SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Applied Science
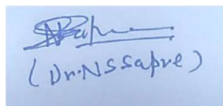### SYLLABUS FOR CE, ME and AE Programs

Subject Category	BSC	Subject Code:	CHB102	Subject Name:		Chemistry			

Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz/Assignment	End Sem	Lab-Work					
60	20	20	30	20	150	3	-	2	4

Prerequisites:

Students who have completed 12th with Science stream or Chemistry of 12th standard or equivalent

Course Objective:

The main aim of Engineering Chemistry is to make Students familiar with basic concepts of Chemistry, the students face in industry and engineering field. With this background the Students will be able to explain Scientifically the various chemistry related problems in industry/engineering field.

Course Outcomes:

Student after successful completion of course shall possess skills to think critically and analyse chemistry problems in engineering field. Students are expected to solve the chemistry problems with an engineering purview. Laboratory work is intended for students to learn conducting experiments and analyse experimental data.

Sno.	CO's Description
CO1	Differentiate hard & soft water, solve the related numerical on water treatment and have knowledge regarding its Significance in industry and daily life.
CO2	Apply their knowledge regarding various types of fuels including petroleum fuels, Fuels Cells, Electrical Vehicle Batteries
CO3	Acquire basic knowledge of various types of polymers, with mechanism and applications.
CO4	To know basic concept of lubrication and its properties. To have knowledge about cement and refractories to appreciate its applications in various industries.
CO5	Analyze the need of instruments. Identify and estimate about the unknown/new compounds with the help of spectroscopy/ chromatography.

UNITs	Descriptions	Hrs.	CO's	Remarks
I	**WATER TECHNOLOGY:** Sources, Availability, impurities in Water, Types of hardness, Units of hardness. Concentration expression: Normality, Molarity, Molality. Water analysis techniques – Hardness determination by EDTA method, Alkalinity determination. Defects in boiler due to Hard water. External Treatment (Lime-soda, Zeolite & Ion exchange resin method) & Internal Treatment of Boiler feed water. Numerical Problems.	8	1	
II	**FUELS & ENERGY STORAGE SYSTEMS:** Characteristics of fuels. Classification of fuels, Calorific Value, HCV, NCV. Proximate and ultimate analysis of coal. Petroleum & its refining. Knocking, Octane Number & Cetane Number, Numerical problems. Electrochemistry: Introduction, EMF of cell, Single electrode potential. Classification of batteries (primary, secondary and reserved batteries), Introduction to Fuel Cell, Electrical Vehicle Batteries their components and materials used.	8	2	
III	**POLYMERS AND NANOMATERIALS:** Polymers: Nomenclature & classification of polymers. Thermoplastics and	8	3	

	Thermosetting polymers. Preparation, properties and applications of PE, PVC, PS, Teflon, Nylon 6:6, PU, SBR, NBR, Bakelite, Silicone resin. Rubber and its types. Vulcanization of Rubber, Applications of rubber. Photoactive polymers, Photovoltaic materials: solar cells and dye sensitized solar cells- principle and applications. Nanomaterials: Introduction, Synthesis and applications of nano materials. Introduction to smart materials and its application.		
IV	**LUBRICANTS AND CEMENTING MATERIAL:** Introduction, Classification &functions, Mechanism of lubrication, Lubricating oils, grease, semisolid lubricant and solid lubricants. Properties of lubricating oils with significance: Viscosity Index, Flash point, Fire point, Aniline point, Cloud & pour point, Steam EmulsionNumber (S.E.N), Numerical problems. Composition of Cement, Manufacture of Portland cement. Chemistry of Setting and hardening of cement.	8	4
V	**INSTRUMENTAL METHODS OF ANALYSIS:** Importance of Instrumental techniques. Classification of Instrumental techniques. Introduction to Electroanalytical and Spectroscopic Methods.Principle, Instrumentation, Working and applications of following techniques: Colorimetry, IR Spectroscopy, Conductometry, pH metry, Chromatography and Gas Chromatography.	8	5
Guest Lectures (if any)			
Total Hours		40	
Suggestive list of experiments:			

LABORATORY EXPERIMENTS:(Any 10 experiments to be performed)

1. To determine strength of unknown Ferrous Ammonium Sulphate $FeSO_4.(NH_4)_2SO_4.6H_2O$ (Mohr's Salt) solution by titrating it against intermediate Potassium Dichromate $(K_2Cr_2O_7)$ solution using Di Phenyl Amine(DPA) as internal indicator.[Redox Titration]
2. To determine Temporary, Permanent and Total Hardness in given sample of water by E.D.T.A. method.[Complexometric Titration]
3. To determine strength of Sodium Carbonate and Sodium Bicarbonate in given alkaline solution by titrating with standard HCl using phenolphthalein and Methyl Orange indicators.
   Or
   To determine alkalinity in given water sample using Phenolphthalein and Methyl Orange indicators.[Acid Base Titration]
4. To determine strength of unknown $CuSO_4$ solution by titrating it against intermediate sodium thiosulphate (Hypo) solution using starch as final indicator.[Iodometric Titration]
5. To determine the chloride content of the given sample of water using silver nitrate solution with potassium chromate solution as an indicator.[Precipitation Titration]
6. To determine Moisture content in given sample of coal.[Proximate Analysis]
7. To determine Ash content in given sample of coal.[Proximate Analysis]
8. To determine the Viscosity Index of give lubricating oil by Redwood Viscometer No.1 and Redwood Viscometer 2.[Lubricating Oil Analysis]
9. To determine the Flash Point and Fire Point of lubricating oil by Abel's Apparatus.[Lubricating Oil Analysis]
10. To determine the Flash Point and Fire Point of lubricating oil by Pensky Martin's Apparatus.[Lubricating Oil Analysis]
11. To determine S.E.N. of given lubricating oil[Lubricating Oil Analysis].
12. To separate mixture of pigments by Thin Layer Chromatography [Instrumental Methods].
13. To separate mixture of pigments by Paper Chromatography [Instrumental Methods].
14. To verify Beer Lambert's law of colorimetry [Instrumental Methods].
15. To determine amount of Iron by colorimetry [Instrumental Methods].
16. To estimate amount of Iron by UV spectrophotometer. [Instrumental Methods]
17. To determine pH of given solution using pH meter. [Instrumental Methods]
18. To determine strength of acid/base by conductometric titrations. [Instrumental Methods]

TEXT BOOKS:

- Engineering Chemistry – Jain & Jain – Dhanpat Rai &Company Pvt. Ltd, New Delhi.
- A Text Book of Engineering Chemistry – S.S. Dara – S. Chand Publication, Delhi.

- Engineering Chemistry- Shashi Chawla, Dhanpat Rai &Company Pvt. Ltd, Delhi.
- Engineering Chemistry – Uppal – Khanna Publishers.
- A Text book of Engg. Chemistry- Agarwal, C.V, Murthy C.P, Naidu, BS Publication, Hyderabad.
- B. Sivasankar, Engineering Chemistry 1 st Edition, Mc Graw Hill Education (India), 2008
- O.G. Palanna, McGraw Hill Education (India) Private Limited, 9 th Reprint, 2015

REFERENCE BOOKS:

- Chemistry in Engineering and Technology, Kuriacose J.C. and Rajaram J.,Tata McGraw Hill.
- Applied Chemistry- Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
- Chemistry of Engineering Material-C.V. Agarwal, Andranaidu C. Parameswara Moorthy –B.S. Publications.
- William Kemp, Organic Spectroscopy, 3 rd edition, Palgrave, New York, 2005.

Modes of Evaluation and Rubric
Evaluation will be continuous as an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and viva of each candidate.

List/Links of e-learning resource

- Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
- https://nptel.ac.in/course.html
- https://iln.ieee.org/resources/e-learning
- https://www.researchgate.net/publication/221928462_ELearning_Usage_During_Chemical_Engineering_Courses
- https://learncheme.com/
- https://www.anits.edu.in/elearn_c.php

Recommendation by Board of studies on	14.6.2022 (Tuesday)
Approval by Academic council on	16.6.2022 (Thursday)
Subject handled by department	Applied Science (Chemistry)

Dr Manju Singh
Prof & Head, Chemistry
UIT, RGPV, Bhopal

Dr Nitin Sapre
Prof & Head, Chemistry
SGSITS, Indore

Dr J Parashar
Dean, Academics
SATI, Vidisha

Dr Manoj Datar
Prof & Head, Chemistry
SATI, Vidisha

Semester/Year		I/I		Program		B.Tech		
Subject Category	ESC	Subject Code:	CEA103	Subject Name:		Engineering Mechanics		

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical						
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz	Total Marks	L	T	P	Total Credits
60	20	10	10	30	10	10	150	3	-	2	4

Prerequisites:

Physics and Mathematics.

Course Objective:

Students are expected to learn the basic concepts of Engineering Mechanics and to think clearly and critically the solution of Engineering problems with this knowledge in their respective fields.

Course Outcomes:

After completion of the course, the student will be able to:
1. Understand the basic concepts and fundamental principles of Engineering Mechanics.
2. To enhance their understanding and apply this knowledge in their specific courses for the analysis and design problems.

UNITs	Descriptions	Hrs.	CO's
I	**Equilibrium of System of Forces :** Force Systems Basic concepts, Particle and Rigid Body equilibrium; Coplanar-Concurrent and Non-concurrent Forces, Components in Space, Resultant, Moment of Forces and its Applications; Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems; Static Indeterminacy, Friction-Application problems such as Impending motion of connected bodies, ladder friction & belt drives.	9	CO1 & CO2
II	**Trusses:** Introduction to various types of Trusses, Analysis of forces in the members of a Perfect truss: Method of joints, Method of Section, Graphical Methods.	7	CO1 & CO2
III	**Analysis of Beams and Simple Frames :** Types of Beams, loading and supports; Shear Force, Bending moment, Axial Force diagrams for various types of determinate beams and frames.	7	CO1 & CO2
IV	**Centroid and Moment of Inertia :** Centroid of simple figures from first principles, centroid of composite sections; Moment of inertia of plane sections from first principles, Moment of inertia of standard sections and composite sections, Product of Inertia, Principal Moment of Inertia.	9	CO1 & CO2
V	**Kinetics of Rigid Bodies:** Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation	8	CO1 & CO2
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:	
1. To verify law of Polygon of forces. 2. To find the reaction at the supports of a Simply Supported Beam and verify the law of Superposition of Forces. 3. To determine the Coefficient of friction between different surfaces using a horizontal plane. 4. To find the Coefficient of friction between Rope and Drum. 5. To verify Shear Force at a given section of a Simply Supported Beam. 6. To verify Bending Moment at a given section of a Simply Supported Beam.	

Text Book-
    1. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
    2. Civil Engineering materials, TTTI, Chandigarh.
    3. R.C. Hibbler– Engineering Mechanics: Statics & Dynamics	

Reference Books-
    1. Engineering Mechanics by R.K. Bansal
    2. Beer &Johnston, Vector Mechanics for Engineering–Statics &Dynamics.
    3. Engineering Mechanics by Bhavi Katti	

Modes of Evaluation and Rubric	
Quiz, Assignment, Midterm exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.	
List/Links of e-learning resource	
https://nptel.ac.in/courses/122/104/122104015/ https://nptel.ac.in/courses/105/106/105106116/ https://nptel.ac.in/courses/105/106/105106201/	
Recommendation by Board of studies on	13-06-2022
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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(An Autonomous Institute Affiliated to RGPV Bhopal)
---------AGRICULTURE ENGINEERING----------

Semester/Year		II/I		Program		B.Tech			
Subject Category	ESC	Subject Code:	CEA102	Subject Name:		Basics of Agricultural & Civil Engineering			

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical						
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz	Total Marks	L	T	P
60	20	10	10	-	-	-	100	3	-	-

(Total Credits: 3)

Prerequisites:
Nil

Course Objective:
To present the basic theory and practice for various areas of Agricultural and Civil Engineering, application of engineering to the problems of agricultural production.

Course Outcomes:
After completion of the course, the student will be able to: CO1- Acquire basic knowledge of agriculture engineering and knowledge of Physiological processes in Plant CO2- Identify different types of soils and their agricultural properties. CO3- Acquire the detailed knowledge about agronomy and horticulture. CO4- Identify various building materials and acquire basics of surveying.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction &Physiological processes in Plant** Importance of agricultural engineering, role of agricultural engineers, contributions of Agricultural Engineering to National development, Definition of Agricultural Engineering, various branches (options), Job prospects for agricultural engineers, scope of agricultural mechanization, Elementary idea of certain physiological processes, osmosis, photosynthesis, transpiration, evaporation and respiration, factors affecting these processes	8	CO1
II	**Soils** Nature and origin of soil; soil forming rocks, soil forming processes, important soil physical properties; and their importance; soil particle distribution; soil inorganic colloids – their composition, properties and origin of charge; soil organic matter – its composition and decomposition, effect on soil fertility; essential plants nutrients – their functions and deficiency symptoms in plants; important inorganic fertilizers and their reactions in soils.	8	CO2
III	**Agronomy and Horticulture** Definition and scope of agronomy, Classification of crops, Principles of tillage, Tilth and its characteristics. Soil water plant relationship and water requirement of crops, weeds and their control, crop rotation, cropping systems, Relay cropping and mixed cropping. Scope of horticultural crops. Soil and climatic requirements for different horticultural crops, improved varieties, criteria for site selection, layout and planting methods, nursery rising, plant growing structures, pruning and training, fertilizer application, Garden tools, farm implements and structures for horticulture crop management	10	CO3

IV	**Building Materials:** Stones, bricks, cement, lime, timber-their types, properties, tests & uses, laboratory tests of concrete and mortar Materials: Workability and Strength properties of Concrete, Preparation of concrete, compaction, curing, etc		7	CO4
V	**Surveying & Positioning:** Introduction to surveying Instruments – levels, theodolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal levelling.		7	CO4
Guest Lectures (if any)				
Total Hours			40	

Suggestive list of experiments:

1. Determination of bulk density;
2. Particle density and porosity of soil;
3. Determination of organic carbon of soil;
4. Identification of crops and their varieties seeds and weeds;
5. Judging maturity time for harvesting of crop;
6. Study of seed viability and germination test;
7. Identification and description of important horticultural crops;
8. Study of different garden tools;
9. To find the Water Absorption and compressive strength of Brick.
10. To find the Consistency of cement, Initial & Final Setting time of cement.
11. Linear Measurement by Tape: a). Ranging and Fixing of Survey Station. b). Plotting Building Block by offset with the help of cross staff.

Text Book-

1. The Nature and Properties of Soil, By: N.C. Brady and R.R. Weil ☐ Fundamentals of Soil Science, Ed By ICAR,
2. Chemistry of Soil, By: E.E. Bear ☐ Principles of Agronomy, By: T. Y. Reddy and G. H. Shankara Reddy ☐ Fundamentals of Agronomy, By: Rajat D
3. Principles and Practices of Agronomy, By: S. S. Singh
4. Introduction of Agronomy, By: V. W. Vaidya and K. R. Shahastrabudher
5. Building Construction by Sushil Kumar.
6. Surveying Vol. I & II by Dr. B. C. Punamia Publication Laxmi Publication Delhi

Reference Books-

1. Principles of Horticulture, By: Prasad and Kumar
2. Principles of Horticulture, By: Denison
3. Horticultural Science, By: J Janick
4. Plant Propagation: Principles and Practices, By: Hartmen and Kester

Modes of Evaluation and Rubric

Quiz, Assignment, Midterm exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

http://www.nptel.iitm.ac.in/courses.php?branch=AG
http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT

Recommendation by Board of studies on	14th June, 2022
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
---------CIVIL ENGINEERING----------

Semester/Year		I/I		Program		B.Tech			
Subject Category	ESC	Subject Code:	CEA103	Subject Name:		Engineering Mechanics			

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical						
End Sem	Mid-Sem	Assign ment	Quiz	End Sem	Lab-Work	Quiz	Total Marks	L	T	P	
60	20	10	10	30	10	10	150	3	-	2	4

Prerequisites:
Physics and Mathematics.

Course Objective:
Students are expected to learn the basic concepts of Engineering Mechanics and to think clearly and critically the solution of Engineering problems with this knowledge in their respective fields.

Course Outcomes:
After completion of the course, the student will be able to: 1. Understand the basic concepts and fundamental principles of Engineering Mechanics.   2. To enhance their understanding and apply this knowledge in their specific courses for the analysis and design problems.

UNITs	Descriptions	Hrs.	CO's
I	**Equilibrium of System of Forces :** Force Systems Basic concepts, Particle and Rigid Body equilibrium; Coplanar-Concurrent and Non-concurrent Forces, Components in Space, Resultant, Moment of Forces and its Applications; Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems; Static Indeterminacy, Friction-Application problems such as Impending motion of connected bodies, ladder friction & belt drives.	9	CO1 & CO2
II	**Trusses:** Introduction to various types of Trusses, Analysis of forces in the members of a Perfect truss: Method of joints, Method of Section, Graphical Methods.	7	CO1 & CO2
III	**Analysis of Beams and Simple Frames :** Types of Beams, loading and supports; Shear Force, Bending moment, Axial Force diagrams for various types of determinate beams and frames.	7	CO1 & CO2
IV	**Centroid and Moment of Inertia :** Centroid of simple figures from first principles, centroid of composite sections; Moment of inertia of plane sections from first principles, Moment of inertia of standard sections and composite sections, Product of Inertia, Principal Moment of Inertia.	9	CO1 & CO2
V	**Kinetics of Rigid Bodies:** Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation	8	CO1 & CO2

Guest Lectures (if any)		
Total Hours	40	

Suggestive list of experiments:
1. To verify law of Polygon of forces.   2. To find the reaction at the supports of a Simply Supported Beam and verify the law of Superposition of Forces.   3. To determine the Coefficient of friction between different surfaces using a horizontal plane.   4. To find the Coefficient of friction between Rope and Drum.

5. To verify Shear Force at a given section of a Simply Supported Beam.
6. To verify Bending Moment at a given section of a Simply Supported Beam.

Text Book-
1. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
2. Civil Engineering materials, TTTI, Chandigarh.
3. R.C. Hibbler– Engineering Mechanics: Statics & Dynamics

Reference Books-
1. Engineering Mechanics by R.K. Bansal
2. Beer &Johnston, Vector Mechanics for Engineering–Statics &Dynamics.
3. Engineering Mechanics by Bhavi Katti

Modes of Evaluation and Rubric

Quiz, Assignment, Midterm exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

https://nptel.ac.in/courses/122/104/122104015/

https://nptel.ac.in/courses/105/106/105106116/

https://nptel.ac.in/courses/105/106/105106201/

Recommendation by Board of studies on	13-06-2022
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Humanities and Management

Semester/Year		I/II		Program			B.Tech.			
Subject Category	Hum	Subject Code:	HUB102	Subject Name:		**Communication and Report Writing**				

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical -		Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	-	2	4

Prerequisites:

In this era of Globalization and Information Technology, English has a special and predominant role in the communicative sphere and thus English commands the most prestigious position in the world in the exchange of information across geographical boundaries. The syllabus has been designed to develop linguistic and communicative competence of Engineering Students.

Course Objective:

1. To improve the language proficiency of the students in English with emphasis on LSRW Skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both formal and informal situations.

Course Outcomes:

1. Students will develop the ability to listen, speak, read and write effectively in both academic and non-academic environment.
2. The students will have an understanding of multidisciplinary contexts.
3. They will be able to successfully handle real life situations of business correspondence.
4. They will also develop the ability to analyse and interpret any technology related subjects.
5. Students will be in a position to make presentations on topics of technical and general interests; current issues related to politics; work and business environment.

UNITs	Descriptions	Hrs.	CO's
I	Significance of Communication: Process of Communication, The importance of Effective Communication in Business, Verbal and Non-Verbal Communication, Oral and Written Communication, Barriers to Communication.	10	1
II	Employability Traits: Job Interview (Body Language), Types of Interviews, Interview Skills, Employability Skills, Group Discussion.	6	2
III	Soft Skills: Goal Setting, Qualities of a good leader, Time Management, Time Wasters, Problem Solving.	8	3
IV	Report Writing: Definition, Importance, Types of Reports, Structure and Layout, Technical Writing, Essay Writing.	8	4
V	Applied Grammar in Communication: Articles, Punctuations, Question Tags, Subject-Verb, Agreement, Prepositions, Narration.	8	5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments: NA

1. NA

Text Book-

1. A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH Pub Sanjay Kumar PushpLata, English for Effective Communication, Oxford.

Reference Books-

- Language and Life: A Skills Approach Board of Editors,Orient Black Swan Publishers,
- India. 2018.
- 3. Business Correspondence and Report Writing - By R C Sharma; TMH.
- 4. Living English Structure – By W.S. Allen; Longmans.
- 5. English Grammar – Ehrlich, Schaum Series; TMH.

- 6. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman.
- 7. New International Business English – by Joans and Alexander; OUP.
- 8. Effective Technical Communication – Rizvi; TMH
- 9. Body Language – Vinay Mohan Sharma

Modes of Evaluation and Rubric
Two mid semester tests, Quiz, Sessional an end semester examination.

List/Links of e-learning resource

- https://onlinecourses.nptel.ac.in
- https://www.classcentral.com (swayam)

Recommendation by Board of studies on	26/02/2022
Approval by Academic council on	
Compiled and designed by	Dr. Amitish Singh, Dr. Manorama Saini and Dr. Veena Datar
Subject handled by department	Department of Humanities

	SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
	(Engineering College), VIDISHA M.P.
	(An Autonomous Institute Affiliated to RGPV Bhopal)
	Department of Applied Science

Semester/Year		First Sem		Program		B.Tech.			
Subject Category	Department al Core	Subject Code:	MAB101	Subject Name:		Linear Algebra and Calculus			

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	Assign ment	End Sem	Lab-Work					
60	20	10	10	-	-	100	3	1	-	4

Prerequisites:

Basic of Differentiations, Integrations and Matrices.

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes:

This course is to develop students abilities to:

1. Apply Differential Calculus to Notions of Curvature. Apart from some other Applications they will have a Basic Understanding of Taylor's Theorem, Maxima and Minima.

2. The Fallouts of Partial Differentiation that is Fundamental to Application of Analysis to Engineering Problems.

3. Finding area and Volume using Double and Triple Integrals.

4. The Essential Tool of Matrices and Linear Algebra in a Comprehensive Manner. Student will understand Matrices and their Application to Solve System of Linear Simultaneous Equations.

5. Students will Gain Experience with Problem Solving in Boolean Algebra and Graph Theory.

UNITs	Descriptions	Hrs.	CO's
I	**Differential Calculus:** Lebnitz Theorem, Expansion of functions by Maclaurins and Taylors theorem (one variable), Maxima & Minima of two variables, Curvature: Radius and Centre of Curvature for Cartesian Coordinates.	8	1
II	**Partial Differentiation:** Partial Derivatives of Higher Order, Homogeneous Functions, Euler's Theorem, Total differentiation, Errors and Approximations.	8	2
III	**Integral Calculus :** Definite Integral as a Limit of the Sum, Application in Summation of Series, Multiple Integrals, Change of order of Integration, Application of Double and Triple Integrals (Area & Volume).	8	3
IV	**Matrix :** Definition, Types & Properties of Matrices, Elementary Transformation, Rank of Matrix, Consistency of Linear System of Equations and their solutions, Eigen Values and Eigen Vectors, Cayley Hamilton Theorem and its Application to find the Inverse.	8	4

	Boolean Algebra & Graph Theory: Algebra of logic, Principal of Duality and basic theorem, Boolean expression and Boolean functions, Definition of Graph, Types of Graphs, Sub Graphs, Walk, Path and Circuits,.		
V		8	5
TOTAL HOURS		40	

Reference Books:
1. Engg. Mathematics: By B.S. Grewal
2. Boolean Algebra: R.S. Agrawal
3. Engg. Mathematics: by H.K. Dass
4. Engg. Mathematics : By B. V. Rammanna

Recommendation by Board of studies on	14-06-2022
Approval by Academic council on	16-06-2022
Compiled and designed by	Applied Maths Board of Studies, Chairman Dr. Shailesh Jaloree

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Humanities and Management

Semester/Year		II Year		Program			B. Tech All Branches				
Subject Category	MAC	Subject Code:		MAC101		Subject Name:	**Universal Human Values**				

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
00	00	00	00	60	20	20	100	-	-	2	Grade

Prerequisites:

During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objective:

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

1. Develop a holistic perspective based on exploration about others and themselves.

2. Develop clarity, importance of harmony and humanity towards family, society and nature/existence.

3. Strengthen self-reflection.

4. Develop commitment and courage to act.

Course Outcomes:

1. By the end of the course, students will become aware of themselves, and their surroundings (family, society, nature)

2. They would have better critical ability.

3. They would become more responsible in life; and keeping human relationships and human nature in mind will be able to handle problems with sustainable solutions.

4. They would also become sensitive to their commitment towards nature and existence.

5. They would be able to apply what they have learnt to their own selves in different day-to-day real-life scenarios, at least a beginning would be made in this direction.

UNITs	Descriptions	Hrs.	CO's
I	Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration 2. Continuous Happiness and Prosperity- A look at basic Human Aspirations 3. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority 4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	8	1

	5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility.		
II	Understanding Harmony in the Human Being - Harmony in Myself! 1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body' 2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility 3. Understanding the characteristics and activities of 'I' and harmony in 'I' 4. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail 5. To ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods. Identifying from one's own life. Differentiate between prosperity and accumulation.	6	2
III	Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship 1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness. 2. Understanding the meaning of Trust; Difference between intention and competence. 3.Understanding the meaning of Respect, Difference between Respect and differentiation; the other salient values in relationship. 4.Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. 5. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Gratitude as a universal value in relationships. Elicit examples from students' lives.	4	3
IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence 1. Understanding the harmony in the Nature. 2. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature. 3. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. 4. Holistic perception of harmony at all levels of existence. 5. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.	8	4
V	Implications of the above Holistic Understanding of Harmony on Professional Ethics 1. Natural acceptance of human values. 2. Definitiveness of Ethical Human Conduct. 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop	9	5

	appropriate technologies and management patterns for above production systems. 5. Strategy for transition from the present state to Universal Human Order: a. as socially and ecologically responsible engineers, technologists b. At the level of society: as mutually enriching institutions and organizations.		
Guest Lectures (if any)		5	
Total Hours		**40**	

Suggestive list of experiments:
Text Book-Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books-
     1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
     2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.

Modes of Evaluation and Rubric
Questionnaire,Quiz,Presentation and standard procedure will be followed .

List/Links of e-learning resource
https://fdp-aicte-india.org https://vvce.ac.in

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Approval by Academic council on	
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Subject handled by department	Humanities and Management