POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI

B.E. in Ceramics and Cement Technology

Scheme of Teaching and Examinations 2022

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD)and Question Paper Setting Board(PSB)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIEMarks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC/BSC	22CC31	Mathematics	TD-Respective Dept. PSB- Respective Dept.	2	2	0		03	50	50	100	3
2	IPCC	22CC32	Introduction to Ceramic Technology	TD-Respective Dept. PSB- Respective Dept.	3	0	2		03	50	50	100	4
3	IPCC	22CC 33	Principles of Ceramic Processing	TD-Respective Dept. PSB- Respective Dept	3	0	2		03	50	50	100	4
4	PCC	22CC34	Geology of ceramic raw materials	TD-Respective Dept. PSB- Respective Dept	2	2	0		03	50	50	100	3
5	PCCL	22CC L35	Geology Lab	TD-Respective Dept. PSB- Respective Dept	0	0	2		03	50	50	100	1
6	ESC	22CC36A	Introduction Materials Science	TD: Respective Dept. PSB: Respective Dept.	3	0	0		03	50	50	100	3
7	UHV	22UHV37	Social connect and responsibility	Respective Dept.	0	0	2		02	50	50	100	1
8	AEC/SEC	22CCAE381	Data analysis using charts and Graphs	Respective Dept.	If the course is a Theory				02	50	50	100	1
					0	2	0						
					If a course is a laboratory				03				
					0	0	2						
9	NCMC	22NS39	Mandatory Course	NSS Coordinator	0	0	2			50	---	50	0
		22PE39	Mandatory Course	Physical Education Director									
		22YO39	Mandatory Course	Yoga Teacher									
									Total	**450**	**400**	**850**	**20**

PDA COLLEGE OF ENGINEERING,KALABURAGI
B E. Third Semester
Engineering Mathematics for Civil Engineering Stream-III
[As per Choice Based Credit System (CBCS) scheme]
(From the academic year 2022-23)

Course Code	22MATC31	CIE Marks	50
Credits	03	SEE Marks	50
Contact Hours/Week (L-T-P)	3-0-0	Total Marks	100
Contact Hours	42	Exam Hours	03

Course Learning Objectives: To enable the students to obtain the knowledge of Engineering Mathematics in the following topics

1. Fourier Series and its application in engineering fields
2. Probability distribution of discrete and continuous random variables
3. Analyze the sample data using Large sample test, t-distribution and chi- distribution

Module-I **9hours**

Statistical methods:

Curve fitting by the method of least squares: Straight line, second degree parabola and the curves of the form $y = ab^x$, $y = ax^b$ *and* $y = ae^{bx}$.

Correlation and lines of regression, angle between two regression lines and rank correlation

RBT Levels: L1, L2 & L3

Module-II **8 hours**

Probability distributions:

Random variable (Discrete and continuous) probability density function, cumulative density function. Binomial distribution, Poisson distributions, Normal distribution and problems.

RBT Levels: L1, L2 & L3

Module-III **9 hours**

Joint probability distributions:

Concept of joint probability distribution, discrete and continuous random variables independent random variables .problems on expectation and variance

RBT Levels: L1, L2 & L3

Module –IV **8 hours**

Sampling theory -I

Sampling, sampling distribution, standard error, null and alternative hypothesis, Type-I and Type-II errors, Confidence limits. Test of significance for Large sample: Test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations

RBT Levels: L1, L2 & L3

Module –V **8 hours**

Sampling theory -II

Test of significance Small samples student's t-distribution: Test for single mean, difference of means, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes and problems

RBT Levels: L1, L2 & L3

Text books:

1 Higher Engineering Mathematics by B.S.Grewal, Khanna publishers; 40th Edition.2007
2 Engineering Mathematics by N. P. Bali and Manish Goyal. Laxmi publications, latest edition

Reference books:

1.Advanced Engineering Mathematics by E. Kreyszig, John Willey & sons 8th Edn.
2.A short course in differential equations – Rainvile E.D.9th Edition.
3.Advanced Engineering Mathematics by R.K.Jain & S.R.K Iyengar; Narosa publishing House.
4.Introductory methods of numerical analysis by S.S.Sastry
5. Statistical Methods Authored By Gupta S.P. Publisher: Sultan Chand & Sons. Publishing Year: 2021
6.Fundamentals of Mathematical Statistics Authored By Gupta S.C.& Kapoor V.K. Publisher:Sultan Chand & Sons.Publishing Year: 2020

Course Outcomes: On completion of this course, students are able to:

CO1: Apply the method of least square to estimate the parameters in regression model
CO2: Solve problems using theoretical probability distributions
CO3: Apply the concepts of joint probability, to find covariance, correlation, independent variables
CO4: Analyze the sample data using Large sample tests
CO5: Analyze the sample data using t-distribution and chi- distribution

Course Title: Introduction to Ceramic Technology
[As per Choice Based Credit System (CBCS) Scheme]
(From the academic year 2022-23)

Course Code	**22CC32**	**CIE Marks**	**50**
Credits		**SEE Marks**	**50**
Course Type Theory	**Theory**		
Lecture Hours/Week	**3**	**Total Marks**	**100**
Total Hours	**Hours: 52**	**SEE Hours**	**03**

Course Objectives:

MODULES	**Hours**
Module-1 Definition, classification, applications, properties and scope of ceramics, ceramics versus metals and organics, historical perspective on the development of ceramics and ceramic industries. General flow diagram of preparation of ceramic articles with equipments used in making of ceramic articles. Newer ceramics versus traditional ceramics.	08+2 (T or L)

Module-2 Structure, classification and properties of Clays (Kaolin Montmorillionite) and feldspars. Structure, properties and polymorphism of quartz. Brief study of Cornish stone, nepheline syenite, talc, steatite, pyrophyllite, sericite pyrophyllite, mica and synthetic raw materials. Calculation of percentage oxide content in clays, feldspar and other raw materials (9 hours)	09+2 (T or L)
Module-3 Preparation of ceramic powders, mixing, preliminary idea of various shaping methods of ceramic articles; dry and semi dry uniaxial pressing, extrusion, jiggering and jollying, injection molding, slip casting, isostatic pressing, hot pressing, hot isostatic pressing, tape casting, machining methods. Drying of ceramics, biscuit firing and glost firing, action of heat on triaxial body. (9 hours)	08+2 (T or L)
Module-4 Elementary ideas of classification, manufacture, properties and applications of conventional ceramics; Refractories, glass, whitewares, bulk density, apparent porosity determination and manufacture of and Portland cement. .	09+2 (T or L)
Module-5 Newer ceramics: Classification – cermets and abrasives, electro-ceramics, bio-ceramics, space ceramics, super conducting ceramics, automotive ceramics.	08+2 (T or L)
Practical component of 22CC32 1. Identification or comparison of materials of materials as (i) Metals, (ii) Polymers (Plastics) and (iii) Ceramics and glasses, based upon density or Specific gravity. 2. Preparation of general flow chart (drawing) for preparation of ceramic articles. 3. Determination of adsorbed Moisture content in clays and other ceramic raw materials 4. Determination of water of plasticity in clays 5. Shaping of clay based ceramics by hand molding 6. Drying or ceramics, determination of loss of moisture due to drying or Time taken to dry hand molded green ceramics to below 1 % of moisture. 7. Comparison of given samples of refractory, glass, whitewares, based on Moh's hardness 8. Comparison of loss on ignition or drying shrinkage of clay based and non clay based ceramics comparison. (any one in tutorial)	
Question paper pattern: Question paper shall contain five modules, each module containing two questions. Students shall answer any one question from each module.	

Textbook:

1. Industrial ceramics - F. Singer and Singer S.S. Publisher Springer ISBN 978902752596
2. Cement data book – Vol.I, II, III – W.H. Duda, Gmbh Germany
   Cement Engineer's Handbook – Von Ottolabahn, McGraw Hill, N.Y.
   Industrial Ceramics – Singer and Singer, Springer Netherland publisher edition-1.

Reference Book:

1.Elements of Ceramics – F.H. Nortan Publisher: Longman Higher Education; 2nd Revised edition edition (1 June 1974) ISBN-10:0201053063, ISBN-13:978-0201053067

2.Introduction to ceramics – W.D. Kingery et al, Publishers Wiley and Sons. ISBN-13: 978-0471478607 2nd edition.

3.What every engineer should know about ceramics? – Solomon Mushikant Publisher Marcel and Dekker New york 1992.

4.Properties of Ceramic Raw Materials– W . Rayon Publishers Elsevier 2003

5.Ceramic whitewares – Rexford Newcomb, Jr., Pitman Pub. Corp., NY

6.Refractories – Manufacture, Properties and Applications – A. Rashid Chesti, Prentice Hall of India Pvt. Ltd.

7.Technology of Portland and blended Cements, Banerjee H.N published by A.H. Wheeler Publishing, Allahabad, Ed. 1980.

8.Abrasives – L. Coes Jr, Springer-Verlag 1971.

9.Modern Glass Practice – Samuel Ray Scholes, Charles H. Greene Publisher: Canners books 1975.

Advanced Technical Ceramics – Shigeyuki Somiya, Academic Press Inc., Harcourt Brace Jovanovich Publishers, 1984

E-books and online course materials:

1. http://shodhganga.inflibnet.ac.in/bitstream/10603/108074/12/12_chapter%204.pdf
2. http://www.scielo.br/pdf/mr/v20s2/1516-1439-mr-1980-5373-MR-2016-0915.pdf

Course outcomes:

On completion of the course, the student will have the ability to:

CO #	Course Outcome (CO) with blooms levels
CO1	Describe ceramic materials and differentiate from other engineering materials (L2)
CO2	Explain characteristics and calculate oxide content of various pure and natural and synthetic ceramic raw materials(L3)
CO3	Explain and compare various shaping methods of ceramic articles(L5)
CO4	Construct and explain flow charts for manufacture of conventional ceramics and explain properties applications of conventional ceramics (L3)
CO5	Explain applications of various newer ceramics and tests conducted on ceramic and ceramic raw materials (L5)

Course Title: Principles of Ceramic Processing [As per Choice Based Credit System (CBCS) Scheme] (From the academic year 2022-23)			
Course Code	**22CC33**	**CIE Marks**	**50**
Credits		**SEE Marks**	**50**
Course Type Theory	**Theory**		

Lecture Hours/Week	3	Total Marks	100
Total Hours	Hours: 42	SEE Hours	03

Course Objectives:

MODULES	Hours
Module-1 Brief history of ceramic technology, Classification of ceramic powder products, Ceramic products by functions, Objectives of ceramic processing, industrial ceramic processing, Common raw materials i.e., crude materials, industrial minerals, and industrial inorganic chemicals, clay minerals and beneficiation of kaolin	8
Module-2 Comminution equipments like jaw crusher, gyratory crusher, roller crusher, hammer mill, ball mill, industrial vibratory mills and planetary mills. Loading and fracture of particles, milling performance, particle size distributions and milling efficiency	8
Module-3 Batching and mixing, mixing mechanisms, mixing equipment and practices like slurries and pastes plastic bodies, granular materials and powders. Mixing performance. Particle sizing, classification techniques and centrifuging	9
Module-4 Filtration and washing processes; Liquid permeability, Filtration and other particle concentration process. Direct granulation, Spray drying process; concurrent spray dryer with centrifugal atomizer and mixed flow spray dryer with a nozzle atomizer, granule characters	9
Module-5 Particle packing characteristics; Characteristics of packing's of uniform spheres, packing in interstices among coarser particles, packing of continuous size distributions and hindered packing. Change in consistency on admixing a liquid and particle interactions	8

Following experiments shall be conducted for being integrated course

1. Estimation of physorbed water in the raw materials
2. Estimation of chemically combined water in clay
3. Estimation of volatility of clay and other ceramic materials
4. Milling of raw materials such as flint, feldspar, quartz
5. Analysis of particle size distribution for milled materials
6. Preparation of batch composition with clay, quartz and feldspar and milling or any other available combination
7. Determination of packing density with coarse, medium and fine particles by tapping method

Question paper pattern:

Question paper shall contain five modules, each module containing two questions. Students shall answer any one question from each module.

Textbook:

James S. Reed "Introduction to the Principles of Ceramic Processing" John Wiley & Sons

Publication New York

Reference Book:

M. N. Rehman, "Ceramic Processing and Sintering" 2nd Edition, Engineering and Technology; Physical Sciences, CRC Press 2003

E-books and online course materials:

1. http://shodhganga.inflibnet.ac.in/bitstream/10603/108074/12/12_chapter%204.pdf
2. http://www.scielo.br/pdf/mr/v20s2/1516-1439-mr-1980-5373-MR-2016-0915.pdf

Course outcomes:

On completion of the course, the student will have the ability to:

CO #	Course Outcome (CO)
CO1	Describe ceramic materials and differentiate from other engineering materials C2
CO2	Explain characteristics and calculate oxide content of various pure and natural and synthetic ceramic raw materials C3
CO3	Explain and compare various shaping methods of ceramic articles
CO4	Construct and explain flow charts for manufacture of conventional ceramics and explain properties applications of conventional ceramics C3
CO5	Explain applications of various newer ceramics and tests conducted on ceramic and ceramic raw materials

Course Title: GEOLOGY OF CERAMIC RAW MATERIALS
[As per Choice Based Credit System (CBCS) Scheme]

Course Code	**22CC34**	**CIE Marks**	**50**
Credits	**3**	**SEE Marks**	**50**
Course Type Theory	**Theory**		
Lecture Hours/Week	**3**	**Total Marks**	**100**
Total Hours	**Hours: 42**	**SEE Hours**	**03**

Course Objectives:

To Impart knowledge on and to enable students to understand

1. General Geology and various branches of geology
2. Identify various types of minerals and their Crystallographic characteristics.
3. Identify the various types of rocks and their physical properties of rocks.
4. Structural features of the earth.
5. Processes of formation of Economic minerals and their availability.

MODULES	Hours
Module-1 **Introduction**: Branches of Geology, Internal structures of the Earth. Applications the geological background cement and ceramic field Definition and characteristic features of crystals. Symmetrical characters and six crystallographic systems	8
Module-2 **MINERALOGY**: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldsper, Quartiz, Flint, Jasper, Olivine, Augite,	8

Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite , Magnetite Chrorite , Galena , Pyrolusite, Graphite, Magnesite, and Bauxite	
Module-3 **PETROLOGY**: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate..	8
Module-4 **STRUCTURAL GEOLOGY:** Out crop, strike and dip study of common geological structures associating with the rocks such as Folds, Faults, Unconformities, and Joints – their important types **STRATIGRAPHY:** General principles of Stratigraphy, Standard Geological time scale .Tripartite physiographical divisions of India. Broad outline of the stratigraphy of India	8
Module-5 **ECONOMIC GEOLOGY AND INDUSTRIAL MINERAL DEPOSITS:** Rock forming and ore forming minerals, processes of formation of Economic mineral deposits. Simple classification of mineral deposits. Description, deposits, distribution of the important following mineral deposits of India. Mica, Gold, Clay, Feldspar, Quartz, Zircon Beryl, Kyanite, Magnetite, Dolomite, Limestone, Barite ,Bauxite	10

Question paper pattern:

Two questions with sub divisions to be set from each module. Students shall answer one question from each module. Mixing of questions in the module is allowed.

Textbook:

1. N. Chennkesavulu, Engineering Geology, Mc Milan India Ltd., New Delhi, India, 12th Edition 2009.

2.Venkat Reddy ,Engineering geology, Vikas Publications, New Delhi, India, 2nd Edition 2011.

3. Parbin Singh., "Engineering and General Geology", Katson Publishers, 2009.

Reference Book:

1. **K. V. G. K. Gokhale,** Principles of engineering Geology, BS Publications, New Delhi, India,3rd Edition ,2012.
2. **F.G. Bell,** Fundamental of Engineering geology butterwoths, Publications, New Delhi,3rd Edition, 1999
3. **David George Price**, "Engineering Geology: Principles and Practice", Springer, 2009.

E-books and online course materials:

Course outcomes:

On completion of the course, the student will have the ability to:

CO #	Course Outcome (CO)
CO1	DETERMINE THE ROLE OF THE GEOLOGY IN CERAMIC FIELD, AND VERIOUS ASPECTS OF THE EARTH.
CO2	FORMATION, CLASSIFICATION AND VERIOUS PHYSICAL PROPERTIES OF MINERALS.

CO3	FORMATION, CLASSIFICATION AND VERIOUS PHYSICAL PROPERTIES OF ROCKS.
CO4	MAKE USE OF MINERALS AND ROCKS IN THE CERAMIC FIELD WITH RESPECT TO STRUCTURAL FEATURES
CO5	KNOW THE DEPOSITS, DISTRIBUTION AND USES OF ECONOMIC MINERAL DEPOSITS.

GEOLOGY LABORATORY

SUBJECT: /COURSE CODE : 22CCL 35	CREDIT: 1.5	
CIE: 50MARKS	SEE: 50 MARKS	TOTAL MARKS :100
HOURS/WEEK : 3 (PRACTICAL)		TOTAL HOURSE: 28

Course objectives:

This laboratory course will enable students to

1: Understand the various physical properties of minerals, and they can identify different types of Minerals

2: Understand the various optical properties of minerals. They can recognize special Characteristics.

3: Understand the various physical properties of the rocks, and they can classify different types of rocks.

1 . Study of physical properties of the following minerals in hand specimens:
Quartz, Orthoclase, Albite, Oligoclase,Bitnowite, Anothite, Asbestose, Kayanite, Talc, Gypsum, Calcite, Flourite, Apatite, topaz, Correndum,Clay minerals, Fullers earth, kyonite, Hematite, megnatite, chromite, pyrolsite, psyllomelane,limonite,etc.

2. Study of optical properties of of the following minerals under petro logical microscope.:
Quartz, Orthoclase, Albite, Oligoclase,Bitnowite, Anothite, Asbestose, Kayanite, Talc, Gypsum, Calcite, Flourite, Apatite, topaz, Correndum,Clay minerals, Fullers earth, kyonite, Hematite, Megnatite, ,etc.

3. Study of Physical properties of the following rocks in hand specimens

IGNEOUS ROCKS: Granite, Pegmatite, Syanite, Felsites, Diorite, Dolerite, Gabroo, Basalt and There different verities.

SEDIMENTARY ROCKS: Conglomerate, Breccia, Sandstone, Limestone, Laterite, Shale, and their Different verities.

METAMORPHIC ROCKS: Gneiss, Schist, Quartzite, marble, slate, phyllite and their different Verities.

Course Outcome: At the end of the course Students will be able to

CO1: Identify various Minerals based on their physical properties (C1)

CO2: Classify /recognize minerals based on physical properties (C2)

CO3: Judge the use of minerals for varies applications (A3)

CO4: Determine the properties of various rocks with respect to ceramic field (C4)

Course Title: Introduction to Material Science and Engineering (IMSE)
[As per Choice Based Credit System (CBCS) Scheme]
(From the academic year 2022-23)

Course Code	22CC36A	**CIE Marks**	**50**
Credits		**SEE Marks**	**50**
Course Type Theory	**Theory**		
Lecture Hours/Week	**3**	**Total Marks**	**100**
Total Hours	**Hours: 42**	**SEE Hours**	**03**

Course Objectives:

To impart knowledge and to enable students to understand:

1. Engineering materials classification, bonding and crystal geometry.
2. Structure of solids and structure determination by XRD, crystal imperfections
3. Phase diagrams and diffusion in solids

Mechanical and chemical behavior of materials.

MODULES	Hours
Module-1 Introduction: Classification of engineering materials, Structure of atom, Definition of ionization potential, electron affinity and electro-negativity. Crystal geometry: Geometry of crystals, the Bravais lattices, crystal directions and planes, the miller indices.	8
Module-2 Structure determination by XRD, Bragg's law, the powder method for structure determination. Surface Phenomena: Capillary rise, Pressure difference across curved surfaces, vapor pressure over curved surfaces, wetting and contact angle, angle of thermal etching and dihedral angle.	9
Module-3 Phase diagram: Binary phase diagrams, lever rule, typical phase diagrams for Al_2O_3-Cr_2O_3, iron-carbon systems. Al_2O_3-SiO_2 system (4h) Diffusion in solids: Ficks laws of diffusion, Temperature dependence of diffusion. Elementary idea of Spinodal decomposition, Homogenous Nucleation and Heterogeneous Nucleation, TTT diagram for glass ceramic formation.	9
Module-4 Crystal imperfections: Point imperfections, line imperfections, Surface imperfections. Notations used for atomic defects, definitions classifications, Frenkel and Schottky defects, reaction equations	8
Module-5 Mechanical behavior: Atomic model of elastic behavior, the modulus as a parameter in design Corrosion and its prevention: Principles of corrosion , Methods of control and prevention of corrosion	8

Question paper pattern:

Two questions with sub divisions to be set from each module. Students shall answer one question from each module. Mixing of questions in the module is allowed.

Textbook:

1. M W Barsoum. Fundamentals of ceramics. Anal Standar Pelayanan Minimal Pada Instal Rawat Jalan di RSUD Kota Semarang. 2015;3:103–11.
2. Kingery WD, Bowen HK, Uhlmann DR. Introduction to ceramics. Second edi. Burke E, Chalmers B, Krumhansi J A, editors. John-Wiley and Sons, Inc; 1976. 448–507 p.
3. Materials Science and Engineering – A first course : Raghavan V., 3rd ed., Prentice Hall of India Pvt. Ltd., new Delhi, 1996

Reference Book:

1. Elements of Material Science – Van Vlack H.L., 2nd ed., Addision – Wesly Pub. Co., NY, 1964. Additional readings 1.
Callister W. D Material Science and Engineering: An Introduction, 7th Edition, 2007, John Wiley and Sons

E-books and online course materials:

Course outcomes:

On completion of the course, the student will have the ability to:

CO #	Course Outcome (CO)
CO1	Define engineering materials and classify them and explain geometry of crystals
CO2	Determine Structure by XRD and explain surface phenomena
CO3	Describe relation among phases and explain Diffusion and time dependence of transformation in solids
CO4	To explain and compare various types of defect and to write defect reactions for a given system.
CO5	Explain mechanical behavior of solids and methods of prevention of corrosion

LAB COURSE TITLE: DATA ANALYSIS USING CHARTS AND GRAPH	
Course Code: 21CCAE36A	Maximum marks CIE: 50
Number of Lecture Hours/Week : 02 (Lab)	Maximum marks SEE: 50
Total Number of Lecture Hours :14	SEE Hours: 02
Prerequisite: Student should have basic knowledge of MS excel	
Course Objectives:Use Microsoft Excel for data analysis with confidence in an Office environment.	

Modules	**Teaching Hours**
Module I **Introduction to charts and graphs** Difference Between Graphs and Charts Graphs vs Charts Infographics	3

Key DifferencesGraphs vs Charts Comparative Table.	
Module II **Understanding how and when to use the following charts** Bar Charts, Line Charts, Pareto Charts, Area Charts Histograms, Pie Charts, Tree Maps, Scatter Plots, Bubble Charts.	3
Module III **Understanding how and when to use the following charts** Heat Maps, Maps, Bullet Charts, Gantt Charts, Box and Whisker Plots, Waterfall Charts Motion Charts	3
Module IV **Creating a Chart:** Learn how to create a chart from spreadsheet data. Learn selecting the charts, moving and resizing a chart, delete a chart. Learns option and tools used to change the type of chartfor ex: from column to bar chart.	3
Module V **Editing the chart:** adding, removing and editing a chart title. adding data labels to a chart, exact values/numbers or percentages. changing the chart area background colour and also the colours that make up the "bars" in the charts, change the colour of text used within the chart.	2
Scheme of Examination: Student will be given a set of data, using the data student has to plot chart/graph and write an interpretation about the data. Plotting of the chart = 10M Interpretation = 10M 10 + 10 =20M (20M x 2 questions=40M) Viva = 10M	
Reference Books: 1.	
E books and online course materials: 1. How to Organize Data with Charts & Graphs - Video & Lesson Transcript | Study.com 2. Big Data Analytics - Charts & Graphs (tutorialspoint.com) 3. What is Data Analysis? Research, Types & Example (guru99.com) 4. https://www.bing.com/search?q=DATA%2520ANALYSIS%2520USING%2520CHARTS%2520AND%2520GRAPH%2FMaterial%2FArea%2520chart.pdf&cvid=f041f3a225a8481e9fe0ed871f9f7f78&aqs=edge..69i57.1023j0j1&pglt=43&FORM=ANNTA1&PC=EDGEDB	

Course outcomes: **On completion of the course, the student will have the ability to:**		
Course Code	**CO #**	**Course Outcome (CO)**
21CCAE36A	**CO1**	Student will be able to differentiate between different charts and graphs
	CO2	Student will be able to understandhow and when to use different charts
	CO3	Student will be able to understandhow and when to use different graphs
	CO4	Student will be able to create different types of charts
	CO5	Student will be able to edit different types of charts

SOCIAL CONNECT AND RESPONSIBILITY

[As per Choice Based Credit System (CBCS) Scheme]
(From the academic year 2022-23)

Course Code	22UHV37	CIE Marks	50
Credits	01	SEE Marks	50
Course Type	Practical		
Lecture Hours/Week (L-T-P)	0-0-2	Total Marks	100
Total Hours	28 Hours	SEE Hours	2 Hrs.

Course Objectives:

- To familiarize the students with the basic biological concepts and their engineering applications.
- To enable the students with an understanding of biodesign principles to create novel devices and structures.
- To provide the students an appreciation of how biological systems can be re-designed as substitute products for natural systems.
- To motivate the students to develop interdisciplinary vision of biological engineering.

Teaching-Learning Process(General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Explanation via real life problem, situation modelling, and deliberation of solutions, hands-on sessions, reflective and questioning /inquiry-based teaching.
2. Instructions with interactions in classroom lectures (physical/hybrid).
3. Use of ICT tools, including YouTube videos, related MOOCs, AR/VR/MR tools.
4. Flipped classroom sessions (~10% of the classes).
5. Industrial visits, Guests talks and competitions for learning beyond the syllabus.
6. Students' participation through audio-video based content creation for the syllabus (as assignments).
7. Use of gamification tools (in both physical/hybrid classes) for creative learning outcomes.
8. Students' seminars (in solo or group) /oral presentations

Modules	Hours
Module - I **Plantation and adoption of a tree:** Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE) They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature - – Objectives, Visit, case study, report, outcomes.	06 Hours

Modules	Hours
Module - II **Heritage walk and crafts corner:** Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms - – Objectives,Visit, case study, report, outcomes.	06 Hours
Module - III **Organic farming and waste management:** Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus Objectives,Visit, case study, report, outcomes.	06 Hours
Module - IV **Water conservation:** Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.	05 Hours
Module - V **Food walk:** City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.	05 Hours

Course outcomes (Course Skill Set):

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

CO1: Communicate and connect to the surrounding. CO2: Create a responsible connection with the society.

CO3: Involve in the community in general in which they work.

CO4: Notice the needs and problems of the community and involve them in problem –solving.

CO5: Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.

CO6: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Activities:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersionwith NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS:

The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversional will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.

Duration :

A total of 40 - 50 hrs engagement per semester is required for the 3rd semester of the B.E. /B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic ,and poetry) Faculty mentors has to design the evaluation system as per VTU guidelines of scheme & syllabus.

Guideline for Assessment Process:

Continuous Internal Evaluation (CIE):

After completion of the course, the student shall prepare, with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent: 80 to 100

Good: 60 to 79

Satisfactory: 40 to 59

Unsatisfactory and fail : <39

Pedagogy – Guidelines:

It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	**Plantation and adoption of a tree:**	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc…..	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
2.	**Heritage walk and crafts corner:**	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
3.	**Organic farming and waste management:**	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc…..	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
4.	**Water conservation:** & conservation techniques	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc…..	site selection / proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
5.	**Food walk: Practices in society**	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.NO	Practice Session Description
1	**Lecture session in field to start activities**
2	**Students Presentation on Ideas**
3	**Commencement of activity and its progress**
4	**Execution of Activity**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Case study based Assessment, Individual performance**
9	**Sector/ Team wise study and its consolidation**
10	**Video based seminar for 10 minutes by each student At the end of semester with Report.**

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	**CIE – 100%**	• Implementation strategies of the project (NSS work). • The last report should be signed by NSS Officer, the HOD and principal. • At last report should be evaluated by the NSS officer of the institute. • Finally the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.
Field Visit, Plan, Discussion	10 Marks	
Commencement of activities and its progress	20 Marks	
Case study based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student At the end of semester with Report. **Activities 1 to 5, 5*5 = 25**	25 Marks	
Total marks for the course in each semester	**100 Marks**	

For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.

Students should present the progress of the activities as per the schedule in the prescribed practical session in the field. There should be positive progress in the vertical order for the benefit of society in general through activities.