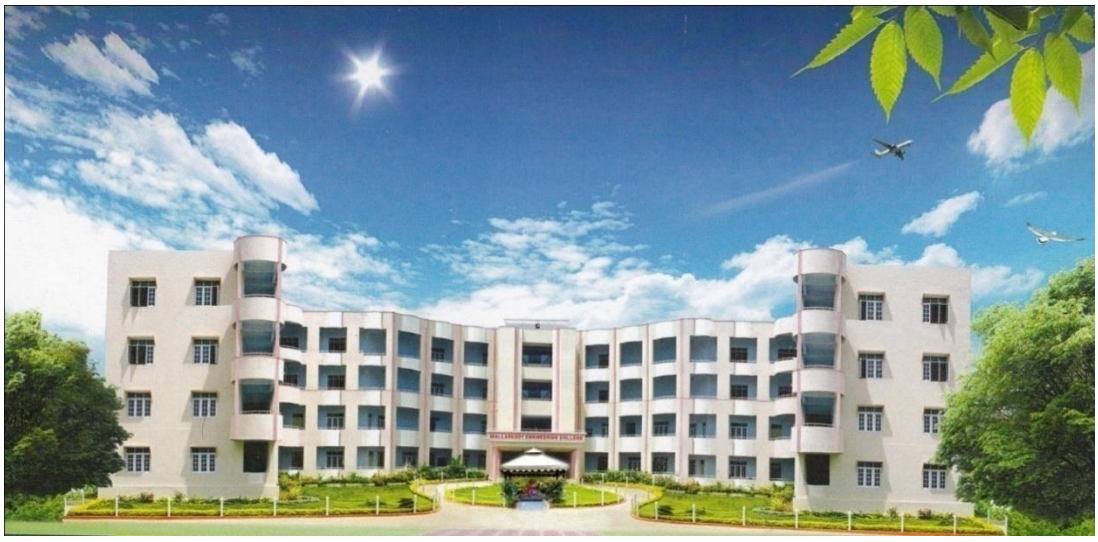
ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2020-21 onwards

Department of Mining Engineering (Min.E)



For

B.Tech. - Four Year Degree Programme

(MR20 Regulations)

DEPARTMENT OF MINING ENGINEERING

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)

(An UGC Autonomous Institution, Approved by AICTE and Affiliated to JNTUH, Hyderabad)
Recognized under section 2(f) &12 (B) of UGC Act 1956, Accredited by NAAC with 'A' Grade (II Cycle) and NBA
Maisammaguda, Dhulapally (Post ViaKompally), Secunderabad - 500 100.
Website: www.mrec.ac.in E-mail: principal@mrec.ac.in

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
MR20 – ACADEMIC REGULATIONS (CBCS)
for B.Tech. (REGULAR) DEGREE PROGRAMME

Applicable for the students of B.Tech. (Regular) programme admitted from the Academic Year ***2020-21*** onwards

The B.Tech. Degree of Jawaharlal Nehru Technological University Hyderabad, Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

VISION

To be a premier center of professional education and research, offering quality programs in a socio-economic and ethical ambience.

MISSION

- To impart knowledge of advanced technologies using state-of-the-art infrastructural facilities.
- To inculcate innovation and best practices in education, training and research.
- To meet changing socio-economic needs in an ethical ambience.

DEPARTMENT VISION

To develop academic and research excellence in Mining and allied areas.

DEPARTMENT MISSION

- To groom students in scientific mining in various domains of mining and allied areas using advanced technologies.
- To impart knowledge about safety, conservation, environmental protection, statutory obligations, economy and social responsibility, utilizing state-of-the-art laboratories.
- To promote institute and industry connect, focusing on leadership, continuous learning, creativity, professional ethics and involvement in research and consultancy projects.

PROGRAMME EDUCATIONAL OUTCOMES (PEOs)

PEO 1: To provide knowledge in science and engineering concepts related to mineral exploration, mining and beneficiation, with the objective of developing application skills for solving real life problems for the benefit of the society.

PEO 2: To nurture to students in a quality environment including entrepreneurship skills, spirit of team work and professional excellence, so as to prepare them for facing the future technical, managerial and financial challenges for sustainable mining.

PEO 3: To develop in depth knowledge and technical competence with the flair for R&D, innovation and lifelong learning.

Programme Specific Objectives (PSOs)

PSO 1: To understand and apply concepts of rock mechanics and ventilation in design, analysis and planning of mines.

PSO 2: To train students in allied subjects like survey, mechanization, mineral Processing, environmental management in mines and geology.

PSO 3: To prepare students to meet the requirements and challenges of mining industry by inculcating scientific thinking including practical aspects in - mining methods, legislation, safety, productivity and economic management of mine

PROGRAMME OUTCOMES (POs)

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MALLA REDDY ENGINEERING COLLEGE (Autonomous)

COURSE STRUCTURE – B.Tech. Mining ENGINEERING

(MR20 Regulations - Effective from Academic Year 2020 – 21 onwards)

SEMESTER – I							
S.No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	HSMC	A0H01	English	3	0	0	3
2.	BSC	A0B05	Linear Algebra and Differential Equations	3	1	0	4
3.	BSC	A0B12	Engineering Physics	3	1	0	4
4.	ESC	A0301	Engineering Graphics	2	0	2	3
5.	ESC	A0501	Programming for Problem Solving	3	0	0	3
6.	BSC	A0B13	Engineering Physics Lab	0	0	2	1
7.	ESC	A0502	Programming for Problem Solving Lab	0	0	2	1
8.	HSMC	A0H02	English Language Lab	0	0	2	1
9.	ESC	A0302	Engineering Workshop	0	0	2	1
10.	AC	A00A1	NSS/SPORTS/YOGA	0	0	3	0
Total				**14**	**2**	**13**	**21**
Total Contact Hours				**29**			

SEMESTER – II							
S.No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	BSC	A0B06	Vector Calculus and Numerical Techniques	3	1	0	4
2.	ESC	A0303	Engineering Mechanics	3	0	0	3
3.	BSC	A0B17	Engineering Chemistry	3	1	0	4
4.	ESC	A0201	Basic Electrical and Electronics Engineering	3	0	0	3
5.	ESC	A0553	Basic Python Programming Lab	0	1	2	2
6.	ESC	A0304	Engineering Mechanics Lab	0	0	2	1
7.	BSC	A0B18	Engineering Chemistry Lab	0	0	2	1
8.	ESC	A0202	Basic Electrical and Electronics Engineering Lab	0	0	2	1
Total				**12**	**3**	**8**	**19**
Total Contact Hours				**23**			

SEMESTER – III							
S.No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
11.	ESC	A0313	Fluid Mechanics and Hydraulic Mechanics	3	0	0	3
12.	ESC	A0239	Electrical Machines and Controls	3	0	0	3
13.	PCC	A2501	Mine Surveying	3	0	0	3
14.	ESC	A0311	Machine Drawing	2	0	0	2
15.	PCC	A2502	Development of Mineral Deposits	3	0	0	3
16.	ESC	A0361	Basic Mechanical Engineering	2	0	0	2
17.	ESC	A0317	Fluid Mechanics and Hydraulic Mechanics Lab	0	0	2	1
18.	PCC	A2503	Mine Surveying Lab	0	0	2	1
19.	ESC	A0554	Fundamentals of Data Structures Lab	0	1	2	2
20.	MCC	A00M2	Environmental Sciences	2	0	0	0
21.	AC	A00A2	Internship-1	0	0	0	0
Total				**18**	**1**	**6**	**20**
Total Contact Hours				**25**			

SEMESTER – IV							
S.No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	BSC	A0B02	Probability and Statistics	3	0	0	3
2.	ESC	A0305	Mechanics of Solids	3	0	0	3
3.	PCC	A2504	Mining Geology	3	0	0	3
4.	PCC	A2505	Mine Environmental Engineering-1	3	0	0	3
5.	PCC	A2506	Drilling and Blasting	3	0	0	3
6.	PCC	A2507	Mining Machinery-1	2	0	0	2
7.	ESC	A0358	Mechanics of Solids Lab	0	0	2	1
8.	PCC	A2508	Mining Geology Lab	0	0	2	1
9.	ESC	A0555	Object Oriented Programming Lab	0	1	2	1
10.	MCC	A00M1	Gender Sensitisation	2	0	0	0
11.	AC	A25N1	NPTEL-1				
Total				**19**	**1**	**6**	**20**
Total Contact Hours				**26**			

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0H01	**ENGLISH**	**L**	**T**	**P**
Credits: 3	**(Common for CE, EEE, ME, ECE, CSE, CSE(AIML), CSE(DS), CSE (CS), CSE(IOT), IT and Min.E)**	**3**	**-**	**-**

Course Objectives:

The objective of this course is to improve the English Language and Literary competence of the students. The course provides requisite insights into grammar, vocabulary, prose, and short stories. Further, it also helps in developing the skills of Reading and Writing. The course also equips students to study their academic subjects more effectively using the theoretical and practical components of the English language and literature.

MODULE – I

Speech **:** "Go Kiss the World" by Subroto Bagchi
Poem **: "**Leisure" by W. H. Davies
Vocabulary **:** Formation of Words, Prefixes, Suffixes, and Root Words
Grammar **:** Articles and Prepositions
Reading **:** Skimming and Scanning
Writing **:** Introduction to Writing Skills, Characteristics of Effective Writing

MODULE – II

Short story **:** "Gift of Magi" by O' Henry
Poem **: "**No Man is an Island" by John Donne
Vocabulary **:** One Word Substitutions; Synonyms and Antonyms
Grammar **:** Degrees of Comparison, Voice – Exercises
Reading **:** Intensive Reading and Extensive Reading
Writing **:** Paragraph Writing- Cohesive devices; Jumbled Sentences; Punctuation

Module – III

Essay **:** "Lucidity, Simplicity, Euphony" by W. Somerset Maugham
Poem **: "**The Mask" by Maya Angelou
Grammar **:** Tense and Aspect
Vocabulary **:** Homonyms, Homophones, Homographs
Reading **:** Reading for Topic and Theme
Writing **:** Letter Writing

MODULE – IV

Short story **:** "The Night Train at Deoli" by Ruskin Bond
Poem **: "**Gift of India" by Sarojini Naidu
Grammar **:** Question Tags; Concord
Vocabulary **:** Idiomatic Expressions; Phrasal Verbs
Reading **:** Reading for Interpretation
Writing **:** Essay Writing, Describing, Defining and Classifying

MODULE – V

Essay : "Toasted English" by R. K. Narayan
Poem : "If" by Rudyard Kipling
Grammar : Direct and Indirect Speech, Misplaced Modifiers
Vocabulary : Redundancies and Clichés
Reading : Reading for Specific Purposes, Reading Comprehension practice
Writing : Paraphrasing & Summarizing,

* Exercises from the texts not prescribed shall also be used for classroom tasks.

Prescribed Textbook:

Reference Books:

1. Azar, Betty and Stacy A, Hagen**.** *Understanding and Using English Grammar*. 4th edition, Foundation Books, 2009.
2. Chaudhuri, Santanu S. *Learn English: A Fun Book of Functional Language, Grammar and Vocabulary*. Tata McGraw Hill Education, New Delhi, 2013.
3. Eastwod, John. *Oxford Guide to English Grammar*. 4th edition, Oxford University Press, 1994.
4. Field, Marion**.** *Improve Your Written English*. 5th Edition. How to Books, UK, 2009.
5. Leech, Geoffrey and Svartvik, J. *A Communicative Grammar of English*. 3rd edition, Routledge, 2013.

Related Websites:

1. http://www.slideshare.net/aszardini/word-formationroot-words-prefixes-and-suffixes
2. http://www.scribd.com/doc/37085980/Circulars-Circular-Letters-Notices-Memo#scribd.
3. http://www.zsme.tarnow.pl/jezykiobce/wp-content/uploads/2013/11/writing-letters1.pdf.

Course Outcomes:

After completion of the course, students will be able to:

1. use written and spoken English considerably well for academic purposes.
2. communicate in Enrich accurately and fluently.
3. employ extensive and intensive reading skills.
4. gain confidence in writing for academic and real-life situations.
5. use standard grammar, punctuation, and spelling in technical documents.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0B05	Linear Algebra and Differential Equations (Common For CE, ME&MINING)	L	T	P
Credits: 4		3	1	-

Prerequisites: Matrices, Differentiation, and Integration

Course Objectives:

1. To learn rank of the matrix and its application to consistency of system of linear equations
2. To learn Eigen Values, Eigen Vectors and nature of Quadratic forms.
3. To learn the concept of the mean value theorems, partial differentiation and maxima and minima.
4. To learn methods of solving differential equations and its applications to basic engineering problems.
5. To learn basics of partial differential equations and the standard forms of partial differential equations.

Module -I: Matrix algebra [12 Periods]

Vector Space, basis, linear dependence and independence (Only Definitions)
Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew- Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; solving system of Homogeneous and Non-Homogeneous linear equations. LU - Decomposition Method

Module- II: Eigen Values and Eigen Vectors [12 Periods]

Eigen values , Eigen vectors and their properties; Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); Finding inverse and power of a matrix by Cayley-Hamilton Theorem; Singular Value Decomposition.
Quadratic forms: Nature, rank, index and signature of the Quadratic Form, Linear Transformation and Orthogonal Transformation, Reduction of Quadratic form to canonical forms by Orthogonal Transformation Method.

Module - III: Differential Calculus [12 Periods]

Mean value theorems: Rolle's theorem and Lagrange's Mean value theorem with their Geometrical Interpretation and its applications, Cauchy's Mean value Theorem. Taylor's Series. Limits, Continuity, Partial differentiation, partial derivatives of first and second order, Jacobian, Taylor's theorem of two variables (without proof). Maxima and Minima of two variables, Lagrange's method of undetermined Multipliers.

Module –IV: Ordinary Differential Equations **[12 Periods]**

First Order and First-Degree ODE: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.
Second and Higher Order ODE with Constant Coefficients: Introduction-Rules for finding complementary function and particular integral. Solution of Homogenous, non-homogeneous differential equations, Non-Homogeneous terms of the type e^{ax} , sin(ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), Method of variation of parameters.

Module – V: Partial Differential Equations **[12 Periods]**

Formation of partial differential equations by eliminating arbitrary constants or arbitrary function, solutions of first order linear (Lagrange) equations, solutions of non linear first order equations (four standard types). Equations reducible to linear, Charpit's Method.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R K Jain SRK Iyengar , Advanced engineering mathematics, Narosa publications.
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley publications.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
3. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, AffiliatedEast–West press, Reprint 2005.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint,2010.

E – RESOURCES:

1. https://www.mathplanet.com/education/algebra-2/matrices/how-to-operate-with-matrices (Systems of linear equations, matrices)
2. http://math.mit.edu/~gs/linearalgebra/ila0601.pdf(Eigen values, Eigen vectors)
3. http://www.math.cmu.edu/~wn0g/noll/2ch6a.pdf(Differential Calculus)
4. https://www.intmath.com/differential-equations/1-solving-des.php (Differential Equations)
5. https://www.math.uni-leipzig.de/~miersemann/pdebook.pdf (Partial differential Equations)

NPTEL:

1. https://www.youtube.com/watch?v=NEpvTe3pFIk&list=PLLy_2iUCG87BLKl8eISe4fHKdE2_j2B_T&index=5 (Matrices – System of linear Equations)
2. https://www.youtube.com/watch?v=wrSJ5re0TAw (Eigen values and Eigen vectors)
3. https://www.youtube.com/watch?v=yuE86XeGhEA (Quadratic forms)

Course Outcomes:

1. The student will be able to find rank of a matrix and analyze solutions of system of linear equations.
2. The student will be able to find Eigen values and Eigen vectors of a matrix, diagonalization a matrix, verification of Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. The student will be able to verify mean value theorems and maxima and minima of function of two variables.
4. Formulate and solve the problems of first and higher order differential equations
5. Apply knowledge of Partial differential equations in real world problems.

CO- PO Mapping:

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COS	**Programme Outcomes(POs)**											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	3	2	2	3	3				2			3
CO2	3	2	2	3	2				2			3
CO3	3	2	2	3	2				2			2
CO4	3	2	2	3	3				2			2
CO5	3	2	2	3	3				2			2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code:A0B12	Engineering Physics (Common For CE, ME&MINING)	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:
The main objective of this course is to provide the basic physics principles, would help engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approaches. This would create awareness about the vital role played by science and engineering in the development of new technologies.

Module – I: Waves and Oscillations [10 Periods]
Simple harmonic Oscillator; damped harmonic oscillator; types of damping – heavy, critical and light damping; energy decay in a damped harmonic oscillator; relaxation time, quality factor; Forced harmonic Oscillator; electrical and mechanical analogy for a simple oscillator.

Module – II [12 Periods]
Acoustics: Introduction, Reverberation and Reverberation time; Basic requirements of acoustically good hall; Absorption coefficient, Jaeger's method for derivation of Sabine's formula; factors affecting the architectural acoustics and their remedies.
Ultrasonics: Introduction, Production of Ultrasonic Waves - Piezo Electric Effect, Inverse piezo electric effect, Piezo-Electric crystal Method, Magnetostriction effect, Magnetostriction Method; Detection of Ultrasonic waves - Piezo Electric detector, Kundt's tube method, Sensitive Flame method and Thermal Detection Method; Applications of Ultrasonics - Medical, SONAR, Ultrasonic drilling and welding,

Module – III: LASERs and Optical Fibers [10 Periods]
LASER: Introduction, Characteristics of LASER; Absorption, spontaneous and Stimulated emission; Einstein's coefficients Derivation; population inversion; pumping mechanisms; Basic components of a laser system; three and four level laser systems; Ruby LASER; He-Ne LASER; Semiconductor diode LASER (Homo junction); Applications of LASER - Computers, Medical, Military.
Optical Fibers: Introduction to Optical fibers, total internal reflection; Acceptance angle, and acceptance cone; numerical aperture; types of optical fibers; Losses in optical fibers - absorption losses, scattering losses and bending losses; Applications of optical fibers - Communications, Level Sensor, LASER angioplasty.

Module – IV [10 Periods]
Non-destructive Testing: Introduction; Objectives of Non-destructive testing; Types of defects – Cracking, Spalling, Staining, Construction and Design defects, Honey combing, Dusting, Blistering, Rain damage; Methods of Non-destructive testing – Liquid penetrant testing, Magnetic particle testing, Ultrasonic inspection method and Radiography testing.

Module – V [10 Periods]
Dielectric Properties: Electric dipole, Dipole moment, Dielectric constant, Polarizability, Electric Susceptibility, Displacement Vector; Determination of dielectric constant by resonance

method; Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Electronic and ionic; Internal field (qualitative treatment); Clausius-mossotti equation; Applications of Dielectric materials.

Nanomaterials: Introduction to nanomaterials, Types of nano materials; factors affecting the properties of nano materials - surface area to volume ratio and Quantum confinement effect; Properties of nano materials; Synthesis of nanomaterials - Sol-gel and Chemical vapour deposition method; Applications of Nanomaterials.

Course Outcomes:

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

1. Distinguish free, damped and forced vibrations.
2. Using the knowledge of acoustics in designing acoustically important buildings and ultrasonics for designing materials.
3. Understand the concepts and applications of LASER and Optical fibers.
4. Apply the knowledge of Ultrasonic to understand non-destructive testing.
5. Understand the importance of dielectric and nanomaterials and their properties.

Text Books:

1. M N Avadhanulu, P G Kshirsagar, "A Textbook of Engineering Physics", Revised Edition 2014.
2. K Vijaya Kumar, S Chandralingam, "Modern Engineering Physics'' Volume I & II, S. Chand, 1st Edition, 2017.
3. B K Pandey and S. Chaturvedi, "Engineering Physics" Cengage Learning India Revised Edition, 2014.

References:

1. P K Palanisamy, "**Engineering Physics**", 4th Edition, SciTech Publications, 2014.
2. G Prasad and Bhimashankaram, "**Engineering Physics**", B S Publications, 3rd Edition, 2008.
3. M.K.Verma, "Introduction to Mechanics", Universities Press.
4. Ajoy Ghatak, "Optics", McGraw-Hill Education, 2012

E-Resources

1. http://www.gistrayagada.ac.in/gist_diploma/PHYSICS-StudyMaterial.pdf
2. http://www.faadooengineers.com/threads/3300-Applied-Physics-Ebooks-pdf-free-download?s=1b6cb6b1de4e7152298bd9d60156cd11

Journals:

1. http://aip.scitation.org/journal/jap
2. http://www.springer.com/physics/journal/340

NPTEL Videos:

1. http://nptel.ac.in/courses/115106061/13
2. https://nptel.ac.in/courses/115/106/115106119/

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0301	ENGINEERING GRAPHICS (Common for CE, ME and Min.E)	L	T	P
Credits: 3		2	-	2

Prerequisites: Nil

Course Objectives:
To develop in students, graphic skills for communication of concepts and ideas of engineering products.

MODULE I: Introduction to Engineering Drawing, Scales and Curves 12 Periods
Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance. Lettering and dimensioning. Geometrical Constructions: Regular polygons only.
Scales: Plane Scale, Comparative Scale, Diagonal Scale, Vernier Scale
Curves: Conic Sections, Cycloidal Curves and Involutes.

MODULE II: Projection of Points, Lines and Planes 12 Periods

Projection of Points: Principles of Orthographic Projections – Conventions – First and Third Angle projections. Projection of points including all four quadrants.
Projection of Lines: Projection of Lines - parallel, perpendicular, inclined to one reference plane and inclined to both reference planes. True length and true angle of a line.
Projection of Planes: Projection of Planes - Axis inclined to one reference plane.

MODULE III: Projection of Solids, Section of Solids and Development of Surfaces 12 Periods

A. Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone by rotating object method. Axis inclined to one reference plane.

B. Section of Solids: Sectioning of single solid with the cutting plane inclined to one plane and perpendicular to the other - true shape of section.
Development of Surfaces: Development of lateral surfaces of simple Solids.

MODULE IV: Isometric Projections and Transformation of Projections 10 Periods

Isometric Projections: Principles of Isometric Projection – Isometric Views– Conventions –Plane Figures, Simple Solids.
Transformation of Projections: Conversion of Isometric Views to Orthographic Views and vice versa– simple objects.

MODULE V: Introduction to Computer Aided Drafting 10 Period
CAD workstation, Advantages of CAD, CAD Software, AutoCAD – Opening and Creating Drawings-Exploring the AutoCAD interface-Zooming and Panning, AutoCAD Commands and Toolbars-Basic Drawing and Editing Commands.

TEXT BOOKS

1. K.L.Narayana, S.Bheemanjaneyulu "**Engineering Drawing with Auto CAD-2016**" New Age International Publishers, 1st Edition, 2018.
2. N.D. Bhat, "**Engineering Drawing**", Charotar Publishing House, 53rd Edition, 2014.

REFERENCES

1. K.L.Narayana, P.Kannaiah, "**Engineering Drawing**", SciTech Publishers. 2nd Edition, 2017
2. K.Venugopal,"**Engineering Drawing**",NewAge International Publishers, 3rd Edition, 2014.
3. K. V. Natarajan, "**A text book of Engineering Graphics**", Dhanalakshmi Publishers, 2015.
4. M.S. Kumar, "**Engineering Graphics**", D.D. Publications, 2011.
5. Trymbaka Murthy, "**Computer Aided Engineering Drawing**", I.K. international Publishing House, 3rd Edition, 2011.

E - RESOURCES

1. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
2. https://www.wiziq.com/tutorials/engineering-drawing
3. http://freevideolectures.com/Course/3420/Engineering-Drawing
4. http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711
5. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics
6. http://nptel.ac.in/courses/112103019/

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0501	Programming for Problem Solving (Common for ALL)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

1. Understand the basic terminology, write, compile and debug programs in computer programming
2. Implement different control statements for solving problems.
3. Understand the concept of structured program and arrays.
4. Implement the idea of strings and pointers.
5. Analyse the usage of structures and different file operations.

MODULE I: Fundamentals and Introduction to 'C' Language [10 Periods]

Introduction Fundamentals– Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to 'C' Language: – Background, C-tokens- Keywords, Identifiers, Basic data types, Variables, Constants, Pre-processor directives-include, define, Managing Input / Output functions - formatted input / output functions, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Simple C Programming examples.

MODULE II: Conditional Statements and Repetition Statements [09 Periods]

Control Statements: if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Repetition statements – while, for, do-while statements, nested looping, other statements related to looping – break, continue, goto, Simple C Programming examples.

MODULE III: Designing Structured Programs and Arrays [10 Periods]

Designing Structured Programs-Introduction to function, Advantages, user defined functions, inter function communication-call by value, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion – recursive functions-Towers of Hanoi problem.

Arrays: Basic Concepts, Types of arrays, applications- Selection sort, Bubble sort, Insertion sort, Linear search and Binary search methods, arrays and functions.

MODULE IV: Strings and Pointers [09 Periods]

Strings: Concepts, String Input / Output functions, arrays of strings, string manipulation functions, string conversion, C program examples.

Pointers – Basic Concepts, Pointers for inter function communication-call by reference, pointers to pointers, Pointer arithmetic, array of pointers, pointers to array, applications, pointers to void, pointers to functions, Dynamic memory allocation functions.

MODULE V: Structures and File Handling **[10 Periods]**

Structures – Declaration, definition and initialization of structures, accessing structure elements, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, difference between structures and union, typedef, bit fields, enumerated types, C programming examples.

Files – Basic Concept of a file, file input / output operations, text files and binary files, file status functions (error handling), Random file access functions, command –line arguments.
C program examples.

TEXTBOOKS

1. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
2. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

E–RESOURCES

1. http://oxford university press.ac.in/eBooks/ Programming in C.
2. https://www.journals.elsevier.com/science-of-computer-programming
3. http://www.ejournalofsciences.org
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. http://onlinevideolecture.com/ebooks/?subject=C-Programming

Outcomes:

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

1. Translate the algorithms/flowcharts to programs (in C language).
2. Decompose a problem into functions and to develop modular reusable code.
3. Apply different types of control structures and arrays in a computer programming.
4. Develop programs that make use of concepts such as strings, pointers and structures.
5. Analyse file operations and command line arguments.

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

Cos	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2				2	1	1	3	3	2	2
CO2	3	3	2	2	2				2	1	1	3	3	2	1
CO3	3	3	3	2	2				1			3	3	2	1
CO4	3	2	3	2	2				1		1	2	3	2	1
CO5	3	3	3	2	2				1	1	1	2	3	2	1

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0B13	Engineering Physics Lab (Common to ME, CE and Min. E)	L	T	P
Credits: 1		-	-	2

Course objectives:

The main objective of this course is to provide the necessary exposure to the practical aspects, which is an essential component for learning science.

List of Experiments:

1 **Melde's Experiment – Longitudinal and Transverse modes**
To determine frequency of electrically maintain Tuning fork using Melde's apparatus.
2 **RLC series circuit**
To determination of resonant frequency, bandwidth and quality factor.
3 **Ultrasonic Interferometer**
To determine the velocity of ultrasonic sound through different liquid media..
4 **Numerical Aperture of an Optical Fiber**
To determine the Numerical aperture of the given fiber.
5 **Bending loss of the given fiber**.
To determine the bending loss of the given fiber.
6 **Diffraction grating**
To determine the wavelength of LASER using Diffraction grating.
7 **B-H Curve**
To study the Magnetization of Ferro magnetic material in presence of magnetic field.
8 **Dispersive Power**
To determine the dispersive power of glass prism.
9 **LASER**
To determination of pitch of the screw gauge using LASER.
10 **Torsional Pendulum**
Determine the rigidity Modulus of given Wire.
11 **Sonometer**
To verify the frequency of AC power Supply**.**
12. **NDT** – Magnetic particle testing

Course Outcomes:

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

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working, application and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Understand measurement technology
5. Use new instruments and real time applications in engineering studies.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0502	Programming for Problem Solving Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL

Objectives:

1. Understand the various steps in Program development
2. Identify syntax and semantics of C Programming Language
3. Illustrate the usage of structured programming approach in solving problems.
4. Develop programs that make use of arrays, strings, pointers and structures in C language
5. Analyse different file operations

Software Requirements: C

List of Programs:

1. a. Practice various Internal and External DOS Commands.
   b. Write sample examples of C programs to implement basic operations.
2. a. Write a C program to find smallest and largest of given three numbers.
   b. Write a C program to find the roots of a quadratic equation.
   c. Write a C program to check whether given character is alphabet, digit or special symbol
3. a. Write a C program to find the sum of individual digits of a positive integer.
   b. Write a C program to generate the first 'n' terms of the sequence.
   [A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.]
4. a. Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
   b. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.
5. Write C programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD (greatest common divisor) of two given integers.
6. a. Write a C program to find both the largest and smallest number in a list of integers.
   b. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search.
   c. Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.

7. a. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order.
   b. Write a C program that implements the Selection sort method to sort a given list of names in ascending order.
8. Write a C program to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices.
9. Write a C program that uses functions to perform the following operations:
   a. To insert a sub-string into given main string from a given position.
   b. To delete n characters from a given position in a given string.
   c. To find substring in a given string
10. a. Write a C program to determine if the given string is a palindrome or not
    b. Write a C program to count the lines, words and characters in a given text.
11. a. Write a C program to swap two numbers, which implement call by value and call by reference.
    b. Write a C program to display the below student details using structures

Roll Number	Name	Gender	Branch	Attendance percentage
501	John	male	CSE	77.3
502	Alice	male	ECE	80.5
503	Sam	female	IT	90.7

    c. Write a C program to find grade of a student using structures.
12. a. Write a C program which copies one file to another
    b. Write a C program to find sum of two numbers using command line arguments
13. a. Develop a mini project which implement the Library Management System
    b. Develop a mini project which implement the Student Record System

TEXT BOOKS:

a. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press
b. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
c. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

a. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
b. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition
c. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

Outcomes:

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

1. Analyse concepts in problem solving and write diversified solutions for a given problem.
2. Identify situations where computational methods and computers would be useful.
3. Understand the programming tasks using techniques learned and write pseudo-code.
4. Compare the program on a computer, edit, compile, debug, correct, recompile and execute it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
Cos	**Programme Outcomes (POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3										2	2	
CO2	3	3	3										2	2	
CO3	2	2	2										2	2	

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0H02	**English Language Lab**	**L**	**T**	**P**
Credits: 1	**(Common for CE, EEE, ME, ECE, CSE, CSE(AIML), CSE(DS), CSE (CS), CSE(IOT), IT and Min.E)**	**-**	**-**	**2**

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Objectives:

The course aims to develop students' intelligibility in their pronunciation of English - speech sounds, word accent, intonation and rhythm. It also helps to improve the fluency in spoken English and make them aware of nuances of major skills, namely, listening and speaking skills. It also trains students to understand nuances of both verbal and non-verbal communication during all activities. The course enables the learners to develop their confidence levels so as to participate in discussions, debates and public speaking.

Listening Skills:

Objectives:

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognize them, awareness regarding stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives:

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Just A Minute (JAM) Sessions.

Syllabus: English Language Communication Skills Lab shall have two parts:
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab
The following course content is prescribed for the English Language Communication Skills Lab

Module - I:
CALL Lab : Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab : Ice-Breaking activity and JAM session; Listening: listening for sounds in context, for ideas; Speaking: ideation and translation of ideas into sentences.

Module - II:
CALL Lab : Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab : Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module - III:
CALL Lab : Word accent and Listening Comprehension-reading(aloud) meaningfully.
ICS Lab : Descriptions- Narrations- Giving Directions and guidelines; Listening: listening for intelligible English; Speaking: formal and informal conversations, register.

Module - IV:
CALL Lab : Intonation and Common errors in Pronunciation- reading aloud (evaluating through recording).
ICS Lab: Extempore- Public Speaking, Oral Presentation Skills; Listening: note taking and listening for speaker's tone/attitude; Speaking: organizing, connecting ideas and sentences, short forms in spoken English, errors in spoken English

Module - V:
CALL Lab : Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab : Information Transfer, Debate

Minimum Requirement of infra structural facilities for EL Lab:
1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
a) P – IV Processor b) Speed – 2.8 GHZ c) RAM – 512 MB Minimum
d) Hard Disk – 80 GB e) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab: The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.
Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

Prescribed Lab Manual:
Rani, Sudha. *English Language Communication Skills Laboratory*. 5th edition, Pearson Publication, 2014.

Reference Books:

1. Gairns, Ruth and Redman, Stuart. *Oxford Word Skills: Learn and Practice English Vocabulary*. 2nd edition, Oxford University Press, 2008.
2. Hughes, John and Mallett, Andrew. *Successful Presentations DVD and Student's Book Pack*. Oxford University Press, 2013.
3. Hancock, Mark. *English Pronunciation in Use* (Intermediate). 2nd edition, Cambridge University Press, 2009.
4. Karia, Akash. *Public Speaking Mastery: Speak Like a Winner*. Kindle edition, 2013.
5. Lucas, Stephen. *The Art of Public Speaking.* 11th edition, Tata McGraw Hill, 2011.

Websites:

1. http://www.mindtools.com/CommSkll/ActiveListening.htm
2. http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity
3. http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b7354268380727a22/An%20article%20for%20Monika%20(2010).pdf

Course Outcomes:
After completion of the course, students will be able to:

1. Understand the nuances of language through audio- visual experience and group activities.
2. Neutralize the accent for intelligibility
3. realize the importance of listening skills and speaking skills and their application in real life situations.
4. Recognize significance of non-verbal communication and develop confidence to face audience and shed inhibitions.
5. Speak with clarity and confidence; thereby enhance employability skills of the students.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: A0302	ENGINEERING WORKSHOP (Common for CE, ME and Min.E)	L	T	P
Credits: 1		-	-	2

COURSE OBJECTIVES:

To understand the usage of hand tools, acquire the skills in model / pattern making and familiarize with various work materials and tools.

I. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry 2.Fitting 3. Tin-Smithy
4. House-wiring 5.Foundry 6.Arc welding

II. TRADES FOR DEMONSTRATION & EXPOSURE

1. Machine shop
2. Plumbing
3. Wood working lathe
4. Identification of Electronic Components
5. Black smithy
6. Computer Peripherals

COURSE OUTCOMES

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

1. Knowledge of carpentry process and methods used in the design and fabrication, installation, maintenance and repair of structures and fixtures (e.g., furniture, cabinets) to accomplish work assignments.
2. Assembling together of part and removing metals to secure the necessary joint by using fitting and welding.
3. Understand the hardware components of house wiring.
4. Understand the manufacturing process using machine shop.
5. Analyze the different types of computer Peripherals

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2	2	1		3			3		2	
CO2	3				2	2	1		3			3		2	
CO3	3				2	2	1		3			3		2	
CO4	3				2	2	1		3			3		2	

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0B06	Vector Calculus and Numerical Techniques (Common For CE, ME&MINING)	L	T	P
Credits: 4		3	1	-

Pre- requisite: Basics of vectors, Differentiation and Integration.

Course Objectives: To learn

1. The physical quantities involved in engineering field related to vector valued functions.
2. The basic properties of vector valued functions and their applications to line, surface and volume integrals.
3. The various numerical techniques which are indispensable tools to solve many algebraic and transcendental equations.
4. Numerical methods of solving the ordinary differential equations.
5. Evaluation of PDE and their applications by using numerical techniques.

MODULE – I: Vector Differentiation [12 periods]

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal and Irrotational vectors. Vector Identities.

MODULE – II: Vector Integration [12 periods]

Line, Surface and Volume Integrals. Green Theorem, Gauss Divergence Theorem and Stokes Theorem (without proofs) and their applications.

MODULE III:: Algebraic and Transcendental equations and Interpolation [12 periods]

(A) Solution of Algebraic and Transcendental Equations: Introduction-Errors, types of errors. Bisection, Method, Method of False Position. The Iteration Method – Newton-Raphson Method

(B) Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences-Forward Differences-Backward differences – Symbolic relations and separation of symbols, Differences of a polynomial-Newton's formulae for interpolation, Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

MODULE – IV: Numerical solution of Ordinary Differential Equations and Numerical Integration [12 periods]

Numerical solution of Ordinary Differential Equations Introduction-Solution by Taylor's series method - Picard's Method of successive Approximations, Euler's Method, Modified Euler's Method – Runge-Kutta Methods.

Numerical Integration: Trapezoidal Rule, Simpson's $1/3^{rd}$ Rule, Simpson's 3/8 Rule.

MODULE – V: Numerical solution of PDE [12 periods]

Classification of second order equations , Finite difference approximations to derivatives ,- standard 5-point formula ,diagonal 5-point formula , solution of Laplace equation, Solution of

Poisson's equation. Solution of one-dimensional heat, wave equations (by Crank-Nicolson explicit/implicit formula only).

Text Books:

1) B.S. Grewal, **HigherEngineering Mathematics**, Khanna Publishers, 36th Edition, 2010.
2) R K Jain S R KIyengar, **Advanced engineering mathematics**, Narosa publications.
3) Erwin Kreyszig, **Advanced Engineering Mathematics**, Wiley publications.
4) M. K Jain, S R K Iyengar, R.K Jain, **Numerical Methods for Scientific and EngineeringComputation**, New age International publishers.
5) S.S.Sastry, **Introductory Methods of Numerical Analysis**,5th Edition,PHI Learning Private Limited

Reference Books:

1. Kanti B. Datta**"Mathematical Methods of Science and Engineering",** Cengage Learning.
2. Alan Jeffrey **"Mathematics for Engineers and Scientists"**, Chapman & Hall/ CRC, 6th Edition 2013
3. Michael Greenberg **"Advanced Engineering Mathematics"**, Pearson Education Second Edition.
4. G.B. Thomas and R.L. Finney, **Calculus and Analytic geometry**, 9th Edition, Pearson,Reprint, 2002

E Resources:

a) Concerned Website links

1. http://www.mecmath.net/calc3book.pdf(VectorCalculus)
2. http://www.simumath.com/library/book.html?code=Alg_Equations_Examples (Algebraic and transcendental equation text book by YURG BERENGARD)
3. http://jupiter.math.nctu.edu.tw/~smchang/9602/NA_lecture_note.pdf (Interpolation)
4. http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf (Numerical Differentiation and Integration)
5. http://www.sam.math.ethz.ch/~hiptmair/tmp/NPDE10.pdf (Numerical Solution of Partial Differential Equations)

b) Concerned Journals/Magazines links

1. https://www.jstor.org/stable/27953736?seq=1#page_scan_tab_contents(Algebraic andtranscendental equation by William L. Schaaf)
2. http://www.ijcsi.org/papers/IJCSI-9-6-2-413-419.pdf(Algebraicandtranscendental equation by Md. Golam Moazzam)
3. http://www.iosrjournals.org/iosr-jm/papers/Vol6-issue6/J0665862.pdf (Interpolation)

c) NPTEL Videos

1. http://nptel.ac.in/courses/122102009 (Algebraic andtranscendental equation)
2. http://nptel.ac.in/courses/112104035/14 (Mathematical methods in engineering and science by Prof.Bhaskar Dasgupta)
3. http://nptel.ac.in/courses/111107063 (Numerical solution of Ordinary Differential Equations)
4. http://nptel.ac.in/courses/111105038 (Numerical Solution of Partial Differential Equations)

Course Outcomes:

After completion of this course, students will be able to:

1. Apply the concept of Gradient, Divergence and Curl of a vector valued functions and scalar valued functions in engineering and physical problems.
2. Apply vector integral theorems in engineering and physical problems.
3. Apply numerical methods to solve some algebraic and transcendental equations to the desired level of accuracy and by applying interpolation concept to evaluate missed data in data analysis.
4. Apply differential equations in engineering-oriented problems and to observe patterns by using numerical techniques.
5. To find out the Numerical solution of partial differential equations.

Co-Po Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2								1
CO2	3	3	2	3								
CO3	3	3	3	3								1
CO4	3	3	3	3								
CO5	3	3	3	3								

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0303	ENGINEERING MECHANICS (Common for CE, ME and Min.E)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

COURSE OBJECTIVES:

The objective of this subject is to provide the basic concepts and effect of system forces on rigid bodies, Geometrical Properties of Planes and Solids, problem solving in kinematics and kinetics using different methods and to analyze the types of friction for moving bodies and problems related to friction.

MODULE I: Introduction to Mechanics & System of Forces **10 Periods**

Introduction: Basic Concepts, Laws of Motion, Force - types, characteristics - Principle of transmissibility - Types of Forces - Concurrent and non-concurrent Forces - Composition of force – Resultant - Triangle, Polygon and Parallelogram Law of Forces - Moment of Force and its Application - Varignon‘s theorem, Couples - Free Body Diagrams, Types of Supports and their reactions, Internal and External Forces - Types of Equilibrium, Equations of Equilibrium, Conditions of Equilibrium - Lami‘s Theorem.

MODULE II: Friction, Centroid and Center of Gravity **10 PERIODS**

Friction: Types of friction, Limiting friction, Laws of friction, static and dynamic friction, application of laws of friction. Motion of bodies - wedge, screw, screw jack.
Centroid and Center of Gravity: Introduction, Centroids of Lines and Areas - simple figures - Centroid of composite figures. Pappus theorem - Centre of gravity of simple solids, composite solids - Centroids of volumes.

MODULE III: Moment of Inertia **10 Periods**

A: Area Moment of Inertia: Definition - Moment of Inertia of plane areas, Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures.
B: Mass Moment of Inertia: Introduction-moment of inertia of masses - Radius of gyration-Transfer formula for mass moment of inertia- by integration - Moment of Inertia of composite bodies.

MODULE IV: Kinematics & Kinetic **09 Periods**

Kinematics: Rectilinear motion - Motion of Rigid Body under uniform and variable accelerations - motion under gravity- curvilinear motion – Projectiles - rotary motion.
Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation - D’Alemberts Principle - Connected bodies- Kinetics of rotating bodies.

MODULE V: Work, Power, Energy & Mechanical Vibrations 09 Periods

Work, Power and Energy: Introduction, work-energy equation - motion of connected bodies - work done by a spring - general plane motion.

Mechanical Vibrations: Definitions, concepts - simple harmonic motion - free vibrations - Simple and compound pendulums.

TEXT BOOKS

1. S. Timoshenko, D.H. Young, J.V. Rao and Sukumar Pati**, "Engineering Mechanics"**, Tata McGraw-Hill Education, 5th Edition, 2013.
2. K.Vijaya Kumar Reddy, J. Suresh Kumar**, "Engineering Mechanics"**, B S Publications, 3rd Edition, 2013

REFERENCES

1. Beer, F.P and Johnston Jr. E.R. "**Vector Mechanics for Engineers**", Tata McGraw-Hill Education 10th Edition (India) Pvt Ltd.. 2013.
2. Fedinand. L. Singer, **"Engineering Mechanics"**, Harper & Row Publishers, 3rd Edition, 1975.
3. R.S. Khurmi, "**A Text Book of Engineering Mechanics"**, S.Chand Publications, 21st Edition, 2007.
4. K L Kumar, "**Engineering Mechanics"**, Tata McGraw Hill Education, 4th Edition, 2011.
5. D.S.Kumar Patil, "**Engineering Mechanics"**, SK Kataria & Sons Publishers, 2nd Edition, 2009.

E - RESOURCES

1. http://www.mathalino.com/reviewer/engineering-mechanics/equilibrium-force-system
2. http://nptel.ac.in/courses/112103109/
3. http://ascelibrary.org/journal/jenmdt
4. https://tll.mit.edu/sites/default/files/SUTDVideoThumb/freebodydiagrams.pdf
5. http://nptel.ac.in/courses/112106180/
6. http://nptel.ac.in/courses/115104094/

COURSE OUTCOMES

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

1. Determine the resultant of a system of forces and draw free body diagrams and can frame appropriate equilibrium equations from the free body diagram.
2. Understand and solve the fundamental static problems and able to find centroid and centre of gravity.
3. Determine area and mass moment of inertia for various sections.
4. Apply fundamental concepts of kinetics and kinematics of particles to the analysis of simple practical problems.
5. Understand and solve fundamental work, power and energy related problems and know the concepts of mechanical vibrations.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**Programme Outcomes(POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**3**	**1**	**3**								**3**	**2**		
CO2	**3**	**3**	**1**	**3**								**3**	**2**		
CO3	**3**	**3**	**1**	**3**								**3**	**2**		
CO4	**3**	**3**	**1**	**3**								**3**	**2**		
CO5	**3**	**3**	**1**	**3**								**3**	**2**		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech II Semester		
Code: A0B17	Engineering Chemistry (Common for CSE, IT, ECE, EEE, CE, ME and Min.E)	L	T	P
Credits: 4		3	1	-

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 on atomic- molecular orbital's, electrochemistry, batteries, corrosion and the role of water as an engineering material in domestic-industrial use. They will also impart the knowledge of stereochemistry, understanding the chemical reaction path way mechanisms and synthesis of drugs. Listing out various types of fuels and understanding the concept of calorific value and combustion.

Module I: Water and its treatment [10 Periods]

Introduction to water, hardness of water, causes of hardness, expression of hardness, units and types of hardness-Numerical Problems. Alkalinity of water, specifications of potable water (BIS); Estimation of temporary & permanent hardness of water by EDTA method. Boiler troubles - Scale & Sludge, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water - Internal treatment (colloidal, phosphate, carbonate and calgon conditioning). External treatment - Lime Soda process (cold & hot) and ion exchange process, Numerical Problems. Disinfection of water by chlorination and ozonization. Desalination by Reverse osmosis and its significance.

Module II: Molecular structure and Theories of Bonding: [10 Periods]

Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N_2 ,O_2 and F_2. Introduction to coordination compounds-ligand-coordination number (CN) - spectrochemical series. Salient features of crystal field theory, Crystal field splitting of transition metal complexes in octahedral ($[CoF_6]^{3-}$ and $[Co(CN)_6]^{3-}$) and tetrahedral ($[NiCl_4]^{2-}$ and $[Ni(CO)_4]$) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion

A. Electrochemistry: [7 Periods]

Introduction to Electrochemistry-Conductance (Specific and Equivalent) and units. Types of cells-electrolytic & electrochemical cells (Galvanic Cells)-Electrode potential- cell potential (EMF).Electrochemical series and its applications, Nernst equation its applications and numerical problems. Reference electrodes - Calomel Electrode and Glass electrode-determination of pH using glass electrode. Batteries: Primary (dry cells) and secondary (Lead-Acid cell, Ni-Cd cell) - applications of batteries. Fuel cells: Hydrogen - Oxygen fuel cell and its applications.

B. Corrosion: [7 Periods]

Causes and effects of corrosion: Theories of corrosion - Chemical & Electrochemical corrosion, Pilling-Bedworth rule, Types of corrosion: Galvanic and Water-line corrosion. Factors affecting rate of corrosion-Nature of metal and Nature of Environment, Corrosion control methods -

Cathodic protection (Sacrificial anodic and impressed current cathodic methods). Surface coatings: Methods of metallic coatings - hot dipping (Galvanization), Electroplating (Copper) and Electroless plating (Nickel).

Module IV: Stereochemistry, Reaction mechanism & synthesis of drug molecules and NMR spectroscopy: [12 Periods]

Introduction to Isomers - classification of isomers - structural (chain, positional & functional) and stereoisomerism-geometrical (cis-trans & E-Z system) - characteristics of geometrical isomerism, optical isomerism (chirality - optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism of n-Butane. Introduction to bond cleavage (homo & hetero cleavage) - reaction intermediates and their stability. Types of organic reactions - Mechanism of substitution (SN^1 & SN^2) and (E_1&E_2) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizaro reaction), cyclization (Components of Diels-Alder reaction-Mechanism of Diels-Alder reaction with suitable example) reactions. Synthesis of Paracetamol, Aspirin and their applications.
Introduction to Spectroscopy, Basic concepts of nuclear magnetic resonance spectroscopy, chemical shift and spin-spin splitting.

UNIT-V Fuels and Combustion [08 Periods]

Fuels: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG. **Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel. Determination of calorific value by Junkers gas calorimeter-Numerical problems on combustion.

Text Books:

1. P.C.Jain and Monica Jain, "**A Text Book of Engineering Chemistry"**, DhanpatRai Publications, New Delhi, 16th Edition 2014.
2. S.S. Dara and S.S. Umare, "**A Text Book of Engineering Chemistry"**, S Chand Publications, New Delhi, 12th Edition 2010.
3. A.Jaya Shree, "Text book of Engineering Chemistry", Wiley, New Delhi, 2018.

Reference Books:

1. B.Rama Devi, Ch.VenkataRamana Reddy and PrasanthaRath, **"Text Book of Engineering chemistry"**, Cengage Learning India Pvt.Ltd,2016.
2. M.G. Fontana and N. D. Greene, "**Corrosion Engineering"**, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. K. P. C. Volhardt and N. E. Schore, **"Organic Chemistry: Structure and Function"**, 5th Edition, 2006.

e-Resources:

a) Concerned Website links:

1) https://books.google.co.in/books?isbn=0070669325 (Engineering chemistry by Sivasankar).
2) https://www.youtube.com/watch?v=yQUD2vzfgh8 (Hot dipping Galvanization).

3)https://archive.org/stream/VollhardtOrganicChemistryStructureFunction6th/Vollhardt_Organic_Chemistry_Structure_Function_6th_djvu.txt.

b) Concerned Journals/Magazines links:

1) http://americanhistory.si.edu/fuelcells/sources.htm (Fuel Cell Information Sources)
2) https://www.abctlc.com/downloads/courses/WaterChemistry.pdf (Water Chemistry)

c) NPTEL Videos:

1) nptel.ac.in/courses/113108051/ (corrosion & electrochemistry web course)
2) https://www.youtube.com/watch?v=V7-8EOfZKeE (Stereochemistry)

Course Outcomes:

After completion of the course students will be able to:

1. Understand water treatment, specifically hardness of water and purification of water by various methods.
2. Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity.
3. Acquire knowledge on electrochemical cells, fuel cells, batteries and their applications.
4. Acquire basic knowledge on the concepts of stereochemistry, reaction mechanisms and interpretation of NMR in organic molecules.
5. Acquire the knowledge of various fuels and identify a better fuel source of less pollution.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for ALL)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

MODULE I: DC Circuits [09 Periods]

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws - Series, parallel, series-parallel, star-to-delta and delta-to-star transformation-analysis of simple circuits with dc excitation. Superposition, Thevenin's and Maximum Power Transfer Theorems with DC excitation.

MODULE II: AC Circuits [09 Periods]

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel).

MODULE III: Introduction to Electrical Machines [10 Periods]

A: DC Machines: Construction & Principle of Operation of DC Generators – E.M.F Equation. Principle of operation DC Motors – Back E.M.F. - Torque equation – Brake Test - Characteristics.

B: AC Machines: Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors - Brake test on 3-Phase Induction Motor – Applications.

MODULE IV: P-N Junction Diode [10 Periods]

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

Filters: Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

MODULE V: BJT and Junction Field Effect Transistor (JFET) [10 Periods]

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations and Input-Output Characteristics, Comparison of CE, CB and CC configurations

Junction Field Effect Transistor and MOSFET: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

TEXT BOOKS

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, "Basic Electrical and Electronics Engineering", S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, "Electronic Devices & Circuit Theory", Pearson Education, 2007.

REFERENCES

1. V.K. Mehtha and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand& Co., 2009.
2. Jacob Milliman, Christos C. Halkias, Satyabrata Jit (2011), "Electronic Devices and Circuits", 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, "Digital Fundamentals", Pearson Education, 2009.
4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering", Tata McGraw Hill, 2001.
6. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - RESOURCES

1. https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/
2. https://www.eeweb.com/passives
3. http://nptel.ac.in/courses/108108076/
4. http://nptel.ac.in/downloads/108105053/

Course Outcomes:

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

1. Apply basic laws in electrical circuit.
2. Analyze the single phase circuits
3. Comprehend the construction and Operation of DC and AC machines
4. Know the practical importance of Diode and its characteristics
5. Recognize the construction and operation of BJT and JFET

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO5															

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0553	**Basic Python Programming Lab** (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives: To be able to introduce core programming basics and program design with functions using Python programming language, understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.

Software Requirements: Python

List of Programs:

1. a) Write a program to demonstrate different number data types in Python.
   b) Write a program to perform different Arithmetic Operations on numbers in Python.
2. a) Write a program to create, concatenate and print a string and accessing sub-string from a given string.
   b) Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
3. Write a program to create, append, and remove lists in python.
4. Write a program to demonstrate working with tuples in python.
5. Write a program to demonstrate working with dictionaries in python.
6. a) Write a python program to find largest of three numbers.
   b) Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
7. a) Write a Python script that prints prime numbers less than 20.
   b) Write a python program to find factorial of a number using Recursion.
8. a) Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
   b) Write a python program to define a module and import a specific function in that module to another program.
9. a) Write a program that defines and print a matrix.
   b) Write a program to perform addition of two square matrices.
   c) Write a program to perform multiplication of two square matrices.
10. a) Write a function dups to find all duplicates in the list.
    b) Write a function unique to find all the unique elements of a list.
11. a) Write a program to print each line of a file in reverse order.
    b) Write a program to compute the number of characters, words and lines in a file.
12. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

TEXT BOOKS:

1. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson Publications.
2. Mark Lutz," Learning Python", Orielly Publishers

REFERENCES:

1. Allen Downey, “Think Python”, Green Tea Press
2. W. Chun, “Core Python Programming”, Pearson.
3. Kenneth A. Lambert, “Introduction to Python”, Cengage

Course Outcomes:

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

1. **Develop** simple applications using python.
2. **Make use of** functions in python scripts.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**Programme Outcomes (POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	1			1	1							1	1		
CO2		1	2	3								3		1	1
CO3	1	1	1	1	2	1	1					3		2	3

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0304	ENGINEERING MECHANICS LAB	L	T	P
Credits: 1	(Common for CE, ME and Min.E)	-	-	2

COURSE OBJECTIVES:

The objective of this subject is to provide the basic concept of force, moment of inertia, reaction and moments by practically.

List of Experiments

1. Verify the triangle law and polygon law of forces.
2. To find the equilibrium of coplanar concurrent force system-forces in the jib crane.
3. To determine the support reaction for a beam.
4. To determine the moment of inertia of a flywheel.
5. To verify the law of moments by disc apparatus.
6. To determine the coefficient of friction.
7. To verify the equilibrium of Non Concurrent forces.
8. To verify the equilibrium of forces using force table.
9. To determine the efficiency of a simple screw jack apparatus.
10. To estimate the value of acceleration due to gravity by using compound pendulum.
11. To determine the efficiency of Worm and Worm Wheel apparatus.
12. To determine the efficiency of a Differential Wheel and Axle apparatus.

COURSE OUTCOMES

At completion of the course, students will be able to

1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.
2. Apply basic knowledge of mathematics and physics to solve real-world problems.
3. Determine the coefficient of friction.
4. Determine the efficiency of a simple screw jack apparatus, Worm and Worm Wheel apparatus and Differential Wheel and Axle.
5. Estimate the value of acceleration due to gravity.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

Cos	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3					3			2	2		
CO2	3	1	1	3					3			2	2		
CO3	3	1	1	3					3			2	2		
CO4	3	1	1	3					3			2	2		
CO5	3	1	1	3					3			2	2		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0B18	**Engineering Chemistry Lab (Common for CE, EEE, ME, ECE, CSE,CSE(AIML), CSE(DS), CSE (CS), CSE(IOT),IT and Min.E))**	**L**	**T**	**P**
Credits: 1		-	-	**2**

Course Objectives:

To provide the students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

List of Experiments:

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of an acid by P^H metry.
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn^{+2} ion in $KMnO_4$ by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

Course outcomes:

After completion of the course, students will be able to:

1. Estimate the hardness of given water samples.
2. Select lubricants for various purposes.
3. Prepare advanced polymers & drug materials.
4. Know the strength of an acid present in batteries.
5. Calculate the amount of Mn^{+2} present in unknown substances/ores using instrumental methods.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: A0202	Basic Electrical and Electronics Engineering Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL

Course Objectives:

To get practical knowledge about basic electrical circuits, electronic devices like Diodes, BJT, JFET and also analyse the performance of DC Motors, AC Motors and Transformers.

List of Experiments:

1. Verification of Kirchhoff's Laws.
2. Verification of Maximum Power Transfer Theorem.
3. Determination of Phase Angle for RC series circuit.
4. Brake Test on DC-Shunt Motor. Determination of Performance curves
5. Load Tests on Single Phase Transformer
6. Brake Test on Three Phase Induction Motors. Determination of Performance curves
7. V-I Characteristics of PN junction Diode
8. V-I Characteristics of Zener Diode
9. Half Wave Rectifier and Full Wave rectifier.
10. Input and Output characteristics of BJT with CE configuration
11. Input and Output characteristics of BJT with CB configuration
12. Input and Output Characteristics of JFET.

Course Outcomes:

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

1. Analyze electrical circuits by applying basic laws
2. Analyze the performance of DC Motor, three phase Induction motor and transformer
3. Understand V-I Characteristics of various diodes
4. Design Different Rectifier Circuits
5. Differentiate the Transistors and their Operations

2020-21 Onwards (MR-20))	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: A0313	FLUID MECHANICS AND HYDRAULIC MACHINES	L	T	P
Credits: 3	[Common to EEE and Min.E]	3	-	-

Prerequisites: Nil

Course Objectives:

The objective of this subject is to provide the knowledge of fluid power and analyze the performance of various hydraulic machines like turbines, compressors and pumps.

MODULE I: FLUID STATICS **10 PERIODS**

Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

Hydro static forces on plane and curved surfaces. Buoyancy and floatation: Meta center, stability of floating body, Submerged bodies, Calculation of metacentric height.

MODULE II: FLUID KINEMATICS & FLUID DYNAMICS **10 PERIODS**

Fluid kinematics: Stream line, path line and streak lines and stream tube, classification of flows- steady & unsteady, uniform & non uniform, laminar & turbulent, rotational and irrotational flows-equation of continuity for one dimensional flow. Velocity potential and stream function – flow net.

Fluid dynamics: Surface and body forces –Euler‘s and Bernoulli‘s equations for flow along a stream line, Measurement of flow: pitot tube, venturimeter and orifice meter, Flow nozzle, Turbine flow meter, momentum equation and its application on pipe bend.

MODULE III: Closed Conduit Flow & Boundary Layer Concepts **10 Periods**

A: Closed conduit flow: Reynold‘s experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel - total energy line - hydraulic gradient line.

B: Boundary Layer Concepts: Definition, thickness, characteristics along thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

MODULE IV: Turbo machinery and Hydraulic Turbines **09 Periods**

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, workdone and efficiency, flow over radial vanes.

Hydraulic Turbines: Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, workdone, efficiencies, hydraulic design – draft tube theory - functions and efficiency. Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

MODULE V: Centrifugal Pumps & Reciprocating Pumps **09 Periods**

Centrifugal pumps: Classification, working, work done – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH. Reciprocating pumps: Working, Discharge, slip, indicator diagrams.

TEXT BOOKS

1. Modi and Seth, "**Hydraulics, fluid mechanics including hydraulic machines**", Standard Publishers, 19th Edition, 2013
2. R.K. Bansal, "**Fluid Mechanics and hydraulic Machines**", Laxmi Publications, 9th Edition, 2010.

REFERENCES

1. R.K. Rajput, "**Fluid Mechanics and Hydraulic Machines**", S.Chand, 5th Edition, 2013.
2. D. Rama Durgaiah, **"Fluid Mechanics and Machinery"**, New Age International (P) Ltd, 1st editions, 2007
3. James W. Dally, William E. Riley **"Instrumentation for Engineering Measurements",** John Wiley & Sons Inc. 3rd editions, 1989.
4. Vijay Gupta and S.K.Gupta, "**Fluid Mechanics and Applications**", New-Age International Ltd. 1999.
5. Banga & Sharma, "**Hydraulic Machines**", Khanna Publishers, 7th Edition, 2007

E - RESOURCES

1. nptel.ac.in/courses/112105183/
2. www.nptelvideos.in/2012/11/fluid-mechanics.htm
3. nptel.ac.in/courses/112104117/
4. www.sanfoundry.com/best-reference-books-fluid-mechanics-and-machinery/
5. https://www.elsevier.com/journals

COURSE OUTCOMES:

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

1. Know the dimension and units of fundamental properties.
2. Understand the concept of fluid kinematics and dynamics.
3. Understand and solve the problems of closed conduit flow & boundary layer concepts.
4. Analyze the performance of turbo machinery and hydraulic turbines.
5. Understand the principles of centrifugal and reciprocating pumps.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		3	2	1						3	3		
CO2	3	3		3	2	1						3	3		
CO3	3	3		3	2	1						3	3		
CO4	3	3		3	2	1						3	3		
CO5	3	3		3	2	1						3	3		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech III Semester		
Code: A0239	ELECTRICAL MACHINES AND CONTROLS	L	T	P
Credits: 3		3	-	-

PREREQUISITE: NIL

Course Objectives:

To impart knowledge on Basics of electric drives, Different speed control methods, various motor starters and controllers, instrumentation and its applications.

MODULE-I: INTRODUCTION **10 PERIODS**

Fundamentals of electric drives – advances of electric drive-characteristics of loads – different types of mechanical loads – choice of an electric drive – control circuit components: Fuses, switches, circuit breakers, contactors. Relay – control transformers.

MODULE-II: SPEED CONTROL OF DC MACHINES **10 PERIODS**

DC shunt motors – Speed Torque characteristics - Ward Leonard method, DC series motor – series parallel control – solid state DC drives – Thyristor bridge rectifier circuits chopper circuits.

MODULE-III: Speed Control of AC Machines **10 Periods**

A: Induction motor – Speed torque Characteristics – pole changing, stator frequency variation - slip-ring induction motor – stator voltage variation - Rotor resistance variation,

B: Slip power recovery – basic inverter circuits- variable voltage frequency control.

MODULE-IV: Motor Starters and Controllers **09Periods**

DC motor starters using voltage sensing relays, current sensing relays and time delay relays - wound rotor induction motor starters – starters using frequency sensing relays -DOL -starter

MODULE-V: INSTRUMENTATION **09 PERIODS**

Flame proof equipments, intrinsically safe equipments,

Dissolved O_2 Analyzer: Conductivity meter – pH meter – Dissolved oxygen analyser – Silica analyser – Turbidity meter – Gas analyser – NOx analyser – H2S analyser – CO and CO2 monitor, Dust & Smoke measurement.

TEXT BOOKS:

1. N.K De and P .K Sen 'Electric Drives' Prentice Hall of India Private Ltd, 2002.
2. Vedam Subramaniam 'Electric Drives' Tata McGraw Hill , New Delhi,2007
3. G.K.Dubey. 'Fundamentals of Electrical Drives' Narosa, Second Edition.
4. Alan S. Morrris. Principles of Measurement and Instrumentation, Print ice-Hall of India Pvt., Ltd. New Delhi, 1999.
5. Ernest O Doeblin. Measurement Systems Application & Design, Tata McGraw Hill Publishing Co., New. Delhi, 1999

REFERENCES:

1. S.K Bhattacharya, Brinjinder Singh 'Control of Electrical Machines' New Age International Publishers,2002.
2. John Bird 'Electrical Circuit theory and technology' Elsevier, First Indian Edition, 2006.
3. Murthy, D.V.S. Transducers and Instrument and Instrumentation, Prentice Hall of India Pvt. Ltd. New Delhi.
4. Liptak B.G. Instrumentation Engineers Hand Book (Measurement), Chilton Book Co., 1994.

E - RESOURCES

1. https://www.electrical4u.com/induction-motor-types-of-induction-motor/
2. https://www.eeweb.com/electromechanical
3. https://www.electrical4u.com/electrical-drives/
4. http://nptel.ac.in/courses/108108077/
5. http://nptel.ac.in/courses/108106072/

COURSE OBJECTIVES:

1. To develop fundamentals of electrical drives and machines
2. Design of speed controls of DC machines
3. Develop of motors and controllers
4. To know about instrumentation.
5. To know deep knowledge about current sensing relays

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2									2			
CO2	3	2	2									2			
CO3	3	2	2									2			
CO4	3	2	2									2			
CO5	3	2	2									2			

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech III Semester		
Code:A2501	MINE SURVEYING	L	T	P
Credits: 3		3	-	-

Prerequisite: Basics of Mathematics and Surveying

Course Objectives:

Ability to apply knowledge of mathematics in surveying to calculate areas and volumes for different projects. Ability to identify, formulate and solve problems in the field of advanced surveying. Ability to analyze survey data and design mining engineering projects. Ability to engage in life- long learning with the advances in survey techniques.

Module 1: Surveying & Levelling **13 Periods**

Surveying**:** Overview of surveying, objectives, principles, primary divisions and classification, Distance measurement using conventional methods. Direct and indirect ranging, Errors in surveying. Corrections of linear measurements.

Levelling: Overview of levelling, objectives, levelling instruments, important terms used in levelling, classification of levelling, methods of levelling, errors in levelling

Module 2: Traversing with compass and contouring **13 Periods**

Principles of Traversing, traversing with surveying instruments, traversing with compass. Bearings, Azimuth, Meridian and declination.

Overview of contouring, characteristics of contouring, use of contours in mining industries

Module 3: Traversing with Theodolite 13 Periods

Construction of theodolite, parts of theodolite, adjustments of theodolite, errors in theodolite.

Measurement of horizontal angles, measurement of vertical angles, theodolite traverse and calculation of coordinates and balancing of traverse.

Module 4: correlation survey, curve surveying, tachometry **13 Periods**

Correlating surface to underground through two shafts, correlating surface to underground through one shaft- by i) Co-planning method, ii) weisbach triangle method.

Types of curves, curve ranging, setting out simple curves- linear method, offset from long chord.

Definition, Finding "K" and "C" constants of tachometer. Measuring the horizontal and vertical distances using different methods of tachometry.

Module 5: Photogrammetric survey, GPS, advancements of survey in mining. **12 Periods**

Basics of Photogrammetric, use of photogrammetry in mining industry. Advantages and disadvantages of photogrametry. Basics of GPS, Application of GPS in mining. Advancements of mine surveying using modern instruments. Basics of EDM and total station. Regulations regarding types of mine plans- preparation and maintenance of mine plans.

TEXT BOOKS:

1. Surveying (Vol-1,2& 3) by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Pubicaions (P) Ltd., NewDelhi.
2. Surveying and leveling (Vol 1 & 2) – Kanitkar, A.V.G. Prakash
3. Surveying (Vol – 1,2 & 3), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) Ltd., NewDelhi.
4. Surveying (Vol 1,2& 3), Duggal S.K. Tata Mc.Graw Hill Publishing Co.Ltd. New Delhi, 2004

REFERENCES:

1. Elements of Plane Surveying, Arthur R. Benton and Philip J Taetly, McGrawHill-2000
2. Surveying Vol 1 & 2 & 3, Arora K R Standard Book House, Delhi,2004.
3. Plane Surveying, Chandra A M, New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Apply Principles of triangulation survey. Text book of surveying by C. Venkataramaiah, UniversitiesPress.
5. Higher Surveying, Chandra A M. ,New age International Pvt. Ltd. Publisher, New Delhi,2002
6. Surveying and leveling by R. Subramanian, Oxford University Press, NewDelhi

E RESOURCES:

1. http://www.ism-minesurveying.org/mine-surveying.html
2. http://www.minesurveyor.net/
3. http://www.pobonline.com/articles/84226-underground-surveying
4. http://www.ism-minesurveying.org/mine-surveying.html
5. http://www.springer.com/gp/book/9781504123679

Course Outcomes:

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

1: Understand basics and historical methods of survey.
2: Understand application Leveling as a part of surveying.
3: Understand traversing methods using various survey instruments.
4: Understand the fundamentals of triangulation survey.
5: Understand contours and using contours for calculations.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2					1				3	2	2	2
CO2	3	2	2				2		1			2	3	2	1
CO3	3	2	2		1		1					2	3	3	2
CO4	3	1	2		2	1	2		2			1	3	2	2
CO5	3	2	2				1		1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: A0311	**MACHINE DRAWING**	**L**	**T**	**P**
Credits: 2		**2**	**-**	**-**

Prerequisites: Engineering Graphics

COURSE OBJECTIVES:

To understand projections of simple machine elements and understand assembly drawings of typical machine parts such as Connecting rod, Eccentric, Cross head, Screw jack, Plummer block.Machine Drawing Conventions:

Need for drawing conventions - introduction to IS conventions

a) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features
b) Types of sections - selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
c) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs, springs.
d) Title boxes, their size, location and details - common abbreviations & their liberal usage
e) Assembly drawings - working drawings of machine parts.

I. DRAWING OF MACHINE ELEMENTS AND SIMPLE PARTS:

Selection of Views, additional views for the following machine elements and parts with every drawing proportion.

a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cotter joints and knuckle joint, bolted joint.
c) Riveted joints for plates
d) Shaft coupling, flange coupling and universal coupling, socket and spigot joint.

II. ASSEMBLY DRAWINGS:

a) Engine parts - Stuffing boxes, Cross heads, Eccentrics, Petrol Engine connecting rod, Piston assembly.
b) Other machine parts - Screws jack, Milling machine tail stock, Plummer block, single tool post, Clapper block

TEXT BOOKS

1. K.L.Narayana, P.Kannaiah **"Machine Drawing"**, New Age Publishers, 5th edition, 2016.
2. RK Dhawan "**Machine Drawing"**, S.Chand Publications, Revised edition, 2014.
3. N.D.Bhatt "**Machine Drawing",** Charotar Publishing House pvt ltd, 48thedition, 2013.

REFERENCES

1. P.S.Gill "**Machine Drawing"**, S.K. Kataria & Sons Publisher, 17th edition, 2009.
2. Rajput "**Machine Drawing",** Lakshmi Publications
3. K.C.JOHN "**Machine Drawing**", PHI Learning Pvt Ltd, 2009
4. N.D. Junnarkar "**Machine Drawing**", Pearson Education India, 2007.

E – RESOURCES

1. http://nptel.ac.in/courses/105108069/
2. http://www.me.metu.edu.tr/courses/me114/Lectures/assembly.htm
3. http://www.nature.com/nature/journal/v58/n1510/abs/058543c0.html

COURSE OUTCOMES:

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

1. Know the basic conventional representation of materials which is fundamental to the subject.
2. Know the nomenclature of threads, bolts, nuts, set screws and taps.
3. Know the importance of joints like cotter joints, knuckle joint and also come to know how the power being transmitted from one shaft to other.
4. Draw the Journal bearings, collar and foot step bearings.
5. Draw the assembly drawings of machine parts.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1					1		3		3	3		
CO2	2		1					1		3		3	3		
CO3	2		1					1		3		3	3		
CO4	2		1					1		3		3	3		
CO5	2		1					1		3		3	3		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech III Semester		
Code: A2502	DEVELOPMENT OF MINERAL DEPOSITS	L	T	P
Credits: 3		3	-	-

Prerequisite: Under graduate Physics, Chemistry and Math's.

COURSE OBJECTIVES:

To demonstrate the importance of mining in national economy, understand the terminology associated with the discipline and be familiar with the available regulatory mechanism to enable safe & sustainable mining operations. To know the history of mining and describe the correlation between the development of mining and cultural progress. To introduce the field of mining and provide basic input about mining unit operations. To learn the various modes of access and study the methods of designing the access.

MODULE-I: INTRODUCTION TO MINING ENGINEERING 10 PERIODS

Significance of mining industry in national economy and infrastructure building, basic mining terminologies, mineral types as per law, stages in mine life cycle, Economic, Social, Environmental and Health impacts of Mining. Industrial progress and mining.

Knowing about deposit through exploration. Classification of mining methods and their selection criteria. Scheme of mining.

Opening up of deposits: Types, size and location of entries into underground coal and other minerals.

MODULE-II: MINE ENTRIES 10 PERIODS

Selection criteria of mode of entry between shaft, Incline and Adit. Preliminary investigations about strata for making entry and equipment. Methods of sinking shaft in water-logged, pressurized strata in loose and running soils. Mechanized shaft sinking methods. Need for widening and deepening of operating shafts. Different methods for widening and deepening shafts. Design of shaft insets, pit bottom excavation.

MODULE-III: DEVELOPMENT OF WORKINGS 10 PERIODS

A: Drivage of cross cuts, drifts, inclines and raises by conventional and mechanized methods. Pull and progress, Calculation of OMS.

B: Arrangements for loading transportation ventilation, support, lighting, and drainage. Drilling patterns and blast design parameters for underground coal mines and hard rock mines.

MODULE-IV: ENVIRONMENTAL PROTECTION 09 PERIODS

Introduction to environmental maintenance and controlling pollutions. Restoration of land to its shape productivity and environment. Planning of mine closure.

Legal provisions for development of workings.

MODULE-V: Modern Technologies for mine development 09 Periods

Modern drill zambos, modern loading and transporting equipment for development of drivages, Tunnel boring machine and its application, Mechanized methods of shaft sinking. Drop rising. Risk to health and safety of workmen, rescue, first aid.

TEXT BOOKS:

1. Introductory mining engineering-, Howard L.Hartman, Jan M.Mutmansky/ wileyIndia (P) Ltd
2. Elements of mining technology Vol-I - D.J. Deshmukh /Denett&Company

REFERENCES:

1. Roy Piyush Pal, Blasting in ground excavations and mines, Oxford and IBH, 1st ed 1993
2. C.P. Chugh, Drilling technology handbook, Oxford and IBH, 1sted,1977

E RESOURCES:

1. https://www.nap.edu/read/10318/chapter/5#23
2. http://www.alta.eu/commodities/mining-technology/surface-mining/long-distance-beltconveyors/
3. Indian Mining Journal

COURSE OUTCOMES:

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

1:Know the status and significance of mining Industry.

2:Apply different methods of Shaft sinking according to the ground conditions.

3:Know about Development of workings.

4:Know about different types of supports, their advantages and disadvantages.

5:Know about different tunnelling methods.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	2		1			1				3	2	2	2
CO2	3	2	2				2		1			2	2	2	1
CO3	3	2	2		1		1					2	3	3	2
CO4	3	1	2	2	1		2		2			1	3	2	2
CO5	3	2	2						1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: A0361	BASIC MECHANICAL ENGINEERING	L	T	P
Credits: 2		2	-	-

Prerequisite:

Course Objectives: This course will develop student's knowledge in types of materials, design methodology and elements of power transmission, different manufacturing processes and their applications. Laws of thermodynamics and types of systems, principle and applications of IC engines

MODULE – I: Engineering Materials

Engineering Materials: Classification, properties and applications Design Criterion: Discrete steps in engineering design process Power Transmission: Classification; flat belt drives - length of open and cross belts, belt tensions and power transmitted; Gears-types and applications; spur gear-nomenclature Bearings: Types – sliding& rolling contact bearings and applications;

MODULE – II: Manufacturing Processes

Manufacturing Processes: Classification; Foundry- steps in sand casting process; pattern-types, materials and allowances, mould cross section, moulding sand-composition and properties; Machining: lathe machine-line diagram and operations; Welding-classification; principle of arc welding- AC and DC welding, principle of gas welding, principle of brazing and soldering; Metal forming process: forging, rolling, extrusion.

MODULE – III: Thermodynamics

Thermodynamics: System-types, state, property, process and cycle; Energy-property; Zeroth law, thermodynamic equilibrium, laws of perfect gases.

Law of Thermodynamics: First law- applied to a cycle, change of state, Internal energy, Enthalpy; Work and Heat in closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytrophic; PMM-I, limitations of first law of thermodynamics.

MODULE – IV: Second Law of Thermodynamics

Second Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their equivalence; Carnot cycle, Carnot theorem, heat engine, heat pump and refrigerator; working principle of domestic air conditioner-line diagram.

MODULE – V: IC Engines & Air Compressors

IC Engines: Classification; working principle of four and two stroke SI and CI engines.

Air compressors: Classifications, working principle of single stage and two stage air compressors.

Text Book:

5. Mathur, Mehta and Tiwari, "Elements of Mechanical Engineering", Jain Brothers, New Delhi,2017.

Reference Books:

1. Hazra Chowdary. S. K and Bose, "Basic Mechanical Engineering", Media Promoters and Publishers Pvt. Ltd, India, 2010.
2. P. K. Nag, "Engineering Thermodynamics", Tata McGraw Hill, New Delhi.
3. Hazra Chowdary. S. K and Bose, "Workshop Technology, Vol. I & II", Media Promoters and Publishers Pvt Ltd, India.

Course Outcomes

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

1: Explain mechanical properties of an engineering materials and learn the steps in design methodology

2: Describe the principles of manufacturing process.

3: Apply first law of thermodynamics to various processes to calculate work and heat for a closed

system.

4: Design second law of thermodynamics and demonstrate the working principle of IC engines.

5: Explain and demonstrate the working principle of single stage and two stage air compressors

CO- PO Mapping **(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak**															
COS	**Programme Outcomes (POs)**												**PSOS**		
	PO1	**PO2**	**PO3**	**PO4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO12**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	2	2											1	1	
CO2	2												1	1	
CO3	2	2											1	1	
CO4	2	2											1	1	
CO5	2	2											1	1	

1

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: A0317	**FLUID MECHANICS AND HYDRAULIC MACHINES LAB [Common to EEE and Min.E]**	**L**	**T**	**P**
Credits:1		**-**	**-**	**2**

COURSE OBJECTIVES:

To provide practical knowledge of fluid flow properties, flow losses, performance testing of hydraulic turbines and hydraulic pumps.

List of Experiments

1. Performance test on impact of jet on Vanes.
2. Performance test on Pelton Wheel.
3. Performance test on Francis Turbine.
4. Performance test on Kaplan Turbine.
5. Performance test on Single Stage Centrifugal Pump.
6. Performance test on Multi Stage Centrifugal Pump.
7. Performance test on Reciprocating Pump.
8. Calibration of Venturi meter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of minor losses (sudden contraction, expansion, pipe bend and union) for a given pipeline.
12. Validation of Bernoulli's Theorem.

COURSE OUTCOMES:

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

1. Analyze the performance of turbines.
2. Analyze the performance of centrifugal and reciprocating pump.
3. Analyze the performance of venturimeter and orifice meter.
4. Determine the minor losses in given pipe system.
5. Demonstrate the Bernoulli's equation in Bernoulli's apparatus.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		3	2	1			3			3	3		
CO2	3	1		3	2	1			3			3	3		
CO3	3	1		3	2	1			3			3	3		
CO4	3	1		3	2	1			3			3	3		
CO5	3	1		3	2	1			3			3	3		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech III Semester		
Code: A2503	MINE SURVEYING LAB	L	T	P
Credits: 1		-	-	2

COURSE OBJECTIVES:

To familiarize with the various surveying instruments and methods.

LIST OF EXPERIMENTS:

1. Chain Surveying- Calculation of area and plotting.
2. Traversing with compass, finding bearing and calculation of interior angles and their adjustments.
3. Profile levelling: plotting the section by rise and fall method.
4. Contouring of an area.
5. Measurement of horizontal and vertical angles by theodolite
6. Traversing by theodolite.
7. Correlation by one shaft method- Weisbach triangle method.
8. Correlation by two shaft method.
9. Curve ranging offsets from long chord.
10. Curve ranging by Ranking's method.
11. Finding K and C constants of a tachometer.
12. Finding horizontal and vertical distance by tachometer

Course Outcomes

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

1: Do the Range and to measure the distance between two points.

2: Conduct the chain triangulation survey.

3:Determine the area by using different methods.

4: Determine the elevation of a given point.

5: Use the instruments used in the surveying.

COS	Programme Outcomes (POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		3			1				3	2	2	2
CO2	3	2	2			1	2		1			2	3	2	1
CO3	3	2	2		2		1					1	2	3	2
CO4	3	1	2			2	2		2			1	3	3	2
CO5	3	2	2			1			1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: A0554	**Fundamentals of Data Structures Lab** (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	1	2

Prerequisites: C Programming.

Course Objectives:
This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

Software Requirements: C

List of Programs:

1. Write a program to create one dimensional array, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements
2. Write a program to create a single linked list, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements.
3. Write a program to create a circular linked test with the following operations
   a) Insertion
   b) b) Deletion
   c) c) Display the elements
   d) d) Count number of elements
4. Write a program to create a double linked list, with the following operations
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements
5. Write a program to implements stack operations using
   a) Arrays
   b) Linked list
6. Write a program
   a) Evaluate postfix expression
   b) Convert infix expression into postfix expression
7. Write a program to implement Linear queue operations using:
   a) Arrays
   b) Linked list
8. Write a program to implements Circular Queue operations using Arrays
9. Write a program to implements Double-ended Queue operations using Arrays
10. Write a recursive program to create a Binary Tree of integers, traverse the tree in preorder, in order and post order of the tree.
11. Write a program to create a Binary Search Tree (BST) and perform insert and search

operations on it.

12. Write a program for implementing the following graph traversal algorithms
    a) Breadth First Search BFS b) Depth First search DFS

TEXTBOOKS

1. Jean Paul Tremblay, Paul G Sorenson, "**An Introduction to Data Structures with Applications**", Tata McGraw Hills, 2nd Edition, 1984.
2. Richard F. Gilberg, Behrouz A. Forouzan, "**Data Structures: A Pseudo code approach with C** ", Thomson (India), 2nd Edition, 2004.

REFERENCES

1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, "**Fundamentals of Data Structure in C**", University Press (India), 2nd Edition, 2008.
2. A. K. Sharma, "**Data Structures using C**", Pearson, 2nd Edition, June, 2013.
3. R. Thareja, "**Data Structures using C**", Oxford University Press, 2nd Edition, 2014.

COURSE OUTCOMES:

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

1. Identify the appropriate recursive algorithms and analyze the performance of algorithms.
2. Understand and implement single, double, and circular linked-lists.
3. Implement linear data structures such as Stacks and Queues using array and linked-list representations.
4. Implement nonlinear data structures such as trees and graphs.

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	ProgrammeOutcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2										3	2	
CO2	2	2	3										2	3	
CO3		2	3											3	1
CO4		2	3										2	3	

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech III Semester		
Code: A00M2	ENVIRONMENTAL SCIENCES (Common for CE, ME and Min.E)	L	T	P
Credits: Nil		2	-	-

PREREQUISITE:

OBJECTIVES:

An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences, including geo systems, biology, chemistry, economics, political science and international processes. The ability to work effectively as a member of an interdisciplinary team on complex problem of environment.

MODULE I: ECOSYSTEMS: 5 PERIODS

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy.

Activity: Plantation.

MODULE II: NATURAL RESOURCES, BIODIVERSITY AND BIOTIC RESOURCES 5 PERIODS

NATURAL RESOURCES:

Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources–case studies. Energy resources: growing energy needs, introduction to renewable and non-renewable energy sources.

BIODIVERSITY AND BIOTIC RESOURCES: 4 PERIODS

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Threats to Biodiversity (habitat loss, poaching of wildlife, man-wild life conflicts). Conservation of Biodiversity (In-situ and Ex- situ conservation),

Activity: case studies.

Module III: ENVIRONMENTAL POLLUTION AND CONTROL: 07 Periods

A) Classification of pollution and pollutants, Causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards.
B) Soil Pollution, Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, Coastal pollution due to sewage and marine disposal of industrial effluents. E-waste and its management.
Activity: Field visit.

MODULE IV: GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFECTS: 06 PERIODS

Greenhouse effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions/Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

Activity: Poster Making.

MODULE V: TOWARDS SUSTAINABLE FUTURE: 05 PERIODS

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

TEXT BOOKS:

1. R.Rajagopalan,**"Environmental Studies from crisis to cure"**, Oxford University Press 2nd Edition, 2005.
2. Anubha Kaushik, C.P.Kaushik, **"Environmental studies"** New age International Publishers,4th Edition,2012

REFERENCES:

1. Erach Bharucha,**"Environmental studies"** University Grants Commission, and University Press,I Edition, 2005.
2. M. Anji Reddy **"Text book of Environmental Science and Technology"** 3rd Edition, 2007
3. Richard T.Wright,**"Environmental Science: towards a sustainable future"** PHL Learning, Private Ltd. New Delhi, 2nd Edition., 2008
4. Gilbert McMasters and Wendell P.Ela,**"Environmental Engineering and science"**, 3rd Edition, PHI Learning Pvt. Ltd.,2008.

E-Resources:

1. http://www.gdrc.org/uem/ait-terms.html (Glossary of Environmental terms).
2. http://www.environmentalscience.org/ (Environmental sciences Lectures series).
   Journal of earth science and climatic change (OMICS International Journal).
3. Journal of pollution effects & control (OMICS International Journal).
4. nptel.ac.in/courses/120108004/ (Principles of Environment Management Lectures).
5. http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html(NPTEL online video courses IIT lectures).

COURSE OUTCOMES:

After completion of the course, students will be able to:

6. To enable the students to realize the importance of ecosystem, its structure, services. To make the students aware of Different natural functions of ecosystem, which helps to sustain the life on the earth.
7. To use natural resources more efficiently.
8. To make the students aware of the impacts of human actions on the environment, its effects and minimizing measures to mitigate them.
9. To educate the students regarding environmental issues and problems at local, national and international level.
10. To know more sustainable way of living

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**Programme Outcomes(POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**		**1**		**1**	**2**	**1**								
CO2	**2**	**3**	**2**	**3**	**1**	**3**		**2**							
CO3	**3**	**3**	**2**	**3**	**2**	**2**		**1**							
CO4	**3**	**2**	**2**	**1**	**2**	**1**									
CO5	**2**	**1**	**1**			**1**	**3**	**3**							

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2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:A0B02	PROBABILITY AND STATISTICS (Common for CE, ME & Min.E)	L	T	P
Credits: 3		3	-	-

Pre-requisite: Basic Probability

COURSE OBJECTIVES:

This course is meant to provide a grounding in Statistics and foundational concepts that can be applied in modeling processes and decision making. These would come in handy for the prospective engineers in most branches.

MODULE - I: PROBABILITY **9 PERIODS**

Introduction to Probability, events, sample space, mutually exclusive events, Exhaustive events, Addition theorem for 2& n events and their related problems. Dependent and Independent events, conditional probability, multiplication theorem, Baye's Theorem, Statement of Weak law of large numbers

MODULE - II: RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS **10 PERIODS**

Random variables – Discrete Probability distributions. Bernoulli, Binomial, poisson, mean, variance, moment generating function–related problems. Geometric distributions.

Continuous probability distribution, Normal distribution, Exponential Distribution, mean, variance, moment generating function–related problems. Gamma distributions (Only mean and Variance) Central Limit Theorem

MODULE - III: SAMPLING DISTRIBUTIONS & TESTING OF HYPOTHESIS **11 PERIODS**

A: Sampling Distributions: Definitions of population-sampling-statistic, parameter. Types of sampling, expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance. Parameter estimations – likelihood estimate, point estimation and interval estimation.

B: Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, and Level of significance. One tailed test, two tailed test.

Large sample tests:

1. Testing of significance for single proportion.
2. Testing of significance for difference of proportion.
3. Testing of significance for single mean.
4. Testing of significance for difference of means.

MODULE IV: SMALL SAMPLE TESTS **09 PERIODS**

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples, Paired t-test, Snedecor's F-distribution and it's properties. Test of equality of two population variances, Chi-square distribution, its properties, Chi-square test of goodness of fit and independence of attributes.

MODULE V: CORRELATION & REGRESSION **09 Periods**

Correlation, Coefficient of correlation, the rank correlation. Regression Coefficient, The lines of regression: simple regression.

TEXT BOOKS:

1. Walpole, Probability & Statistics, for Engineers & Scientists, 8th Edition, Pearson Education.
2. Paul A Maeyer Introductory Probability and Statistical Applications, John Wiley Publicaitons.
3. Monte Gomery, "Applied Statistics and Probability for Engineers", 6th Edition, Wiley Publications.

REFERENCES:

1. Sheldon M Ross, Introduction to Probability & Statistics, for Engineers & Scientists, 5th Edition, Academic Press.
2. Miller & Freund's , Probability & Statistics, for Engineers & Scientists, 6th Edition, Pearson Education.
3. Murray R Spiegel, Probability & Statistics, Schaum's Outlines, 2nd Edition, Tata Mc. Graw Hill Publications.
4. S Palaniammal, Probability & Queuing Theory, 1st Edition, Printice Hall.

E -RESOURCES:

1. http://www.csie.ntu.edu.tw/~sdlin/download/Probability%20&%20Statistics.pdf
2. (Probability & Statistics for Engineers & Scientists text book)
3. http://www.stat.pitt.edu/stoffer/tsa4/intro_prob.pdf (Random variables and its distributions)
4. http://users.wfu.edu/cottrell/ecn215/sampling.pdf (Notes on Sampling and hypothesis testing)
5. http://nptel.ac.in/courses/117105085/9 (Mean and variance of random variables)
6. http://nptel.ac.in/courses/111105041/33 (Testing of hypothesis)
7. http://nptel.ac.in/courses/110106064/5 (Measures of Dispersion)

COURSE OUTCOMES:

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

1. The students will understand central tendency and variability for the given data.
2. Students would be able to find the Probability in certain realistic situation.
3. Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also, able to differentiate among many random variables Involved in the probability models. It is quite useful for all branches of engineering.
4. The student would be able to calculate mean and proportions (large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations.
5. The student would be able to calculate mean and proportions (small sample) and to make important decisions from few samples which are taken out of unmanageably huge populations.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**Programme Outcomes(POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	**3**	**3**	**1**	**4**		**3**					**3**	**1**			
CO2	**3**	**3**	**2**		**3**			**2**	**1**		**2**				
CO3	**3**	**2**	**1**		**3**					**2**	**3**				
CO4	**3**	**3**	**2**		**2**		**1**		**1**			**1**			
CO5	**3**	**2**	**2**												

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: A0305	MECHANICS OF SOLIDS	L	T	P
Credits: 3		3	-	-

Prerequisites: Physics of Materials and Engineering Mechanics

Course Objectives:

The objective of this subject is to provide the basic concepts of mechanical behaviour of the materials under various loads, provides knowledge on shear force and bending moment diagrams of beams and knowledge about stress distribution across various cross sections of beams.

MODULE I: SIMPLE STRESSES & STRAINS 10 PERIODS

Elasticity and plasticity – Types of stresses & strains – Hooke's law – stress–strain diagram for ductile and brittle material–Working stress–Factor of safety–Lateral strain, Poisson's ratio & volumetric strain. Elastic Module & the relationship between them–Bars of varying section–composite bars– Temperature stresses. Strain energy – Resilience–Gradual, sudden, impact and shock loadings

MODULE II: Shear Force and Bending Moment 10Periods

Definition of beam –Types of beams–Concept of shear force and bending moment–SF and BM diagrams for cantilever, simply supported and overhanging beams subjected to point loads, UDL, UVL and combination of these loads–Point of contra flexure–Relation between SF and BM and rate of loading at section of a beam

MODULE III: BENDING STRESSES & SHEAR STRESSES 10 PERIODS

A: Bending Stresses: Theory of simple bending– Assumptions– Neutral axis – Derivation of bending equation: M/I=f/y=E/R –Determination bending stresses– section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections–Design of simple beam sections.

B: Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections – rectangular, circular, triangular, I, T and angle sections.

MODULE IV: Deflection of Beams &Torsion 09 Periods

Deflection of Beams**:** Bending into a circular arc–slope, deflection and radius of curvature – Differential equation for the elastic line of a beam– Double integration and Macaulay's methods– Determination of slope and deflection for cantilever and simply supported beams subjected to point loads- UDL – uniformly varying load.

Torsion: Theory of pure torsion – Assumptions – Derivation of torsion equation, polar section modulus – power transmitted by shafts – combined bending and torsion.

MODULE V: ANALYSIS OF PIN JOINTED PLANE FRAMES & THIN CYLINDERS 09 PERIODS

Analysis of Pin- Jointed Plane Frames**:** Determination of forces in the members of various types of cantilever & simply supported trusses using (i) Method of Joints (ii) Method of Sections.

Thin Cylinders**:** Thin seamless cylindrical shells–Derivation of formula for longitudinal and circumferential stresses– hoop, longitudinal and volumetric strains– changes in diameter and volume of thin cylinder

TEXT BOOKS

1. S.Timshenko **"Strength of Materials",** D. Van Nostr and Company, inc., 3rd edition, 1983
2. Ramamrutham **"Strength of materials",** Dhanpat Rai Publishing, 18th edition, 2014

REFERENCES

1. R..K. Rajput, **"Strength of Materials"** S. Chand company Pvt, 5th edition, 2014
2. R K Bansal **"Strength of Materials"** Lakshmi – publications, 6th edition, 2015
3. Bhavikatti **"Strength of materials"** Lakshmi publications, 4th edition, 2014.
4. R S Khurmi, **"Strength of Materials"** S Chand, revised edition, 2013.
5. D. S. Kumar, **"Strength of Materials,** S K Kataria & Sons, Reprint 2013.

E - RESOURCES

1. nptel.ac.in/courses/112107147
2. nptel.ac.in/courses/Web course- contents/…/strength%20of%20materials/homepage.htm
3. www.springer.com › Home › Materials › Characterization & Evaluation of Materials
4. discovermagazine.com/tags/strength of materials
5. nptel.ac.in/courses/105105108/
6. nptel.ac.in/courses/105105108/30

COURSE OUTCOMES:

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

1. Describe the fundamentals about the simple stresses, strains and deformation in components due to external loads.
2. Draw the shear force and bending moment diagrams for various beams.
3. Understand bending stress and shear stress.
4. Determine the deflection of beams and torsion.
5. Solve pin joint, thin cylinder problems.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	3		3						3	3		
CO2	3	3	1	3		3						3	3		
CO3	3	3	1	3		3						3	3		
CO4	3	3	1	3		3						3	3		
CO5	3	3	1	3		3						3	3		

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech IV Semester		
Code: A2504	MINING GEOLOGY	L	T	P
Credits: 3		3	-	-

Prerequisite: Under graduate Physics and Chemistry

COURSE OBJECTIVES:

To introduce fundamentals of mining geology to the student emphasizing the importance of properties of rocks, soils and minerals. Course is also aimed at explanation of geology of tunnels, geology of bore hole drilling and excavation.

MODULE-I: LAND FORMS AND MINERALOGY **10 PERIODS**

Origin or mode of development, characteristic features and engineering considerations of land forms developed by rivers, wind, oceans and volcanoes

Mineralogy: physical and chemical properties, classification of minerals and properties of common silicate minerals, oxides and sulphides.

MODULE-II: PETROLOGY **10 PERIODS**

Igneous rocks: Magma and lava, extrusive and intrusive forms, classification and description of some common igneous rocks.

Sedimentary rocks: Sedimentation process**,** classification and description of some common sedimentary rocks

Metamorphic rocks: Process of metamorphism, textures and structures of metamorphic rocks, classification and description of some metamorphic rocks

MODULE-III: STRUCTURAL GEOLOGY AND STRATIGRAPHY

A: Structural Geology **10 Periods**

Strike and dip, fundamental type, characteristic features and mechanics of folds, faults, joints and unconformities.

B: STRATIGRAPHY

Principles of stratigraphy, geological time scale.

MODULE-IV: GENESIS OF MINERAL DEPOSITS **09 PERIODS**

Definition of ore, gangue**,** tenor and grade of ore, processes and formation of ore deposits including coal and petroleum

Mineral Resources of India: Major and minor mineral resources of India, origin and distribution

MODULE-V: MINERAL EXPLORATION **09 PERIODS**

Geological, geophysical and geochemical exploration of mineral deposits**,** Estimation and determination of mineral reserves by different methods

TEXT BOOKS:

1. Mining Geology by Arogya Swamy, Oxford & IBH Publishing Company ,(1996)
2. Mining Geology by Mc Kinstry, Prentice-Hall

REFERENCES:

1. Mineral Resources of India by Krishna Swamy, Oxford & IBH,2nd edition (1984)
2. Engineering Geology & Geotechnics by Krynine and Hudd/McGraw-Hill.
3. Economic Mineral Deposits Alan M. Bateman (Author), M.L. Jensen (Editor), John Wiley & Sons Inc; 3rd edition (1979).

E RESOURCES:

1. http://dmg.kerala.gov.in/
2. http://www.mininggeology.ausimm.com.au/

COURSE OUTCOMES:

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

1:Know different types of land forms formed by rivers,wind, oceans and volcanoes.

2:Know igneous rocks, Sedimentary rocks, and metamorphic rocks.

3:Know Structural Geology and Stratigraphy.

4:Know Genesis of Mineral deposits and Mineral Resources of India.

5:Know Geological, geophysical and geochemical exploration of mineral deposits.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PSO2	PSO3
CO1	3	2	2					1				3	2	2	2
CO2	3	2	2				2		1			2	3	2	1
CO3	3	2	2		2		1					2	3	3	2
CO4	3	1	2		2	1	2		2			1	3	2	2
CO5	3	2	2		2				1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: A2505	**MINE ENVIRONMENTAL ENGINEERING - I**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisite: Fundamentals of Fluid Mechanics

COURSE OBJECTIVES:

Students should be aware of the principles of ventilation and basic ventilation systems.

MODULE-I: MINE GASES **10 PERIODS**

Atmospheric air – its composition, mine air – its general composition, origin, physical and chemical properties of mine gases, physiological effects of breathing mine gases and its detection, sampling and analysis of mine air, methane drainage.

MODULE-II: HEAT, HUMIDITY AND AIR FLOW **10 PERIODS**

Sources of heat in mines, effects of heat and humidity, kata thermometer and hygrometer. Laws governing the airflow in mines, resistance of airways, Equivalent orifice, Natural ventilation, determination of NVP, direction of natural ventilation

MODULE-III: Mechanical ventilation **10 Periods**

A: Principal types of mine fans, fan characteristic curves, mine characteristic curves, operating point, reversal of mine fans, Evasee and its importance.

B: Series and parallel operation of mine fans, booster fans, Face Ventilation. Overlap ventilation systems and controlled re-circulation

MODULE-IV: STANDARDS OF VENTILATION AND AIR DISTRIBUTION **09 PERIODS**

Standards of ventilation including permissible air velocities, Ascensional, Descensional, Homotropal, Antitropal ventilation, Distribution of air, ventilation stoppings, Air crossings, Measurement of air velocities and pressure.

MODULE-V: VENTILATION PLANNING **09 PERIODS**

Quantity and pressure requirement. Ventilation layout for coal mining and metal mining. Calculation of air quantity and total mine head required for ventilating a mine. Introduction to Network analysis: Hardy-Cross method, Ventilation survey.

TEXT BOOKS:

1. Mine Environment and Ventilation – G.B. Misra, Oxford University Press
2. Mine Ventilation and Air Condition – HL Hearlman,Wiley India (p) ltd

REFERENCES:

1. Environmental Engineering in Mines, Vatukuri V.S. & Lama R.D,Cambridge Unversity Press.
2. Mining and Environment, Dhar B.B, APH Publishing.

E RESOURCES:

1.http://technology.infomine.com/reviews/ventilation/welcome.asp?view=full 2. https://link.springer.com/article/10.1134/S1062739116041178

COURSE OUTCOMES:

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

1: Understand origin, physical and chemical properties of mine gases and their physiological effects

2: Understand Heat, Humidity and Air flow in mines

3: Understand Principal types of mine fans, Series and parallel operation of mine fans

4. Understand Standards of ventilation and Air distribution

5. Understand Ventilation Planning and Network analysis.

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech IV Semester

Code: A2506	DRILLING AND BLASTING	L	T	P
Credits: 3		3		-

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	2					1				2	2	2	2
CO2	3	2	2				2		2			2	3	2	2
CO3	3	2	2				2					2	3	3	2
CO4	3	1	2		1		2		2			1	3	1	2
CO5	3	1	2				1		1			2	3	1	2

Prerequisite: fundamental activates for extraction of mineral.

COURSE OBJECTIVES:

To understand the principles and mechanism of different drilling methods, novel drilling techniques. To learn the basic mechanism of rock fragmentation by blasting. To know the various types of explosives and accessories used in blasting. To learn the different methods of blasting adopted in surface and underground coal / non-coal mines including adverse effects of blasting & their control

MODULE-I: Principles of Drilling and Drill bits 10Periods

Principles of drilling: Principles of rock drilling, drillability, factors affecting the drillability, selection of drills.

Drill Bits: Various types of drill bits, study of bit life, factors affecting bit life, Thrust and rotation

MODULE-II: EXPLOSIVES 10 PERIODS

Historical development, properties of explosives, low and high explosives, ANFO, slurries, Emulsion explosives, heavy ANFO, permitted explosives, testing of permitted explosives, bulk explosive systems-PMS, SMS, substitutes for explosives and their applications- hydrox, cardox, airdox.

MODULE-III: FIRING OF EXPLOSIVES AND BLASTING METHODS 10 PERIODS

A: Firing of Explosives: Safety fuse, detonating cord and accessories, detonators, Exploders, Electric firing and non-electric firing, electronic detonators, NONEL blasting.

B: Blasting methods: Preparation of charge, stemming and shot firing, choice and economical use of explosives, misfires, blown out shots, incomplete detonation, their causes, prevention and remedies.

MODULE-IV: HANDLING OF EXPLOSIVES 09 PERIODS

Surface and underground transport of explosives, storage and handling of explosives, magazines, accidents due to explosives, precautions and safety measures during transportation.

MODULE-V: Mechanics of blasting and effects of blasting 09 Periods

Mechanics of blasting: Factors affecting rock breakage using explosives, theory of shaped charge, detonation pressure, coupling, shock waves impedance, critical diameter.

Effects of blasting: Vibrations due to blasting and damage criteria, fly rocks, dust, fumes, water pollution and controlled blasting.

TEXT BOOKS:

1. Blasting in ground excavations and mines, Roy Pijush Pal, Oxford and IBH, 1st ed 1993
2. Drilling technology handbook, C.P. Chugh, Oxford and IBH, 1st ed, 1977 .

REFERENCES:

1. Rock blasting effect and operation, Roy Pijush Pal, A.A. Balkema, 1st ed, 2005
2. Elements of mining technology, Vol-1, D.J. Deshmukh
3. Blasting operations, B.Hemphill Gary, Mc-graw Hill, 1st ed 1981
4. Explosive and blasting practices in mines, S.K.Das, Lovely prakashan, 1st ed, 1993.

E RESOURCES:

1. http://technology.infomine.com/reviews/blasting/welcome.asp?view=full
2. https://miningandblasting.wordpress.com/list-of-technical-papers/
3. Science direct

COURSE OUTCOMES:

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

1: Understand Principles of drilling and various types of drill bits.

2: Understand different types of Explosives.

3: Apply different methods of Blasting according to the conditions.

4: Deal with the Explosives.

5: Understand Mechanics of blasting and effects of blasting

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2					1				2	2	2	2
CO2	3	2	2				2		1			2	3	2	2
CO3	3	2	2				1					2	3	3	2
CO4	3	1	2				2		2			1	3	1	2
CO5	3	1	2						1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech IV Semester		
Code: A2507	MINING MACHINERY-I	L	T	P
Credits: 2		2	-	-

Prerequisite: Engineering Mechanics, Mechanical Technology,

COURSE OBJECTIVES:

To understand the electrical layouts and power distribution in mine. To study the rope haulage layouts, technical details and applications. To study the various modes of transport means and electrical circuits. To study the types of pumps, installations and design calculations.

MODULE-I: INTRODUCTION **10 PERIODS**

Different types of motive power used in mines – their field of application, relative merits and demerits; transmission and distribution of compressed air in mines, compressed air in mines, compressed air drills. Elements of the transport system, classification and techno- economic indices. Wire ropes – classification, construction, fields of application, rope capping and splicing; deterioration of rope in use and its prevention; testing of ropes, selection and maintenance, rope calculations.

MODULE-II: ROPE HAULAGE **10 PERIODS**

Construction of the wire ropes, rope haulages–gravity, direct, balanced direct, main & tail, endless, reversible endless. Suitability of these haulages and their limitations. Dimension of ropes, drums and pulleys, care and maintenance of ropes, changing of haulage ropes, rope splicing, safety appliances in haulage road, and signaling, statutory requirements of haulages.

MODULE-III: Other transport systems **10 Periods**

A: Locomotives – diesel, trolley-wire, battery locomotives, constructional features and safety devices and comparison of different types; underground and surface battery charging stations and safety measures, locomotive calculations;

B: Shuttle cars, underground trucks, load-haul- dumpers, SDL, aerial rope ways, gravity transport, principles of hydraulic& pneumatic transportation and their fields of application, electric layouts, man-riding systems.

MODULE-IV: PUMPING & CONVEYING **09 PERIODS**

Different types of drives, installation and maintenance of pumps and pipes in shafts and roadways, electrical layouts, various sources of water in mines, design of sumps.

Face haulage and conveyors – Various types of conveyors, Scraper chain conveyors, AFCs, belt conveyors, cable belt conveyor, shaking and vibrating conveyors, armoured flexible conveyors, high angle conveying, electrical layouts. Numerical

problems in conveyors.

MODULE-V:Mine electrical engineering **09Periods**

Distribution of electric power in mines, types of mine cables and their fields of applications, mining switch gears and their installation in hazardous atmosphere, flame proof enclosures, intrinsically safe circuits, (examples) safety aspects and signaling. Mine telephone system and latest development in mine communications.

TEXT BOOKS:

1. Elements of Mining Technology Vol. III, D.J. Deshmukh, Denett & Company,
2. Mine Transport – N.T. Karelin, Orient Longmans,

REFERENCES:

1. Mining and Transport – S. C. Walker, Elsevier
2. Introduction to Mining Engineers – Hartman. H.L, John Wiley & Sons.

E RESOURCES:

1.http://www.westrac.com.au/Industries/Pages/Mining.aspx
2.http://www.springer.com/in/book/9783319477909

COURSE OUTCOMES:

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

1: Understand Different types of motive power used in mines and different types of wire ropes and their applications

2: Understand different types of rope haulages

3: Understand diesel, trolley-wire, battery locomotives and machinery used in underground workings

4: Understand different types of pumps and belt conveyor

5: Understand how electricity will be supplied in mines.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	2					1				3	2	2	2
CO2	3	2	2				2		1			2	3	2	2
CO3	3	2	2				1					2	3	3	2
CO4	3	1	2				2		2			1	3	1	2
CO5	3	2	2						1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: A0358	**MECHANICS OF SOLIDS LAB**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Course Objectives:

Student will be able to learn and understand the various basic concept and principles of properties of materials like young's modulus and rigidity modulus.

LIST OF EXPERIMENTS:

1. Compression test by using UTM
2. Tensile test by using UTM
3. Bending test on simply supported beam
4. Bending test on cantilever beam
5. Torsion test
6. Hardness test usingBrinnel hardness tester
7. Hardness test using Rockwell hardness tester
8. Test on springs a) compression spring b) tension spring
9. Impact test using Izod
10. Impact test using Charpy
11. Fatigue test
12. Hoop stress and strain relationship for the Thin Cylinder

COURSE OUTCOMES:

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

1. Find out the hardness of different engineering materials.
2. Find out the Young's modulus of materials using deflection of beams
3. Determine the toughness of materials using Charpy and Izod test.
4. Understand the working principle of heavy machines like UTM, Hardness testers
5. Find out the Rigidity modulus of shafts using torsion test.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	2					1				3	2	2	2
CO2	3	2	2				2		1			2	3	2	2
CO3	3	2	2		1		1					2	3	3	2
CO4	3	1	2				2		2			1	3	1	2
CO5	3	2	2						1			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech IV Semester		
Code: A2508	MINING GEOLOGY LAB	L	T	P
Credits: 1		-	-	2

OBJECTIVES:

To identify minerals, rocks, ores and geological structures. To learn geological mapping, remote sensing techniques and geophysical methods

LIST OF EXPERIMENTS:

1. Identification and physical properties of impartment rock-forming minerals.
2. Identification and physical properties of ore-forming minerals.
3. Identification and distinguish characteristics of important igneous.
4. Identification and of sedimentary and metamorphic rocks.
5. Determination of srike and dip of planar features by clinometer compass.
6. Study of models pertaining to folds, faults and unconformities.
7. Study and interpretation of Topographic Maps.
8. Study of Geological Maps of Andhra Pradesh & India.
9. Study of Geomorphologic Map of India and Tectonic Map of India.
10. Study of Seismotectonic Atlas of India.
11. Vertical Electrical sounding Survey to determine depth to water table & bed rock.
12. Determination of unconfined compressive strength of important rock

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

1: Identify the properties of rock forming and ore forming minerals.

2: Determine the strike and dip planar features by clinometer compass. Mine Surveying

3: Identify the folds, faults and unconformities.

4: Knowledge of geology mapping.

5: Determine the unconfined compressive strength of important rocks.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOS		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2					1				3	2	2	2
CO2	3	2	2				2		1			2	3	2	1
CO3	3	2	2		1		1					2	2	3	2
CO4	3	1	2		2	2	2		2			1	3	2	2
CO5	3	2	2			3			2			2	3	1	2

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: A0555	Object Oriented Programming Lab (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 1		-	1	2

Prerequisites: NIL

Course Objectives:

This course will make students able to learn and understand the concepts and features of object-oriented programming and the object-oriented concept like inheritance and will know how to make use of interfaces and package, to acquire the knowledge in Java's exception handling mechanism, multithreading.

Software Requirements: Java

List of Programs:

1. Write a Java Program to implement
   a) Default Constructor
   b) Parameterized constructor

2. Write a Java Program to implement
   a) Method overloading
   b) Constructor overloading

3. Write a Java program to implement
   a) Single Inheritance
   b) Multilevel Inheritance
   c)Hierarchical Inheritance

4. Write Java programs that uses the following keywords…
   a) this
   c) super

5. Write Java programs that uses the following keywords…
   a) static
   b) final

6. Write a Java program to implement
   a) Method overriding.
   b) Dynamic method dispatch.

7. Write a Java program to implement
   a) abstract method
   b) Interfaces

8. Write a Java program to create user defined packages.

9. Write a Java program to implement Exception Handling using
   a) try-catch clause
   b) Multiple Catch clauses

d) Nested try blocks

10. Write a Java program that
a) create user defined Thread by extending Thread class.
b) create user defined Thread by implementing Runnable Interface
c) create two user defined Threads i.e., Multi-Threading using Thread

11. Write a Java program
a) checks whether a given string is a palindrome or not.
b) for sorting a given list of names in ascending order.
c) reads a line if integers and then displays each integer and the sum of all integers (use string tokenizer class of java.util).

12. Write a Java program that
a) reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
b) reads a file and displays the file on the screen, with a line number before each line.

TEXT BOOKS:

1. Herbert Schildt, "**Java The complete reference**", TMH, 8th edition, 2011.
2. T. Budd, "**Understanding OOP with Java**", Pearson Education, updated edition, 1998.

REFERENCES:

1. P.J. Deitel and H.M. Deitel, "**Java for Programmers**", Pearson education.
2. P. Radha Krishna, "**Object Oriented Programming through Java**", Universities Press.
3. Bruce Eckel," **Programming in Java**", Pearson Education.
4. S. Malhotra and S. Choudhary," **Programming in Java**", Oxford Univ. Press.

Course Outcomes:

At the end of the course, students will be able to
1. Differentiate structured programming and object-oriented programming and know the concepts of classes, objects, members of a class.
2. Apply object-oriented programming features and concepts for solving given problems using inheritance and will know how to organize files in packages and concept of interface.
3. Capable of handling run time errors using Exceptional Handling and exploring strings.
4. Develop applications for concurrent processing using Thread Concept.
5. Capable of handling IO operations using Files.

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	ProgrammeOutcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3										3	2	
CO2			3		2								2	3	
CO3		2	2		2									2	
CO4			3		3									2	
CO5		2	2		3								2	2	

2020-21 Onwards (MR-20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. IV Semester		
Code: A00M1	**GENDER SENSITIZATION**	**L**	**T**	**P**
Credits: Nil	**(Common for CE, ME and Min.E)**	**2**	**-**	**-**

PREREQUISITE: NIL

COURSE

OBJECTIVES:

To develop students' sensibility with regard to issues of gender in contemporary India. To provide a critical perspective on the socialization of men and women. To introduce students to information about some key biological aspects of genders. To expose the students to debates on the politics and economics of work. To help students reflect critically on gender violence. To expose students to more egalitarian interactions between men and women.

MODULE -I: - UNDERSTANDING GENDER **06 PERIODS**

Gender: Why Should We Study It? *(Towards a World of Equals:* Unit -1) Socialization: Making Women, Making Men *(Towards a World of Equals:* Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First Lessons in Caste. Different Masculinities.

Just Relationships: Being Together as Equals (*Towards a* World *of Equals:* Unit *-2)* Mary iKorn and Onler. Love and Acid just do not Mix. Love Letters. Mothers ani Fathers. Further Reading: Rosa Parks-The Brave Heart.

MODULE -II: - GENDER AND BIOLOGY **06 PERIODS**

Missing Women: Sex Selection and Its Consequences *(Towards a World of Equals:* Unit -4) Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary *(Towards* a *World of Equals:* Unit -10) Two or Many? Struggles with Discrimination.

Additional Reading: Our Bodies, Our Health *(Towards a World of Equals:* Unit -13)

MODULE -III: - GENDER AND LABOUR **07 PERIODS**

A: Housework: The Invisible Labour *(Towards a World* of *Equals:* Unit -3) "My Mother doesn't Work." "Share the I.oad."

B: Women's Work: Its Politics and Economics *(Towards a World of Equals:* Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

MODULE -IV: - ISSUES OF VIOLENCE **07 PERIODS**

Sexual Harassment: Say Nol *(Towards a World of Equals:* Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: *"Chdpulum.* Domestic Violence: Speaking Out *(Towards a World of Equals:* Unit -5)

Is Home a Safe Place? When Women Unite (Film" Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence *(Towards a World of Equals:* Unit -11)

Blaming the Victim-1 Fought for my Life... " - Further Reading: The Caste Face of Violence.

MODULE -V: - GENDER STUDIES **06 PERIODS**

Knowledge: Through the Lens of Gender *(Towards a Work/ of Equals:* Unit -5)

Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.

Whose History? Questions for Historians and Others *(Towards a World of Equals:* Unit -9)

Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All the Units In the Textbook, *"Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Mina Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Thant

Note: Since it Is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

TEXT BOOKS: -

1. Towards a World of Equals: A bilingual Textbook on Gender , A Suneetha -etall

REFERENCES: -

1. Sen, Amartya. "More than One Million Women are Missing.' New York Review of Books 37.20 (20 December 1990). Print. We *Were Making History ' Life Stories of Women in the ToIrmgana People's Struggle.* New Delhi: Kali for Women, 1989.

2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." Women's Studios Journal (14 November 2012) Available online at: http:// blogs.visj.com/ India real time/2012/11/14/by -the-numbers-where-Indan-womenworkP

3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada htto://harooreollins.co.in/BookDetailasp?Flook Cndet,3732

4. Vimata. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press 1995. 599-601.

5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health end Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.

6. Stree Shakti Sanghatana. 'We Were Making I listory ' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

E - Resources:

- http://www.actforyouth.net/resources/rf/rf_gender1_1213.cfm(UNDERSTANDING GENDER)
- https://www.simplypsychology.org/gender-biology.html(GENDERAND BIOLOGY)
- http://www.yourarticlelibrary.com/essay/essay-on-gender-issues-in-labour-market-in-india/40442/ (GENDER AND LABOUR)

Journals/Magazines links:-

- http://journals.sagepub.com/doi/abs/10.1177/1077801200006007004 (ISSUES OF VIOLENCE)
- http://www.nordiclabourjournal.org/emner/likestilling (GENDER AND BIOLOGY)

Course Outcomes:

After completion of the course, students will be able to:

1. Develop a better understanding of important issues related to gender in contemporary India.
2. Sensitize about the basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Acquire insight into the gendered division of labour and its relation to politics and economics.
5. Develop a sense of appreciation of women in all walks of life.

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	**Programme Outcomes(POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1						3		3	3		2	3			
CO2						3		3	3		2	3			
CO3						3		3	3		2	3			
CO4						3		3	3		2	3			
CO5						3		3	3		2	3			