on two other strings, if the
      system is in equilibrium   [8M]

2. a. Explain the types of Friction with Examples.   [7M]

   b. A ladder 5m long and 250N weight is placed against a vertical wall in a position
      where its inclination to the vertical is 30^0 . A man weighting 800N climbs the ladder.
      At what position will he induce slipping? The coefficient of friction or both the
       contact surfaces of the ladder with the floor is 0.2.   [8M]

                                                (OR)

   c. In the Figure 1, the two blocks (A=30 N and B=50 N) are placed on rough
      horizontal plane. Coefficient of friction between the block A and the plane is 0.3
      and that between B and plane is 0.2. Find the minimum value of the force P to just
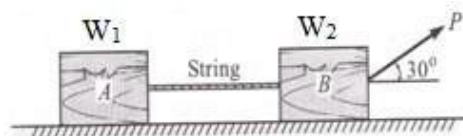   move the system. Also find the tension in the string.   [10M]

Figure 1

   d. Define the terms: (i) Friction; (ii) Coefficient of friction.   [5M]

3. Determine an expression for the center of gravity of a right circular solid cone
   about is base from first principles.   [7M]

b) Find the center of gravity of the shaded area as shown in the Figure 2.   [8M]
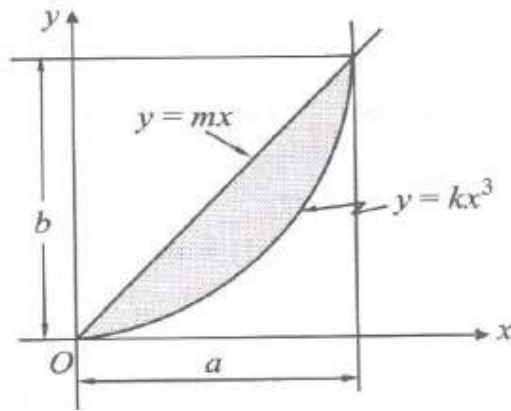

Figure 2.

(OR)

c. Derive an equation for moment of inertia of a Quarter circle.   [8M]

d. Find the Moment of Inertia about the centroidal axis in the given Figure 3.   [7M]
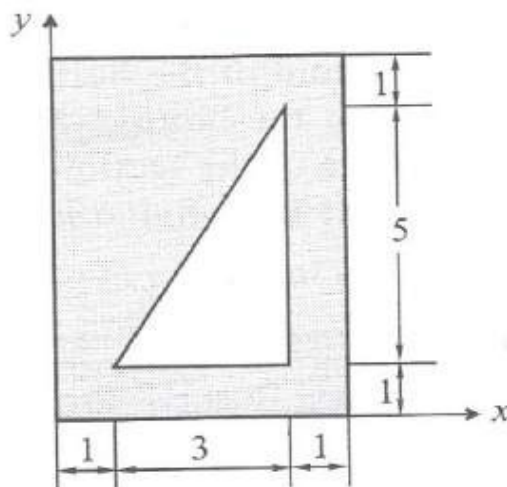

Figure 3

4. a. State and prove transfer formula for product of inertia.   [8M]
    b. Find the mass moment of inertia of an aluminum pipe of 120mm outer diameter
       and 90mm inner diameter and 2.5m height about its longitudinal axis.
       (density,=2560 kg/m3).   [7M]

(OR)

  c. An elevator weighs 10000 N when fully loaded. It is connected to 7500 N counter
     weight C and is powered by an electric wire as show in the Figure 4. Determine
     the power required when (i) the elevator is moving upward at constant speed of 20
     m/s; (ii) the elevator is moving downward at a constant speed of 20 m/s and (iii)
     the elevator has an instantaneous velocity of 20 m/s upward and an upward acceleration
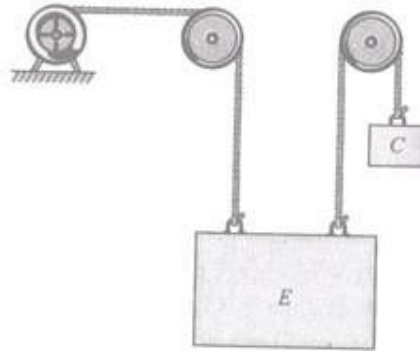   of 3 m/s2.   [15M]

Figure 4

SECTION– B

Answer any FIVE   **5x3=15M**

5. a. Define Equilibrium of motion. Write the equations for Equilibrium.

   b. State the Laws of Friction.

   c. Define Centroid and centre of Gravity.

   d. State D'Alembert Principle giving Equations.

   e. Define the term Radius of gyration. Write the units.

   f. What is fixed axis rotation? Explain.

   g. State Work-Energy theorem for a system of particles.

Time: 3hrs   Max. Marks: 75

SECTION A

 Answer ALL questions   4x15=60M

1. a) Discuss the need for value education and enumerate its content.   [7]
   b) Critically evaluate the process of self-exploration.   [8]
                        (OR)
   c) Define ethics and give an account on ethical vision.   [7]
   d) Explain in detail the classification of human values.   [8]
2. a) Elucidate the nature of ethics for engineering profession.   [8]
   b) Give a note on code of ethics with specific reference to CSI.   [7]
                        (OR)
   c) Write briefly about engineering as social experimentation.   [7]
   d) Explain the role of engineers in promoting ethical climate.   [8]
3. a) Discuss the moral responsibility of engineers towards safety.   [8]
   b) Explain the Fukushima nuclear disaster with the ethical issues involved.   [7]
                        (OR)
   c) Enlist the rights of a professional.   [7]
   d) Trace the importance of having regulatory criteria for a balanced outlook on law.   [8]
4. a) Define the concept of globalization and explain the role of MNCs in India.   [8]
   b) Discuss the importance of environmental ethics.   [7]
                        (OR)
   c) Critically classify cybercrimes with relevant examples.   [8]
   d) Discuss the concept of harmony in life.   [7]

SECTION B

5. Answer any FIVE questions   5 X 3=15M

   a. Introspection
   b. Ethical decisions
   c. Professionalism
   d. Engineers as leaders
   e. Chernobyl disaster
   f. Gender discrimination
   g. Computer ethics h. Ethical living