Department of Civil Engineering

List of programs in School of Engineering and their POs & PSOs

1. **B.Tech. Civil Engineering**
   School of Engineering and Technology provides B. Tech. degrees in the following programmes:

PROGRAM OUTCOMES OF B.TECH.

PO1. Engineering knowledge: Graduates can apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to Civil Engineering related problems.
PO2. Problem analysis: An ability to identify, formulate, review research literature, and analyze Civil engineering problems reaching substantiated conclusions using principles of mathematics and engineering sciences.
PO3. Design/development of solutions: An ability to plan, analyse, design and implement engineering problems and design system components or processes to meet the specified needs.
PO4. Conduct investigations of complex problems: An ability to 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.
PO5. Modern tool usage: An ability to apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6. The engineer and society: An ability to apply contextual knowledge to assess societal, legal issues and the consequent responsibilities relevant to the professional engineering practice.
PO7. Environment and sustainability: An ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8. Ethics: An ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9. Individual and teamwork: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings to accomplish a common goal.

PO10. Communication: An ability to communicate effectively on engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, and make effective presentations.
PO11. Project management and finance: Ability to 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.
PO12. Life-long learning: An ability to engage in independent and life-long learning in the broadest context of technological change.

B. TECH. Civil Engineering

Program Specific Outcomes:

- **PSO1**-To produce quality engineering graduates by imparting quality education and research in the field of civil engineering in order to respond swiftly to the challenges of the 21st century.
- **PSO2**-To train students with good extensiveness of information in the field of civil engineering and related multidisciplinary engineering streams so as to formulate engineering principles, in order to offer techno commercially feasible and socially acceptable solutions to real-life engineering problems.
- **PSO3**-An ability to apply knowledge of mathematical, scientific, and civil engineering to evaluate, analyze, synthesize, model and integrate technologies to develop new construction techniques for applied engineering systems.

Course Outcome

Paper Code	CE 201
Paper Title	Strength of Material-I
Course outcomes	This course is supposed to give the knowledge of how to make various types of behavior of mechanics.
CO 1	To analyze the different types of mechanisms.
CO 2	To analyze the internal behavior of the product.
CO 3	To analyze where to use these in models are system.

Paper Code	CE 203
Paper Title	Fluid Mechanics
Course outcomes	This course is supposed to give the knowledge of Fluid and analyze the different types of fluid.
CO 1	To analyze fluid behavior.
CO 2	To analyze where to use fluid application etc.
CO 3	To analyze the problems faced by fluid.

Paper Code	CE 205
Paper Title	Building Planning
Course outcomes	This course is supposed to give the knowledge of how to make various types of Building materials and construction materials.
CO 1	To analyse the different types of material
CO 2	To analyze material quality.
CO 3	To analyze where to use these materials and its planning etc.
CO 4	To analyze the problems faced in Building Material and Planning.

Paper Code	CE 207
Paper Title	Surveying-I
Course outcomes	This course is supposed to give the knowledge of measurement.
CO 1	To give the knowledge of measurement.
CO 2	To gain knowledge about mapping.
CO 3	To analyze the various method of measurement.
CO 4	To give the knowledge of mapping.

Paper Code	MA 205
Paper Title	**Advance Mathematics**
Course outcomes	This course is supposed to give the knowledge Mathematics and it give the knowledge of Advanced mathematics.
CO 1	To gain knowledge about Calculation.
CO 2	To analyze Statistical Method.
CO 3	To give the knowledge of Advanced Calculation.

Paper Code	CE 204
Paper Title	**Hydrology & Hydraulics**
Course outcomes	This course is supposed to give the knowledge of fluid machines.
CO 1	To analyze fluid behavior.
CO 2	To analyze where to use fluid application etc.
CO 3	To analyze the problems faced by fluid.

Paper Code	**CE 206**
Paper Title	**Engineering Geology**
Course outcomes	As a student in the Bachelor of Engineering (Civil Engineering) will undertake courses in geology Such as Rock and minerals.
CO 1	Students are able to understand the different geological structures and their impact on civil engineering structures.
CO 2	Students are able to decide the suitable site selection for civil engineering structures.
CO 3	Students are able to know the different geological hazards and its mitigation.

Paper Code	**CE 211**
Paper Title	**Modern concrete technology**
Course outcomes	**This course requires the student to know about the basic of civil engineering, fundamentals of chemistry, building materials, statics etc.**
CO 1	Identify the functional role of ingredients of concrete and apply this knowledge to mix design philosophy
CO 2	Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete
CO 3	Evaluate the effect of the environment on service life performance, properties and

	failure modes of structural concrete and demonstrate techniques of measuring the Non Destructive Testing of concrete structure
CO 4	Develop an awareness of the utilization of waste materials as novel innovative materials for use in concrete
CO 5	Design a concrete mix which fulfills the required properties for fresh and hardened concrete

Paper Code	**CE 303**
Paper Title	**Design of concrete structures-I**
Course outcomes	**The main objectives of the course are: To enhance competence in design of advanced reinforced concrete structures and to familiarize the students with the concepts of designing concrete mixes using different methods of proportioning and to understand the effects of various parameters.**
CO 1	At the completion of the course, students will be able to: Show competency in design of advanced reinforced concrete structures.
CO 2	Design concrete mixes using different methods of proportioning and develop understanding of the effects of various parameters on concrete.

Paper Code	**CE 404**
Paper Title	**Design of concrete structures-II**
Course outcomes	**The subject will give basic knowledge to principles and methods for design of prestressed concrete, prefabricated concrete structures and foundations.**

CO 1	To design prestressed concrete beam CO2
CO 2	To design prestressed composite beams
CO3	To design flexural members with partial prestressing
CO4	To design prestressed concrete tanks, poles and sleepers
CO5	To design prestressed concrete bridges.

Paper Code	**CE 309**
Paper Title	**Quantitative surveying & valuation**
Course outcomes	**Impart the knowledge of Estimating, Costing and Valuation for Civil Engineering Structures.** **Prepare and evaluate contract documents.**
CO 1	To understand knowledge of quantity surveying and will become familiar with modes of measurement and utility of various types of estimates.
CO 2	To understand the use of current schedule of rates and quantitative resource allocation for the rate analysis.
CO 3	To extend the knowledge of detailed estimate preparation for various civil engineering works.
CO 4	To calculate cost of works acknowledging overhead charges, contingencies, work charge establishment and percentage of various services.

CO 5	To understand utility, purpose and concepts involved in the building valuation.

Paper Code	**CE 301**
Paper Title	**Theory of structures-I**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	Understand the concepts of idealization in structures and basic mechanism of different loadings
CO 2	Analyze the structural members subjected to compression, tension, shear and bending using the fundamental concepts of structural analysis.
CO 3	To apply appropriate engineering solutions to solve the problems of stability, safety of structural elements.
CO 4	Perform engineering work in accordance with health, safety and economic constraints related to the analyses of structures.

Paper Code	**CE 402**
Paper Title	**Theory of structures-II**
Course outcomes	**Course Learning Outcomes are as listed below:**

CO 1	The student will be able to analyze statically indeterminate structures using various methods
CO 2	The student will be able to analyze beams using plastic theory

Paper Code	**CE 305**
Paper Title	**Design of steel structures-I**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	Learn the basic elements of a steel structure
CO 2	Learn the fundamentals of structural steel fasteners
CO 3	Able to design column splices and bases.
CO 4	Able to design basic elements of steel structure like tension members, compression members, beams and beam-columns

Paper Code	**CE 406**
Paper Title	**Design of steel structures-II**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	Design complicated structures like plate girder, gantry girder, Industrial structures, tanks and slabs.

CO 2	Design steel structures on plastic theory where ever possible.
CO 3	Design light gauge & aluminium structures too.
CO 4	Use relevant BIS for above structural design.

Paper Code	**CE 311**
Paper Title	**Repair and rehabilitation of structures**
Course outcomes	**By the end of this course students will have the capability/knowledge of**
CO 1	Various distress and damages to concrete and masonry structures
CO 2	The importance of maintenance of structures, types and properties of repair materials etc.
CO 3	Assessing damage to structures and various repair techniques

Paper Code	**CE 401**
Paper Title	**Geotechnical Engineering-I**

Course outcomes	Course Learning Outcomes are as listed below:
CO 1	The students will gain an experience in the implementation of Geotechnical Engineering on engineering concepts which are applied in field Geotechnical Engineering.
CO 2	The students will get a diverse knowledge of geotechnical engineering practices applied to real life problems of designing of structures.
CO 3	The students will learn to understand the theoretical and practical aspects of geotechnical engineering along with the design and management applications.

Paper Code	CE 402
Paper Title	GEOTEHCNICAL ENGINEERING-II
Course outcomes	Course Learning Outcomes are as listed below:
CO 1	Student will solve actual problems of stability with various material .
CO 2	Students are able to apply various theories and predict the risk factor.

Paper Code	CE 310
Paper Title	TRANSPORTATION ENGINEERING-I

Course outcomes	Course Learning Outcomes are as listed below:
CO 1	Plan highway networks
CO 2	Design highway geometrics.
CO 3	Design Intersections and prepare traffic management plans.
CO 4	Design flexible and rigid pavements.
CO 5	Understand the principles of construction and maintenance of highways

Paper Code	CE 409
Paper Title	**TRANSPORTATION ENGINEERING-II**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	In Airport Engineering students will get knowledge of Airport planning, layout and runway and taxiway components.
CO 2	Students will get the feel of fundamentals of railway engineering from the syllabus. under railway Engineering students get knowledge of railway geometrics, Signaling & interlocking Points, crossing and turnouts etc.
CO 3	Similarly students get knowledge regarding fundamentals of tunnel its excavation methods, support systems, and executional aspects of tunnel

Paper Code	CE 403

Paper Title	**Water Resources Engineering**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	Student will know the different terminologies related with hydrology.
CO 2	Students will analyze hydrological parameters required for water resource management.
CO 3	Student will assess ground water potential
CO 4	Students will identify suitable method of irrigation and drainage of waterlogged area.

Paper Code	**CE 408**
Paper Title	**Environment Engineering-I**
Course outcomes	**Course Learning Outcomes are as listed below:**
CO 1	Plan and design water supply systems for a rural/urban area
CO 2	Use population forecasting methods.
CO 3	Design various water treatment units and plan their operations on the basis of raw water quality and water demand.
CO 4	Apply knowledge of advanced water treatment processes for individual water purification

Paper Code	CE 405
Paper Title	Environment Engineering-II
Course outcomes	Course Learning Outcomes are as listed below:
CO 1	Students understood Sewage quantity and quality for better treatment so as to reduce scarcity by recycling waste water
CO 2	Students understood industrial waste water quantity and quality for achieving better sanitation in society

SURESH GYAN VIHAR UNIVERSITY

Accredited by NAAC with 'A' Grade

Department of Civil Engineering

SYLLABI

(Session 2021-22)

Of

Bachelor of Technology (Civil engineering)

B. TECH. CIVIL ENGINEERING – 4 YEARSPROGRAM

FEATURES OF B.TECH PROGRAM OF SGVU

BachelorofTechnologyinCivilEngineering(B.Tech)isafouryeargraduationdegree programinCivilEngineering.Thecoursehasbeensodesignedthatthestudentscanmeetall thedemandsofprofessionalsinthefieldofCivilEngineering.

NEED, OBJECTIVES & MAIN FEATURES OF B.TECH PROGRAM

NEED –

- Todevelopaplatformforhigherstudiesinthefieldof CivilEngineeringandits applications
- Todeveloptheabilityinstudentsforunderstandingthebasicconceptsand theirapplicationsintheindustries.
- Todevelopthecapabilityinstudentsforrelevantresearchwork.
- Toobtainandgenerateanemploymentincomputingfield.

OBJECTIVES

- ThemainobjectiveofB.Techprogramistoprovideabasicplatformforhigher studiesofCivilengineering.Thiswillonlybeachievedbyanapproachinvolving rigorousandcomprehensiveacademiccourseworkcoveringpracticalhandson experiencewithrealworldapplications.

FEATURES OF BTECH CURRICULUM

- 1st yearoftheprogramofferedbySGVUiscommontoallB.Tech.programs coveringcoursesrelatedtoBasicSciences,HumanitiesCommunicationskills.
- 2nd yearcoversthe areasofStrengthofMaterial&MechanicsofStructures, Fluid Mechanics, Transportation Engg.-1, Engineering Geology,Building Material & Construction Elementary Survey, EMET LAB, Fluid Mechanics Lab, SurveyLab 1,RoadMaterialTestingLab,BuildingPlanning&Design1,MaterialTesting Lab.
- 3rd yearcoversthesubjects–TheoryofStructures–I,ConcreteStructures-I, SteelStructures-I,Modernconcretetechnologyandpractice,RemoteSensing and GIS , Design of Concrete Structures II , Design of Steel Structures II, EnvironmentalEngg.Design&Lab.I,SurveyingLab.–II
- 4th year covers the subjects - Geotechnical Engineering – I, Water Resources Engineering–I,BuildingDesign,ProjectPlanning&ConstructionManagement, Bridge Engineering**,** Design of Foundations, Water Resources Engineering Design-I
- B.Techcoursecontainsthejoborientedandadvancedpracticallabswhichhelp studentsunderstandthepracticalapplicationsoftheareasof Civilengineering withthetheoreticalknowledgeaswell.

- B.TechCivilEngineeringCurriculaincludestheindustryvisits,SummerTraining, Seminars Projects to develop the creativity and enhance the developed Attitudetowardstheindustrialsector.

ROLE OF BTECH CURRICULUM IN NATIONAL DEVELOPMENT

Civilengineeringplaysamajorroleintheemploymentaswellasintheeconomyofthe country,thecurriculumplaysanimportantroleinthedevelopmentofgraduateswhocan serveworldclassservicesandtakethenationforward.

GLOBAL TRENDS REFLECTED IN B.Tech CURRICULUM

ThereisalwaysademandofCivilengineersglobally.ThedepartmentofCivilengineering aimstoproducehighqualityengineersintechnologywithasoundtheoreticalandpractical knowledgewhocanundertakeresponsibilitytocontributeeffectivelyintheprogressofthe country andsociety.

POSSIBILITY OF MOTIVATION & SELF DEVELOPMENT

Therearevariouspossibilitiesofmotivationandself-developmentofthestudentsthrough curriculum.Thecurriculumhasbeensodesignedthatastudentcan

- Understandtheprofessional/industryenvironment
- Understandteamworkandgroupdynamism.
- Developasenseofeffectiveproblemsolvinganddecisionmaking.
- Thinkanddevelopprojectsindependently.
- Developcareerascomputerprofessional.

PLACEMENT OPPORTUNITY

TechnicalUGprogramsarebasicallyafoundationfortechnicalPGprogramsandresearch. Now a day because of the economy boom, there is high placement opportunities in industriesinIndiaandacrosstheworldaswell.UGprogramofCivilengineeringincludes studyofvariousaspectsofCivilengineeringtomeettherequirementsofvariouscompanies. Atechnicalgraduatecanworkforanyconstructioncompanybigorsmallasa Civilengineer andhandlevariousroleslike–

- Constructionengineer
- Designingengineer
- Civilengineer
- Developmentengineer

Gyan Vihar School of Engineering and Technology
Teaching and Examination Scheme
B. Tech./Dual Degree I Year (Common to All) CSE/ECE/EE/ME/CE
Effective from Academic Session 2021-2022

Year: I **Semester: I (Autumn)**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.			Exam Hrs.	Weightage (in%)	
				L	T/S	P		CIE	ESE
A		**University Core**							
1	PC 101	Proficiency in Co-curricular Activities	2	0	0	0	0	0	100
2	FD 102	Foundation Course-I	1	2	0	0	3	25	75
3	EN 105	Professional Communication I	2	2	0	0	3	40	60
4	EN 151	Professional Communication Lab	1	0	0	2	2	60	40
B		**Program Core**							
5	**PY 103**	Physics	4	3	1	0	3	40	60
6	MA 103	Mathematics – I	4	3	1	0	3	40	60
7	EE 105	Basic Electrical Engineering	4	3	1	0	3	40	60
8	CP 107	Programming for Problem Solving	3	3	0	0	3	40	60
9	CP 153	Programming for Problem Solving Lab	1	0	0	2	3	60	40
10	EE 151	Electrical and Electronics Engineering Lab	1	0	0	2	3	60	40
11	ME 157	Engineering Graphics & Design Lab	2	0	0	3	3	60	40
12	PY 152	Engineering Physics Lab	1	0	0	3	3	60	40
C		**University/Open Elective**							
		Students can choose elective from the attached list.							
		Total	**26**						

NOTE: The University Electives are apart from minimum credits required for award of degree.

L= Lecture **T=Tutorial** **CIE=Continuous Internal Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

Members of BoS, EE **Convener, BoS Engg.**

Gyan Vihar School of Engineering and Technology
Teaching and Examination Scheme
B. Tech./Dual Degree I Year (Common to All) CSE/ECE/EE/ME/CE
Effective from Academic Session 2021-2022

Year: I **Semester: II (Spring)**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.			Exam Hrs.	Weightage (in%)	
				L	T/S	P		CIE	ESE
A		**University Core**							
1	PC 102	Proficiency in Co-Curricular Activities	2	0	0	0	0	0	100
2	FD 104	Foundation Course -II	1	1	0	0	3	25	75
3	EM 102	Employability Skills–I	1	0	2	0	0	60	40
4	EN 106	Professional Communication II	2	2	0	0	3	40	60
B		**Program Core**							
5	EC 106	Basic Electronics Engineering	3	3	0	0	3	40	60
6	MA 104	Mathematics – II	4	3	1	0	3	40	60
7	CY 102	Chemistry	3	3	0	0	3	40	60
8	CY 152	Chemistry lab	1	0	0	2	3	60	40
9	ME 158	Workshop Manufacturing Practices	2	0	0	3	3	60	40
C		**University/Open Elective**							
		Students can choose elective from the attached list.							
		Total	**19**						

NOTE: The University Electives are apart from minimum credits required for award of degree.

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S= Seminar **P= Practical** **ESE= End Semester Examination**

Members of BoS, EE **Convener, BoS Engg.**

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

IIYEAR **IIISEM**

S.NO	Course Code	Course Name	Credit	Contact Hours/Week			Exam Hours	Weightage (%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 201	Strength of Material-I	4	3	1	-	3	40	60
2	CE 203	Fluid Mechanics	4	3	1	-	3	40	60
3	CE 205	Building Planning	3	3		-	3	40	60
4	CE 207	Surveying-I	3	3		-	3	40	60
5	MA 205	Advance Mathematics	3	3	-	-	3	60	40
6	CE 253	Fluid Mechanics Lab	1	-	-	3	3	60	40
7	CE 255	Civil Auto CAD (2D Design)	1	-	-	3	3	60	40
8	CE 257	Survey Lab	1	-	-	3	3	60	40
9	CE 259	Engineering Material Testing Lab	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
10	CE 211	Modern concrete technology	3	3	-	-	3	40	60
11	CE213	Design of Pre-stressed Concrete Structures	3	3	-	-	3	40	60
12	CE 215	Engineering Geosciences	3	3	-	-	3	60	40
UNIVERSITY CORE									
13	PC 201	Proficiency and Co-Curricular Activities –III	2	-	-	-	-	100	60
14	HS 203	Economics and Social Sciences	3	3	-	-	3	40	60
15	EM 201	Employability Skills-II	1	-	2	-	3		
UNIVERSITY ELECTIVE									
16		Students can opt from the list of university Elective							
		TOTAL	**30**	**21**	**2**	**12**			

Theory (23 Credit) + Lab (04 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering

Teaching and Examination Scheme for B.Tech Civil Engg.

Session 2021-2022

II YEAR **IVSEM**

S.NO	Course Code	Course Name	Credit	Contact Hours/Week			Exam Hours	Weightage (%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 202	Strength of Material-II	4	3	1	-	3	40	60
2	CE 204	Hydrology & Hydraulics	4	3	1	-	3	40	60
3	CE 206	Engineering Geology	4	3	-	-	3	40	60
4	CE 208	Surveying-II	4	3	1	-	3	40	60
5	CE 210	Building Material & Construction	4	3	1	-	3	40	60
7	CE 254	Hydraulics & Hydraulics Machine Lab	1	-	-	3	3	60	40
8	CE 256	Civil Auto CAD(3D Design)	1	-	-	3	3	60	40
9	CE 258	Survey Lab-II	1	-	-	3	3	60	40
10	CE 260	Eng. Material & Geology Lab	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 212	Construction Equipment & Material Management	3	3	-	-	3	40	60
12	CE 214	Green Building Technology	3	3	-	-	3	40	60
13	CE 216	Town Planning	3	3	-	-	3	40	60
UNIVERSITY CORE									
12	PC 202	Proficiency and Co-Curricular Activities – IV	2	-		-	-	100	-
14	EM 202	Employability Skills-III	1	-	2	-	3	-	-
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective							
		TOTAL	**30**	**18**	**4**	**15**			

Note: - Summer Training: Professional Project Training for 30 days after 4th Semester Exams is compulsory.

Theory (23Credit) + Lab (04Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

SURESH GYAN VIHAR UNIVERSITY.
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

III YEAR **V SEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. (Hours)	Weightage(%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 401	Theory of Structures-I	4	3	1	-	3	40	60
2	CE 403	Design of	4	3	1	-	3	40	60
3	CE 405	Design Steel Structures-I	4	3	1	-	3	40	60
4	CE 409	Quantity Surveying & Valuation	4	3	1		3	40	60
5	CE 351	Design of Steel Structure-I	4	-	-	3	3	60	40
6	CE 353	Structural Engineering Lab	1	-	-	3	3	60	40
7	CE 355	Design of Concrete Structures Lab-I	1	-	-	3	3	60	40
8	CE 357	STAAD Pro. LAb	1	-	-	3	3	60	40
9	CE 359	Estimation, Costing & Professional Practice	1	-	-	3	3	60	40
10	PT301	Practical Training Seminar	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
10	CE 311	Repair And Rehabilitation of Structures	3	3	-	-	3	40	60
11	CE 313	Remote Sensing and GIS	3	3	-	-	3	40	60
12	CE 315	Theory of Pre-stressed	3	3	-	-	3	40	60
UNIVERSITY CORE									
13	PC 301	Proficiency and Co-Curricular Activities – V	2	-	-	-	-	100	
14	EM 301	Employability Skills-IV	1	-	2	-	3	100	
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective							
		Total	31	15	6	18			

Theory (23 Credit) + Lab (05 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 31 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

SURESH GYAN VIHAR UNIVERSITY
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session2021-2022

IIIYEAR **VISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage(%)	
				L	T	P		CE	CE
PROGRAMME CORE									
1	CE 402	Theory of Structures – II	4	3	1	-	3	40	60
2	CE 404	Design of Concrete Structures-II	4	3	1	-	3	40	60
3	CE 406	Design of Steel Structures-II	4	3	1	-	3	40	60
4	CE 408	Environmental Engineering– I	4	3	1	-	3	40	60
5	CE 310	Transportation Engineering-I	4	3	1	-	3	40	60
6	CE 354	Design of Concrete Structures Lab-II	1	-	-	3	3	60	40
7	CE 356	Design of Steel Structures Lab-II	1	-	-	3	3	60	40
8	CE 358	Environmental Engg. Design & Lab. I	1	-	-	3	3	60	40
9	CE 360	Road Materials Testing Lab.	1	-	-	3	3	60	40
10	PE 302	Project (Stage-I)	3	-	-	3	3	60	40
11	PT 401	Seminar Training-II	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
12	CE 312	Modern concrete technology and practice	3	3	-	-	3	40	60
13	CE 314	Construction Equipments and Material Management	3	3	-	-	3	40	60
14	CE 316	Solid Waste Management	3	3	-	-	3	40	60
UNIVERSITY CORE									
15	PC 301	Proficiency and Co-Curricular Activities-VI	2	-	-	-	-	100	
16	EM 301	Employability Skills-IV	1	-	2	-	3	100	
UNIVERSITY ELECTIVE									
17	PC 302	Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**34**	**18**	**5**	**18**			

Note: - Summer Training: Professional Project Training for 45 days after 6th Semester Exams is compulsory.

Theory (23 Credit) + Lab (8 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

SURESH GYAN VIHAR UNIVERSITY
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

IV YEAR **VIISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage (%)	
				L	T	P		CE	ESE
PROGRAMME CORE									
1	CE 401	Geotechnical Engineering – I	4	3	1	-	3	40	60
2	CE 403	Water Resources Engineering –I	4	3	1	-	3	40	60
3	CE 405	Environmental Engineering– II	4	3	1	-	3	40	60
4	CE 407	Building Design	4	3	1	-	3	40	60
5	CE 409	Transportation Engineering – II	4	3	1	-	3	40	60
6	CE 451	Geotechnical Engg. Design & Lab.-I	1	-	-	3	3	60	40
7	CE 453	Water Resources Engineering Design-I	1	-	-	3	3	60	40
8	CE 455	Environmental Engg. Design & Lab. II	1	-	-	3	3	60	40
10	PE 401	Project (Stage-II)	2	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 411	Earthquake Resistant buildingDesign	3	3	-	-	3	40	60
12	CE 413	Ground Improvement Techniques	3	3	-	-	3	40	60
13	CE 415	Smart cities and Automation	3	3	-	-	3	40	60
UNIVERSITY CORE									
14	PC 301	Proficiency and Co-Curricular Activities-VII	2	-	-	-	-	100	
15	EM 301	Employability Skills-VI	1	-	2	-	3	100	
UNIVERSITY ELECTIVE									
16		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**31**	**18**	**7**	**12**			

Theory (23 Credit) + Lab (05 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

IVYEAR **VIIISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage (%)	
				L	T	P		CE	ESE
PROGRAMME CORE									
1	CE 402	Geotechnical Engineering–II	4	3	1	-	3	40	60
2	CE 404	Water Resources Engineering-II	4	3	1	-	3	40	60
3	CE 406	Project Planning & Construction Management	4	3	1	-	3	40	60
4	CE 452	Geotechnical Engg. Design & Lab.-II	1	-	-	3	3	60	40
5	CE 454	Water Resources Engineering Design-II	1	-	-	3	3	60	40
6	CE 456	Professional Practice and Estimating	1	-	-	3	3	60	40
7	CE 458	Design of Foundations Lab	1	-	-	3	3	60	40
8	CE 460	Revit Architecture	1	-	-	3	3	60	40
9	SM 402	B.Tech Seminar	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 408	Bridge Engineering	3	3	-	-	-	-	-
12	CE 410	Advance Foundation Engineering	-	-	-	-	-	-	-
13	CE 412	Advanced Transportation Engg.	-	-	-	-	-	-	-
UNIVERSITY CORE									
14	HS 402	Intellectual Property Rights	2	2	-	-	3	40	60
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**23**	**14**	**3**	**21**			

Theory (17 Credit) + Lab (06 Credit) = 23 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

Detailed Syllabus
Semester I

Course Title: **PHYSICS**		Course Code	**: PY 103**
Semester	: **I**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:1:0**	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **48**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Semiconductor physics

Course Objectives:

- To impart knowledge in basic concepts of physics relevant to engineering applications.
- To Introduce advances in technology for engineering applications

Course Content:

Topic and Contents	Hours	Marks
Physics		
UNIT-1: Interference of light	7	12
Michelson's Interferometer: Production of circular & straight line fringes; Determination of wavelength of light; Determination of wavelength separation of two nearby wavelengths. Optical technology: Elementary idea of anti-reflection coating and interference filters.		
UNIT-2: Diffraction and Polarization	8	12
Fraunhofer Diffraction at Single Slit. Diffraction grating: Construction, theory and spectrum; Determination of wavelength of light. Resolving power: Raleigh criterion; Resolving power of diffraction grating and telescope. Plane, circularly and elliptically polarized light on the basis of electric (light) vector: Malus law; Double Refraction; Phase retardation plates and their use in production and detection of circularly and elliptically polarized light; Optical activity and laws of optical rotation; specific rotation and its measurement using half-shade device.		
UNIT-3: **Element of Material science and Quantum Mechanics**	7	12
Bonding in solids; covalent bonding and Metallic bonding; Classification of solids as Insulators, Semiconductors and Conductors; X-Ray diffraction and Bragg's Law. Hall Effect: Theory, Hall Coefficient and applications. Compton effect & quantum nature of light; Derivation of time dependent and time independent Schrodinger's Wave Equation; Physical interpretation of wave function and its properties; boundary conditions; Particle in one dimensional box.		
UNIT-4: Coherence and Optical	7	12
Fibers: Spatial and temporal coherence; Coherence length; Coherence time and 'Q' factor for light; Visibility as a measure of Coherence and spectral purity; Optical fiber as optical wave guide; Numerical aperture; Maximum angle of acceptance and applications of optical fiber.		
UNIT 5: Laser and Holography	7	12

Theory of laser action; Einstein's coefficients; Components of laser; Threshold conditions for laser action; Theory, Design and applications of He-Ne and semiconductor lasers; Holography versus photography, Basic theory of holography; basic requirement of a Holographic laboratory; Applications of Holography in microscopy and interferometry.		
TOTAL	**36**	**60**

Reference:

1. Engineering Physics: Malik and Singh (Tata McGraw Hill)
2. Engineering Physics: Naidu (Pearson)
3. Optics : Ajay Ghatak (Tata McGraw Hill)
4. Concept of Modern Phyiscs: A. Baiser (Tata McGraw Hill)
5. Fundamental of Optics : Jetkins and White (Tata McGraw Hill)
6. Material Science: Smith (McGraw Hill)

Course Outcomes:

At the end of this course students will demonstrate the ability to

- To design and conduct simple experiments as well as analyze and interpret data in.
- Capability to understand advanced topics in engineering engineering
- Apply quantum physics to electrical phenomena

Course Title: **MATHEMATICS – I**		Course Code	: **MA 103**
Semester	: **I**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:1:0**	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **48**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Knowledge of Mathematics, up-to Senior Secondary School level.

Course Objectives:

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fourier series that is fundamental to application of analysis to Engineering problems.
- To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.

Course Content:

Topic and Contents	Hours	Marks
UNIT 1: Calculus	7	12
Improper integrals (Beta and Gamma functions) and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.		
UNIT 2: Sequences and Series	6	12
Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.		
UNIT 3: Fourier Series	7	12
Periodic functions, Fourier series, Euler‟s formula, Change of intervals, Half range sine and cosine series, Parseval‟s theorem.		
UNIT 4: Multivariable Calculus (Differentiation)	8	12
Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.		
UNIT 5: Multivariable Calculus (Integration)	8	12
Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Centre of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.		
TOTAL	**36**	**60**

Reference:

Text Book : Engg. Mathematics-1 by Y.N. Gaur & C.L. Koul

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Course Title: **BASIC ELECTRICAL ENGINEERING**	Course Code: **EE 105**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **3:1:0**	Credits : 4 **Credits**
Type of course: **Lecture + Tutorials + Assignments**	Total Contact Hours : **48**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

Pre-requisites:

Basics of Mathematics of Higher Secondary Level to include Algebra, Geometry, Trigonometry, Differential and Integral Calculus. Magnetism, Electrostatics and Electromagnetism, Current, Voltage, Electricity. Basic knowledge of semiconductors, Particle and Wave, nature of electromagnetic energy. Use of scientific calculator.

Course Objectives:

- Impart basic knowledge of electrical quantities such as D.C. and A.C. Current voltage, power, energy and frequency.
- Provide working knowledge for the analysis of D.C. and A.C. circuits required for all branches of engineers.
- Develop skills to identify the type of generators and motors required for practical application.
- Highlight importance of transformers and transmission and distribution of electric power.
- Provide knowledge of basic communication systems and different types of transducers
- Design simple electronic circuits.

Course Content:

Topic and Contents	Hours	Marks
UNIT-1**: D.C. Circuits**	7	12
Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.		
UNITS-2: A.C Circuits	7	12
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), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.		
UNITS-3: Transformers	7	12

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.		
UNIT-4: Electrical Machines	7	12
Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.		
UNIT 5: Power Converters & Installation Ckt.	8	12
DC-DC buck and boost converters, duty ratio control. Single-phase and three-phase voltage source inverters; sinusoidal modulation Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.		
TOTAL	**36**	**60**

Reference Books

1. Basic Electrical and Electronics Engineering by Sukhija and Nagsarkar, Oxford Publication
2. Basic Electrical & Electronics Engineering by Kothari, Nagrath, TMH
3. Basic Electrical & Electronics Engineering by V. Jagathesan, K. Vinod Kumar & R. Saravan Kumar, Wiley India.
4. Basic Electrical & Electronics Engineering by Prasad/Sivanagraju, Cengage learning Indian Edition
5. Basic Electrical and Electronics Engineering by Muthusubrmaniam, TMH
6. Fundamentals of Electrical and Electronics Engineering by Ghosh, Smarajit, PHI India
7. Basic Electrical & Electronics Engineering by Ravish Singh, TMH
8. Electrical and Electronic Technology by Edward Hughes et al, Pearson Publication
9. Basic Electrical Engineering by A. E. Fitzgerald, TMH
10. Fundamental of Electrical Engineering by Leonard S. Bobrow, Oxford

Course outcomes:

On successful completion of the course, the student will be able to:

- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines and Power Converters.
- To introduce components of Low Voltage Electrical Installations

Course Title: **PROGRAMMING FOR PROBLEM SOLVING**		Course Code	: **CP 107**
Semester	: **I**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:0:0**	Credits	: **3 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **36**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Knowledge of Mathematics, up-to Senior Secondary School level.

Course Objectives:

This course enables the students to apply the knowledge of Mathematics in various Engineering fields by improving the ability to apply knowledge of mathematics on engineering problems. It introduces the basic concepts required to understand, programming, basic algorithm, branching, loop and pointers.

.**Course Content:**

Topic and Contents	Hours	Marks
UNIT 1: Introduction To Programming	7	12
Introduction to Programming (Flow chart/pseudocode, compilation etc.), Variables (including data types).		
UNIT 2: Conditional Branching And Loops	7	12
Writing and evaluation of conditionals and consequent branching Iteration and loops.		
UNIT 3: Arrays And Basic Algorithm	8	12
Arrays (1-D, 2-D), Character arrays and Strings properties. Searching, Basic Sorting Algorithms, Finding roots of equations, idea of time complexity.		
UNIT 4: Function And Recursion	7	12
Functions (including using built in libraries), Recursion with example programs such as Quick sort, Ackerman function etc		
UNIT 5: Structure And Pointers	7	12
Pointers, Structures (including self referential structures e.g., linked list, notional introduction)		
TOTAL	**36**	**60**

Reference:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Course outcomes:

The course will enable the students

- To formulate simple algorithms for arithmetic and logical problems
- To translate the algorithms to programs (in C language)
- To test and execute the programs and correct syntax and logical errors
- To implement conditional branching, iteration and recursion
- To decompose a problem into functions and synthesize a complete program using divide and conquer approach
- To use arrays, pointers and structures to formulate algorithms and programs
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems

Course Title: **ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	Course Code: **EE 151**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : 1 **Credits**
Type of course: **Labs**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

List of Experiments

Note: A minimum of 10 experiments from the following should be performed

1.	Verification of Kirchhoff's laws
2	Verification of (i) Superposition theorem (ii) The Thevenin's Theorem (iii) Maximum Power Transfer Theorem
3	Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor
4	Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
5	Measurement of power in a 3- phase circuit by two wattmeter method.
6	Determination of parameters of ac single phase series RLC circuit.
7	Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer
8	To study speed control of dc shunt motor using (i) armature voltage control (ii) field flux control
9	Determination of efficiency of a dc shunt motor by load test.
10	To study input/output characteristics of a BJT.
11	To measure energy by a single phase energy meter and determine error.
12	To study P-N diode characteristics.
13	To study full wave and half wave rectifier circuits with and without capacitor and determine ripple factors
14	To study various logic gates (TTL)
15	. To study Operational Amplifier as Adder and Subtractor
16	To study transistor as a switch
17	To study Function generator and CRO.
18	House Wiring with electric safety measures.

Project: To fabricate a functional electrical/electronic project with a given circuit diagram, using various components soldered on a PCB/Zero PCB. Students should submit project report in a file with headings: objective, principle of working, list of components with cost, circuit diagram, difficulties experienced and conclusion. The project will be evaluated after a presentation given by the students.

Laboratory Outcomes: The students are expected to

- Get an exposure to common electrical components and their ratings.
- Make electrical connections by wires of appropriate ratings.

- Understand the usage of common electrical measuring instruments.
- Understand the basic characteristics of transformers and electrical machines.
- Get an exposure to the working of power electronic converters.

Course Title: **ENGINEERING PHYSICS LAB**	Course Code**: PY 152**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : 1 **Credits**
Type of course: **Lab**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

Course Objectives:

- In this lab students gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- It learns the usage of electrical and optical systems for various measurements.
- It apply the analytical techniques and graphical analysis to the experimental data

Any 10

S. No.	LIST OF PRACTICALS
1	To determine the dispersive power of material of prism
2	To determine the wavelength of sodium light by Newton's rings experiment
3	To determine the specific rotation of glucose / cane sugar solution using polarimeter
4	To determine the wavelength of prominent lines of white light by plane diffraction grating
5	To determine the wavelength of sodium light with the help of Michelson interferometer
6	To study the profile of He-Ne Laser
7	To determine the Numerical Aperture of optical fiber
8	To determine the fringe width and distance between coherent sources by Fresnel's bi-prism experiment
9	To determine the band gap in a semiconductor using a P.N. junction diode
10	To convert a galvanometer into an ammeter.
11	To convert a galvanometer into a voltmeter
12	To draw the plateau characteristic of a Geiger Muller Counter using a radioactive source.
13	To determine the height of an object with the help of sextant
14	To determine high resistance by method of leakage with the help of ballistic galvanometer
15	To determine the specific resistance of a given of a wire with the help of Carry Foster's Bridge

Reference:

1. R. K. Agrawal, Garima Jain Text Book of "Physics practical's" part I, Krishna Publication
2. R. K. Agrawal, Garima Jain Text Book of "Physics practical's" part II, Krishna publication

Laboratory Outcomes:

- Learn basics of instruments and how to calibrate them.
- Develop the circuit design understanding.
- To understand how laser works and its application in fiber communication.
- To understand the operation of semiconductor devices and its applications

Course Title: **PROGRAMMING FOR PROBLEM SOLVING LAB**	Course Code: **CP 153**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : 1 **Credits**
Type of course: **Labs**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

S. No.	LIST OF PRACTICALS
1	Problem solving using computers: Lab1: Familiarization with programming environment
2	Variable types and type conversions: Lab 2: Simple computational problems using arithmetic expressions
3	Branching and logical expressions: Lab 3: Problems involving if-then-else structures
4	Loops, while and for loops: Lab 4: Iterative problems e.g., sum of series
5	1D Arrays: searching, sorting: Lab 5: 1D Array manipulation
6	2D arrays and Strings, memory structure: Lab 6: Matrix problems, String operations
7	Functions, call by value: Lab 7: Simple functions
8, 9	Numerical methods (Root finding, numerical differentiation, numerical integration): Lab 8 and 9: Numerical methods problems
10	Recursion, structure of recursive calls: Lab 10: Recursive functions
11	Pointers, structures and dynamic memory allocation Lab 11: Pointers and structures
12	File handling: Lab 12: File operations

Textbooks:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self referential structures.
- To be able to create, read and write to and from simple text files.

Course Title: **ENGINEERING GRAPHICS & DESIGN**	Course Code: **ME 157**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:3**	Credits : 2 **Credits**
Type of course: **Labs**	Total Contact Hours : **30**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively
- to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

S.N.	Contents of the Course
1.	Lines, Lettering, Dimensioning, Scales; Plain Scale, Diagonal Scale (Sheet-1)
2.	To draw curves; Parabola, Hyperbola, Ellipse (Sheet-1)
3.	Projection of Points & Lines; Orthographic Projection- 1st And 3rd Angle Projection, Projection of Surfaces– Hexagon (Sheet-1)
4.	Projection of Solids; Cube, Pyramid, Prism, Cylinder, Cone, Full & Half Sectional Views of Solids (Sheet-1)
5.	To study of AutoCAD 2D cammand: Cartesian and Polar coordinate system, Absolute and Relative coordinates; Basic editing commands: Line, Point, Trace, Rectangle, Polygon, Circle, Arc, Ellipse, , Erase, Display commands: Zoom, Pan, unit, line type, line weight, rayline, Xline
6.	To study of AutoCAD 2D cammand: Polyline, Move, Copy, Offset, Fillet, Chamfer, Trim, Extend, Mirror, break, join, extend, stretch, dimension, text, area, boundary, explode, hatch, filter, layer, block, print
7.	To draw Orthographic Projections drawing using AutoCAD (2 Problems)
8.	To draw Sectional Views using AutoCAD (2 Problems)
9.	To draw assembly drawing of simple machine elements like rigid or flexible coupling, muff coupling, plummer block, footstep bearing, bracket using AutoCAD (2 Drawing)
10.	To study of AutoCAD 3D cammand: Box, Cylinder, Sphere, Cone,Wedge,Toros,Pyramid,Extrude,Helix,Sweep,Loft,Revolve,Mirror 3D (1 Problems)

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to computer-aided geometric design

Reference:

1. Narayana, K.L. and Kannaiah, P. Text Book of Engineering Drawing"Engineering Graphics", Scitech Publication

2. Bhatt, N.D. “Elementary Engineering Drawing”, Charotar Book Stall, Anand, 1998 • Lakshminarayanan, V. and Vaish Wanar, R.S., “Engineering Graphics”, Jain Brothers, New Delhi, 1998
3. Chandra, A.M. and Chandra Satish, “Engineering Graphics”, Narosa, 1998 • Jolhe, “Engineering Graphics”, Tata McGraw-Hill- WBUT Series

Semester II

Course Title: **ENGLISH**		Course Code	**: EN 108**
Semester	: **II**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:0:0**	Credits	: **2 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **36**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Knowledge of English, up-to Senior Secondary School level.

Course Objectives:

- This course develops the ability to understand the role of communication in personal & professional success.
- Develop awareness of appropriate communication strategies and ability to prepare and present messages with a specific intent.
- Analyze and learn variety of communication acts. And ethically use, document and integrate sources.

Course Content:

Topic and Contents	Hours	Marks
UNIT 1: Vocabulary Building	8	12
The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.		
UNIT 2: Basic Writing Skills	7	12
Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely		
UNIT 3: Identifying Common Errors In Writing	7	12
Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés.		
UNIT 4: Nature, Style Of Sensible Writing	7	12
Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion		
UNIT 5: Writing Practice	7	12
Comprehension, Précis Writing, Essay Writing.		
TOTAL	**36**	**60**

Reference:

1. Practical English Usage. Michael Swan. OUP.1995

2. Remedial English Grammar. F.T. Wood Macmillan.2007 (iii)On Writing Well. William Zinsser. Harper Resource Book. 2001
3. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006
4. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011
5. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

Course outcomes:

On successful completion of the course, the student will be able to:

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

Course Title: **MATHEMATICS – II**		Course Code	: MA 104
Semester	: **II**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:1:0**	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **48**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Knowledge of Mathematics, up-to Senior Secondary School level.

Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. More precisely, the objectives are:

- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- To introduce effective mathematical tools for the solutions of differential equations that model physical processes.
- To introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.

.Course Content:

Topic and Contents	Hours	Marks
UNIT 1: Matrices	8	12
Rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.		
UNIT 2: First Order Ordinary Differential Equations	7	12
Linear and Bernoulli‟s equations, Exact equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut‟s type.		
UNIT 3: Ordinary Differential Equations of Higher Orders	8	12

Linear Differential Equations of Higher order with constant coefficients, Simultaneous Linear Differential Equations, Second order linear differential equations with variable coefficients: Homogenous and Exact forms, one part of CF is known, Change of dependent and independent variables, method of variation of parameters, CauchyEuler equation; Power series solutions including Legendre differential equation and Bessel differential equations.		
UNIT 4: Partial Differential Equations	6	12
First order: Order and Degree, Formation; Linear Partial differential equations of First order, Lagrange‟s Form, Non Linear Partial Differential equations of first order, Charpit‟s method, Standard forms.		
UNIT 5: Partial Differential Equations	7	12
Higher order: Classification of Second order partial differential equations, Separation of variables method to simple problems in Cartesian coordinates including two dimensional Laplace, one dimensional Heat and one dimensional Wave equations.		
TOTAL	**36**	**60**

Reference:

1. D. Poole, "Linear Algebra: A Modern Introduction", Brooks/Cole, 2005.
2. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2008.
3. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2010.
4. V. Krishnamurthy, V. P. Mainra and J. L. Arora, "An introduction to Linear Algebra", Affiliated East-West press, 2005.

Course outcomes:

On completion of this course, students are able

- Understand the design and analysis of continuous and discrete systems with the help of Fourier series and Harmonic analysis.
- Interpret the concept of rank of a matrix and apply it to solve the system of linear algebraic equations.
- Examine and recognize the use of Eigen values and Eigen vectors in various Complex Engineering Problems.
- Understand the concept of solid geometry (Sphere, Cone, and Cylinder) which arises in electromagnetic field theory, CAD-CAM, Computer graphics.
- To introduce the concept of Vector differentiation and integration that finds applications in various fields like solid mechanics, fluid flow, heat problems and potential theory.

Course Title: **CHEMISTRY**		Course Code	: **CY 102**
Semester	: **II**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	**: 3:0:0**	Credits	: **3 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **36**
Continuous Internal Evaluation	: **40 Marks**	ESE	: **60 Marks**
Programmes: **B.Tech (All)**			

Pre-requisites:

Knowledge of Mathematics, up-to Senior Secondary School level.

Course Objectives:

- To encourage basic engineering materials which are useful for different engineering and technology such as of Chemistry and knowledge is added
- To develop knowledge by teaching and modeling for engineering Materials
- Knowledge dissemination for Engineering by Chemicals and Materials
- Advanced materials are also the objective for Students
- Apply the concept of materials and Chemicals used to solve the engineering materials in different engineering field.
- Apply the processing in solving the problems of required materials.
- Solve the problem of advanced materials used the civil engineering computer science (memory materials) electrical ,EC Mechanical , VLSI using concepts of different properties.
- Evaluate the advanced engineering materials such as communication, networking high temperature using structures of chemicals.
- Apply and evaluate different concept in development and innovation in engineering field.
- Innovate new materials to solve basic concept of various technology.

Course Content:

Topic and Contents	Hours	Marks
UNIT 1: Atomic And Molecular Structure	8	12
Schrodinger equation. Particle in box solutions and their applications for conjugated molecules and nano particles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbital of diatomic molecules and plots of the multi-centre orbital. Equations for atomic and molecular orbital. Energy level diagrams of diatomic. Pi- molecular orbital of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.		
UNIT 2: Spectroscopic Techniques And Applications	7	12
Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterization techniques. Diffraction and scattering.		
UNIT 3: Intermolecular Forces And Potential Energy Surfaces Rays And Basic Algorithm, Use Of Free Energy In Chemical Equilibrium	8	12
Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces . Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibrium. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.		
UNIT 4: Periodic Properties And Stereochemistry	7	12

Effective nuclear charge, penetration of orbital, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electro negativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries. Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.		
UNIT 5: Organic Reactions And Synthesis Of Drug Molecule	6	12
Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.		
TOTAL	**36**	**60**

Reference:

1. B. H. Mahan, "University chemistry", Addison-Wesley Publishing Company, 1975.
2. M. J. Sienko and R. A. Plane, "Chemistry: Principles and Applications", McGraw Hill International, 1974.
3. C. N. Banwell, "Fundamentals of Molecular Spectroscopy", McGraw Hill Education, 1994.
4. B. L. Tembe, Kamaluddin and M. S. Krishnan, "Engineering Chemistry" (NPTEL).
5. K.P.C. Volhardt and N. E. Schore, "Organic Chemistry: Structure and Function" Freeman, 2010.

Course outcomes:

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels; one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

- Analyze microscopic chemistry in terms of atomic and molecular orbital and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalize periodic properties such as ionization potential, electro negativity, oxidation states and electro negativity.
- List major chemical reactions that are used in the synthesis of molecules.

Course Title: **BASIC ELECTRONIC ENGINEERING**	Course Code: **EC 106**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **3:0:0**	Credits : 3 **Credits**
Type of course: **Lecture + Tutorials + Assignments**	Total Contact Hours : **36**
Continuous Internal Evaluation : **40 Marks**	SEE : **60 Marks**
Programmes:	

Pre-requisites:

Semiconductor physics

Course Objectives:

- Impart basic knowledge of electronics quantities such as diode and transistors.
- Provide working knowledge of Transistor and Junction Diode for all branches of Engineering..
- Develop skills to identify the type of electronics in digital and analog system.
- Highlight importance of Communication system and Digital Electronics System.
- Design simple electronic circuits with Transistor and Junction.

Topic and Contents	Hours	Marks
UNIT 1: Semiconductor Devices and Applications	8	12
Introduction to P-N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator. Regulated power supply IC based on 78XX and 79XX series, Introduction to BJT, its input-output and transfer characteristics, BJT as a single stage CE amplifier, frequency response and bandwidth.		
UNIT 2: Operational Amplifier And Its Applications	7	12
Introduction to operational amplifiers, Op-amp input modes and parameters, Op-amp in open loop configuration, op-amp with negative feedback, study of practical op-amp IC 741, inverting and non-inverting amplifier applications: summing and difference amplifier, unity gain buffer, comparator, integrator and differentiator.		
UNIT 3: Timing Circuits And Oscillators	6	12
RC-timing circuits, IC 555 and its applications as astable and mono-stable multi-vibrators, positive feedback, Barkhausen's criteria for oscillation, R-C phase shift and Wein bridge oscillator.		
UNIT 4: Digital Electronics Fundamentals	8	12
Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, de-multiplexers, flip-flops, shift registers, counters, Block diagram of microprocessor/microcontroller and their applications.		
UNIT 5: Electronic Communication Systems	7	12

The elements of communication system, IEEE frequency spectrum, and Transmission media: wired and wireless, need of modulation, AM and FM modulation schemes, Mobile communication systems: cellular concept and block diagram of GSM system.		
TOTAL	**36**	**60**

Reference:

1. Floyd ," Electronic Devices" Pearson Education 9th edition, 2012.
2. R.P. Jain , "Modern Digital Electronics", Tata Mc Graw Hill, 3rd Edition, 2007.
3. Frenzel, "Communication Electronics: Principles and Applications", Tata Mc Graw Hill, 3rd Edition, 2001.

Course Outcomes:

At the end of this course students will demonstrate the ability to

- Understand the principles of semiconductor devices and their applications.
- Design an application using Operational amplifier.
- Understand the working of timing circuits and oscillators.
- Understand logic gates, flip flop as a building block of digital systems.
- Learn the basics of Communication system.

Course Title: **CHEMISTRY LAB**	Course Code: **CY 152**
Semester : **I**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : 1 **Credits**
Type of course: **Labs**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

S. No.	LIST OF PRACTICALS
1	Determination of surface tension and viscosity
2	Thin layer chromatography
3	Ion exchange column for removal of hardness of water
4	Determination of chloride content of water
5	Colligative properties using freezing point depression
6	Determination of the rate constant of a reaction
7	Determination of cell constant and conductance of solutions
8	Potentiometry - determination of redox potentials and emfs.
9	Synthesis of a polymer/drug
10	Saponification/acid value of an oil
11	Chemical analysis of a salt
12	Lattice structures and packing of spheres
13	Models of potential energy surfaces
14	Chemical oscillations- Iodine clock reaction
15	Determination of the partition coefficient of a substance between two immiscible liquids
16	Adsorption of acetic acid by charcoal
17	Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg

Reference:

1. ogel's Textbook of Quantitative Chemical Analysis (Latest ed.), Revised by G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney
2. Applied Chemistry: Theory and Practice (Latest ed.), By O.P. Vermani & A.K. Narula.
3. Practical Physical Chemistry (Latest ed.), By B.D. Khosla, A. Gulati & V.C. Garg
4. Laboratory Manual on Engineering Chemistry (Latest ed.), By S.K. Bhasin and Sudha Rani

Laboratory Outcomes:

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
- The students will learn to Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyze a salt sample.

Course Title: **ENGLISH LANGUAGE LAB**	Course Code: **EN 152**
Semester : **II**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : 1 **Credits**
Type of course: **Labs**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

S. No.	LIST OF PRACTICALS
1	Listening Comprehension
2	Pronunciation, Intonation
3	Stress and Rhythm
4	Common Everyday Situations: Conversations and Dialogues
5	Communication at Workplace
6	Interviews
7	Formal Presentations

Course Title: : **WORKSHOP MANUFACTURING PRACTICES**	Course Code: **ME 158**
Semester : **II**	Core / Elective: **Program Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:3**	Credits : **2 Credits**
Type of course: **Labs**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

Manufacturing is fundamental to the development of any engineering product. This course is intended to expose engineering students to different types of manufacturing/ fabrication processes, dealing with different materials such as metals, ceramics, plastics, wood, glass etc. While the actual practice of fabrication techniques is given more weightage, some lectures and video clips available on different methods of manufacturing are also included. The course intends to prepare students for:

- Understanding different manufacturing techniques and their relative advantages/ disadvantages with respect to different applications
- The selection of a suitable technique for meeting a specific fabrication need
- Acquire a minimum practical skill with respect to the different manufacturing methods and develop the confidence to design & fabricate small components for their project work and also to participate in various national and international technical competitions.

Course Objectives:

- Introduction to different manufacturing methods in different fields of engineering
- Practical exposure to different fabrication techniques
- Creation of simple components using different materials
- Exposure to some of the advanced and latest manufacturing techniques being employed in the industry

S.N.	Contents of the Course
1.	To study different types of measuring tools used in workshop and determine least counts of vernier calipers, micrometers and vernier height gauges.
2.	To prepare a multi-operation job on a lathe involving facing, turning, step turning, chamfering & knurling
3.	To prepare horizontal surface/ vertical surface/ slots or V-grooves on a shaper/planner machine.
4.	To study different types of fitting tools and marking tools used in fitting shop.
5.	To prepare a model in fitting shop and make hole using drilling machine.
6.	To study various types of carpentry tools and type of pattern.
7.	To prepare two wooden joints; Lap & Bridle Joint
8.	To prepare a mould cavity by using a solid / single piece pattern.
9.	To prepare melting pouring and making an aluminium casting
10.	To prepare at least two welding joints; Butt/ Lap/T-Joint/ Corner Joint by arc welding

Laboratory Outcomes

- Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.
- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances

possible with different manufacturing processes.

- By assembling different components, they will be able to produce small devices of their interest.
-

Suggested Text/Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.

Course Title: : **EMPLOYABILITY SKILLS – I**	Course Code: **EM-102**
Semester : **II**	Core / Elective: **University Core**
Teaching Scheme in Hrs (L:T:P) : **2:0:0**	Credits : **1 Credits**
Type of course: **Labs**	Total Contact Hours : **25**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programmes: **Common to all B. Tech. Engineering Programmes**	

S.No.	Topic	Details	Contact Hrs
1	Motivation	Orientation for all & Importance of Soft Skills & Confidence in Business	1
2	Communication	Basics, Introduction, Barriers in Communication, Types, Verbal, Non-verbal, Face/Eye/Body Language, Interview Skills &Types	15
3	Attitude& Manners	Grooming & Etiquettes, Vales & Ethics, What is personality, Good Human Being, Confidence Building	9

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

IIYEAR **IIISEM**

S.NO	Course Code	Course Name	Credit	Contact Hours/Week			Exam Hours	Weightage (%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 201	Strength of Material-I	4	3	1	-	3	40	60
2	CE 203	Fluid Mechanics	4	3	1	-	3	40	60
3	CE 219	Building Planning	3	3		-	3	40	60
4	CE 207	Surveying-I	3	3		-	3	40	60
5	CE 209	Advance Engineering Mathematics	3	3	-	-	3	60	40
6	CE 253	Fluid Mechanics Lab	1	-	-	3	3	60	40
7	CE 255	Auto CAD (2D Design)	1	-	-	3	3	60	40
8	CE 257	Survey Lab	1	-	-	3	3	60	40
9	CE 259	Engineering Material Testing Lab	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
10	CE 211	Modern concrete technology	3	3	-	-	3	40	60
11	CE213	Design of Pre-stressed Concrete Structures	3	3	-	-	3	40	60
12	CE 211	Engineering Geosciences	3	3	-	-	3	60	40
UNIVERSITY CORE									
13	PC 201	Proficiency and Co-Curricular Activities – III	2	-	-	-	-	100	60
14	HS 203	Economics and Social Sciences	3	3	-	-	3	40	60
15	EM 201	Employability Skills-II	1	-	2	-			
UNIVERSITY ELECTIVE									
16		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		TOTAL	**30**	**21**	**2**	**12**			

Theory (23 Credit) + Lab (04 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

CE201 STRENGTH OF MATERIALS AND MECHANICSOFSTRUCTURES C(L,T,P)=4(3,1,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Simple Stresses and Strains :** Concept of stress and strain in three dimensions and generalized Hooke's law; Direct stress and strain: free body diagrams, Hooke's law, Young's modulus; Tension test of mild steel and other materials: true and apparent stress, ultimate strength, yield stress and permissible stress; Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson's ratio, Volumetric strain, Bulk modulus, relation betweenelasticconstants;Strainenergyforgraduallyapplied,suddenlyappliedandimpact loads.	8
II	**Compound Stress :**Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle & it's application. **Columns :** Short and long columns, slenderness ratio, crushing and buckling of column, short columnsubjectedtoaxialandeccentric loads; Euler'stheoryanditslimitation, concept of effective length of columns; Rankine& Secant formulae.	8
III	**Centroid and Moment of Inertia :** First moment of area, Centroid and moment of inertia of symmetrical & unsymmetrical sections, radius of gyration, polar moment of inertia, product momentofinertia,parallelaxistheorem,principalaxesandprincipalmomentofinertia. **Plane trusses :**Simple pin jointed trusses and their analysis: method of joints, method of section and introduction to computer methods.	8
IV	**Bending of Beams :** Types of supports, support reactions, determinate and indeterminate structures, static stability of plane structures; Bending moment, Shear force and Axial thrust diagrams for statically determinate beams subjected o various types of loads and moments.	7
V	**Theory of simple bending**: Distribution of bending and shear stresses for simple and composite sections; Shear center and its location in flanged sections. Introduction to unsymmetrical bending.	7

Reference Books:

1. Gere,JamesM.,"MechanicsofMaterials,"6thEdition.
2. Dowling, Norman E., "Mechanical Behavior ofMaterial
3. Strength Of Material-B.C.Punmia
4. Strength Of Material-S.Chand
5. Strength Of Material-R.S.Khurmi

CE203 **FLUIDMECHANICS** **C(L,T,P)=4(3,1,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Fluids**: Definition, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids. **Properties of Fluids:** Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity	7
II	**Hydrostatics :** Pressure at a point in a static fluid; pressure variation in an incompressible static fluid; atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, Manometers Bourdon pressuregauge. **Buoyancy**: Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and metacentric height experimental and analytical determination of metacentric height	8
III	**Equilibrium of Fluid particles and flow**: Fluid mass subjected to horizontal and vertical acceleration and uniform rotation. **Hydro-kinematics :** Types of Flows : Steady and unsteady, uniform and non-uniform, stream lines, path lines, stream tubes, principles of conservation of mass, equation of continuity, acceleration of fluid particles local and connective, Rotational and irrational motions, free and forced vortex, circulation and voracity velocity potential and stream function, elementary treatmentof flownet.Euler'sequationsof motionandintegrationof Euler'sequations, Bernoulli'sequationforincompressibleFluids,assumptionsinBernoulli's equation, Energy correction factor	8
IV	**Applications of Bernoulli's equation** :Pitot tube, Venturimeter, orifice meter, orifices & mouth pieces, time of emptying of tanks by orifices, sharp edged rectangular, triangular and trapezoidal notches, Francis formula. Velocity of approach. End contractions Cippoletti Weir, time of emptying reservoirs byweirs. **Momentum Equation and its Application :** Development of momentum equation by control volumeconcept,Momentumcorrectionfactor,applications–Boarda'smouthpieces,sudden enlargement of flow, pressure on flat plates,Nozzles	8
V	**Flow through Pipes** : Laminar flow, Reynolds experiment, transition from laminar to turbulentflow. **Turbulent Flow** : Laws of fluid friction, friction factor Moodys diagram, loss of head due to friction and other causes. Hydraulic gradient, total energy line Chezy's, Darcys and Mannings formula, flow through parallel pipes and pipes in series, flow through branched pipes. Flow along a by pass. Power transmission through pipe, condition for maximum power. Elementary water hammer concept	8

Reference Books-:

1. Fluid Mechanics-F. M. White,McGraw-Hill
2. Fluid Mechanics and Hydraulic Machines-R. K.Bansal
3. Fluid Mechanics and Hydraulic Machines-Modi&Seth

CE205 **Building Planning** **C(L,T,P)=3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Introduction:** to scope, objective and outcome of subject. **Introduction**: Types of buildings, criteria for location and site selection, site plan and its detail.	7
II	**Sun Consideration :** Different methods of drawing sun chart, sun shading devices, design of louvers. **Climatic and comfort Consideration**: Elements of climate, global climate, climatic zones of India, thermal comfort, biclimatic chart,	7
III	**Orientation:** Meaning, factors affecting orientation, orientation criteria for tropical climate. **Building Bye Laws and NBC Regulations:** Objective of by-laws, regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation.	7
IV	**Principles of Planning:** Different factors affecting planning viz-aspect, prospect, furniture requirement,roominess, grouping, circulation, elegance, privacy etc. **Vastu Shastra In Modern Building planning:** Factors considered in Vastu, site selection, orientation,planning and design of residential buildings, school/hospital	7
V	**Functional Design And Accommodation Requirements Of Non Residential Buildings:** viz-school buildings, rest house, primary health centers, post office etc Services in Buildings(A) Lighting and ventilation, doors and windows, lifts. (B) Acoustics, sound insulation and noise control. (C) Fire fighting provisions	7

Reference books :-

1. " **Building Planning** and Drawing" by S S Bhavikatti and M V Chitawa
2. **Building Planning** and Darawing" by Rao and Swami
3. **Building** Drawing with an Integrated Approach to Built Environment" by Shah

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Introduction :**Importance of surveying to engineers, Plane and geodetic surveying, methods of location of points, principle of surveying from whole to part, conventional signs. **Measurement of Distances :**Different types of chains, tapes and their uses. Sources of error and precautions, corrections to tape measurements. Field problems in distance measurement.	7
II	**Measurement of Angles &Direction :**Different types of direction measuring instruments and their uses. Reference meridians, Bearing and azimuths, magnetic declination and its variation. Use and adjustment of surveyors and prismatic compass. Venire and micro-optic theodolite, temporary and permanent adjustment of vernier theodolite. Measurement of horizontal and vertical angle by different methods. Application of theodolite in field problems.	8
III	**Traversing :**Different methods of traversing; chain traverse, chain & compass traverse, transit-tape traverse. Methods of computations and adjustment of traverse; transit rule, Bowditch rule, graphical method, axis method. Gales traverse table.	7
IV	**Leveling :**Definitions of various terms in leveling. Different types of leveling, sources of errors in leveling curvature and refraction corrections. Temporary and permanent adjustment of dumpy and tilting levels. Computation and adjustment of levels. Profile leveling; L-Sectionand cross-sections	7
V	**Plane Table Surveying: Elements** of plane table survey working operations, methods of plane table survey; intersection, traversing and resection, two point and three point problems. **Contouring :** Characteristics of contours, contour interval, contour gradient, Methodsof locating contours, uses of contour maps	7

Reference books:-

1. Surveying" by Bannister A and RaymondS
2. Engineering Survey" by Schofield W
3. Suryeving:- B.C.Punmia

CE 209 **ADVANCE ENGINEERING MATHEMATICS** **C(L,T,P)=3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Numerical Methods:** Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Gauss's forward and backward interpolation formulae. Stirling's Formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange'sformulae. Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.	7
II	**Numerical Methods:** Numerical solution of ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge- Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Solution of polynomial and transcendental equations-Bisection method, Newton-Raphson method and Regula-Falsi method.	8
III	**Laplace Transform:** Definition and existence of Laplace transform, Properties of Laplace Transform and formulae, Unit Step function, Dirac Delta function, Heaviside function, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace transforms method.	7
IV	**Fourier Transform:** Fourier Complex, Sine and Cosine transform, properties and formulae, inverse Fourier transforms, Convolution theorem, application of Fourier transforms to partial ordinary differential equation (One dimensional heat and wave equations only).	7
V	**Z-Transform:** Definition, properties and formulae, Convolution theorem, inverse Z-transform, application of Z-transform to difference equation.	7

CE253 **FLUIDMECHANICSLAB** **C(L,T,P)=1(0,0,3)**

S.No.	List of Experiments	Hours
1	To verify the Bernoulli's theorem.	
2	To calibrate the Venturimeter	
3	To calibrate the Orificmeter	
4	To determine Metacentrie Height	
5	To determine Cc, Cv, Cd of an orifice	
6	To determine Cd of a mouthpiece	
7	To determine Cd of a V-notch	
8	To determine viscosity of a given fluid.	
9	Bye Pass	

CE 255 **Auto CAD (2D Design)** **C(L,T,P)=1(0,0,3)**

S.No.	List of Experiments	Hours
1	Drawing of walls	
2	Pointing, Arches, Lintels and Floor	
3	Doors and Windows	
4	Stairs, Cross section of Dog legged stairs	
5	Development of Front Elevation and Sectional Elevation from a given plan	
6	Development of Plan, Front Elevation and Sectional Elevation from line diagram	
7	Roofs: Flat and Pitched roof (Steel truss)	

CE257 **SURVEYLAB-I** **s** **C(L,T,P)=1(0,0,3)**

S.No.	List of Experiments	Hours
1	Ranging and Fixing of Survey Station.	
2	Plotting Building Block by offset with the help of cross staff	
3	To determine the magnetic bearing of a line a. Using surveyor'scompass b. Using prismaticcompass	
4	Measurement and adjustment of included angles of traverse using prismatic compass	
5	To determine the reduced levels using Tilting Level	
6	**To** determine the reduce levels in closed circuit using Dumpy Level	

7	To carry out profile leveling and plot longitudinal and cross sections for road	
8	To carryout temporary adjustment of Theodolite	
9	Measurement of horizontal angle. a. By method ofrepetition. b. By method ofReiteration.	
10	To determine the tachometric constant.	
11	To determine the horizontal and vertical distance by tachometric survey	
12	To study the various minor instruments	
13	To determine the area of a figure using a planimeter	

CE259 EGINEERING MATERIAL TESTINGLAB C(L,T,P)=2(0,0,3)

S.No.	**List of Experiments**	**Hours**
1	Aggregate impact test	
2	Angularity number test	
3	To determine fineness modulus of a given sample of coarse aggregate.	
4	Los angles abrasion test	
5	Aggregate crushing value test	
6	Standard tar viscometer test	
7	Specific gravity and water absorption test	
8	To determine the elongation index for given sample of aggregate.	
9	To determine the flakiness index of given sample of aggregate.	
10	Ductility test	
11	To determine the softening point for give sample of bitumen.	
12	Marshell stability test	
13	Float test	

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2018-2019

II YEAR **IVSEM**

S.NO	Course Code	Course Name	Credit	Contact Hours/Week			Exam Hours	Weightage (%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 202	Strength of Material-II	4	3	1	-	3	40	60
2	CE 204	Hydrology & Hydraulics	4	3	1	-	3	40	60
3	CE 206	Engineering Geology	4	3	-	-	3	40	60
4	CE 208	Surveying-II	4	3	1	-	3	40	60
5	CE 210	Building Material & Construction	4	3	1	-	3	40	60
7	CE 254	Hydraulics & Hydraulics Machine Lab	1	-	-	3	3	60	40
8	CE 256	Auto CAD (3D Design)	1	-	-	3	3	60	40
9	CE 258	Survey Lab-II	1	-	-	3	3	60	40
10	CE 260	Eng. Material & Geology Lab	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 212	Construction Equipment & Material Management	3	3	-	-	3	40	60
12	CE 214	Green Building Technology	3	3	-	-	3	40	60
13	CE 216	Town Planning	3	3	-	-	3	40	60
UNIVERSITY CORE									
12	PC 202	Proficiency and Co-Curricular Activities – IV	2	-	-	-	-	100	-
14	EM 202	Employability Skills-III	1	-	2	-	-	-	-
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		TOTAL	**30**	**18**	**4**	**15**			

Note: - Summer Training: Professional Project Training for 30 days after 4th Semester Exams is compulsory.

CE202 STRENGTHOFMATERIAL&MECHANICSOFSTRUCTURESII C(L,T,P)=4(3,1,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Deflection of Beams: Differential** relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay'smethod,areamomentmethodandconjugatebeammethod.	7
II	**Fixed Beams & Continuous Beams :**Analysis of fixed beams & continuous beams by three moment theorem and area moment method.	7
III	**Torsion :** Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion; Springs: stiffness of springs, close coiled helical springs, springs in series and parallel, laminated plate springs. **MembraneAnalysis:**Stressandstraininthincylindrical&sphericalshellsunderinternal pressures.	8
IV	**Introduction to Energy Methods :** Strain energy due to bending, shear and torsion; Castigleno's theorems, unit load method & their applications in analysis of redundant frames uptotwodegreeofredundancyanddeflectionofdeterminatebeams,framesandtrussed beams; Stresses due to temperature & lack of fit in redundant frames. Theories of Failures	8
V	**Vibrations :**Stress tensor and failure criterion. Elementary concepts of structural vibration, degreeoffreedom,freevibrationofundampedsingledegreeoffreedomsystems.Newton'slaw ofmotion,D'Almbert'sprinciple,solutionofdifferentialequationofmotion,frequency&period ofvibration,amplitudeofmotion;Dampedsingledegreeoffreedomsystem:typesofdamping, analysis of viscously damped, under-damped, over-damped &critically-damped systems,logarithmic decrement.	8

Reference Books-:

1. Strength Of Material-B.C.Punmia
2. Strength Of Material-S.Chand
3. Strength Of Material-R.S.Khurmi
4. Gere,JamesM.,"MechanicsofMaterials,"6thEdition.
5. Dowling, Norman E., "Mechanical Behavior ofMaterial

CE204 **HYDROLOGY&HYDRAULICS** **C(L,T,P)=4(3,1,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Dimensional Analysis &Models:** Dynamical Similarity and Dimensional Homogeneity Model experiment,geometric,KinematicandDynamicsimilarity.Reynolds's,Froude's,Weber's,Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem, applications of dimensional analysis to pipe Friction problems, resistance to motion ofpartially and fully submerged bodies and other simple problems. Ship model experiments.	7
II	**Laminar Flow** : Relation betweens shear & pressure gradient. Flow between plates & pipes. Equations for velocity distribution, pressure difference. **Turbulent Flow in pipes:** Theories of Turbulence, Nikuradse's Experiments. Hydrodynamically smooth & rough boundaries. Laminar, Sub layer, Equations of velocity distribution and friction coefficient. Stanton Diagram, Moody's diagram	7
III	**Flow through channels** : Uniform, Non-Uniform and variable flow. Resistance equations of Chezy, Manning's and Bazin. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Equations of gradually varied flow in Prismatic channels. Limitation of its applicability and assumption made in its derivation. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild,steepandCriticalSlopes.Classificationofsurfacecurvesinprismaticchannelsand elementary computation	8
IV	**Rapidly varied flow**: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. Broad crested weirs for channel flow: Measurement, velocity distribution in open channels, parshall flume. **Impact of free Jets :** Impact of a jet on a flat or a curved vane, moving and stationary vane, flow over radial vanes	7
V	**Centrifugal pumps and turbines :**Vulute and whirlpool chambers, Loses of head due to variation of discharge Manometric and Hydraulic efficiencies, Description of single and multistage pumps. Specific speed, characteristic curves. Model Test. Reaction and Impulse turbines, specific speed, Mixed flow turbines. Pelton wheel turbine, Francis turbine, propeller turbine and Kaplan turbine Efficiency, Characteristics of turbines. Basic principles of governing of turbines, Draft-tube, Selection of turbines, model tests.	9

Reference Books:-

1. Fluid Mechanics-F. M. White,McGraw-Hill
2. Fluid Mechanics and Hydraulic Machines-R. K.Bansal
3. FluidMechanicsandHydraulicMachines-Modi&Seth
4. Urban Hydrology and Hydraulic Design -By James Chwen-YuanGuo
5. Engineering Hydrology - By K.Subramanya

CE206 **ENGINEERINGGEOLOGY** **C(L,T,P)=3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**General Geology :** Subdivision of Geology; Importance of Geology in Civil Engg.; Internal Structure of the Earth; Physical properties of Minerals; Weathering and Work of Wind &River ; Geological Time Scale.	8
II	**Petrology: Origin**, Classification, Texture & Structures of Igneous, Sedimentary and Metamorphic Rocks; Engineering Properties of Rocks.	7
III	**Structural Geology:** Causes & Classification of Fold, Fault, Joints & Unconformities. **Geophysical Methods:** Electrical resistivity & Seismic refraction method for civil engineering importance.	8
IV	**Engineering Geology:** Geological investigation for site selection of site for Dams, Tunnels, Reservoirs and Bridges. Site improvement for different engineering projects.	7
V	**Remote Sensing:** Introduction and applications in Civil Engineering.	7

Reference Books:-

1. Engineering Geology: Principles and Practice -By David GeorgePrice
2. Fundamentals of Engineering Geology- By F. G.Bell
3. Textbook of Engineering Geology- ByKesavulu

CE208 **SURVEYING-II** **C(L,T,P)=4(3,1,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Trigonometric Leveling:** Methods of trigonometric leveling direct method and reciprocal method, axis Signal corrections. Determination of difference in elevations of points	7
II	**Curve Surveying:** Elements of circular (Simple, compound and reverse) curves,transition curves, degrees of curves Methods of setting out circular and transition curves	7
III	**Triangulation:** Merits and demerits of traversing, triangulation and trilateration. Grades of triangulation, Strength of figure, field procedure of triangulation. Reconnaissance and selection of triangulation stations. Intervisibility of stations and calculation of the heights of towers. Equipment needed for base line measurement, corrections to base line. Satellite station and base line extension	7
IV	**Errors in Surveying: Classification** of errors in surveying. The probability curve, its equationandproperties,theoryofleastsquares,weight,mostprobablevalve,probableerrors, standard errors. Normal equationcorrelates. **Adjustment of Triangulation Figures:** Adjustment of levels. Adjustment of triangulations figures, Braced quadrilateral Triangle with central, station. Approximate and method of least squares for figure adjustment, Trilateration.	7
V	**Field Astronomy:** Definitions of terminology used in Astronomy, Co-ordinate Systems. RelationshipsbetweendifferentCo-ordinatesystems.AstronomicalTriangle,Napier'sRule. Different methods of determination of Azimuth. **Electronic distance measurement and use of Total station.** **Survey camp:** (including exercise on triangulation, topographic, or project survey) with duration of maximum 10 days.	7

Reference Books:-

1. Adv. Survey:- B.C.Punmia
2. Surveying &Levelling By R.Agor

CE210 BUILDING MATERIAL&CONSTRUCTION C(L,T,P)=4(3,1,0)

UNIT	COURSE CONTENTS	Hours.
I	**Stones : C**lassification, quarrying of stones, Dressing of stones, various standard test on building stores including compressive strength, water absorption, durability, impact value, tensile strength, identification, selection criteria and uses of common buildingstones. **Clay Products** : Bricks such as water absorption, compressive strength, effloresces, dimension and tolerance test– Manufacture process, properties, Classification, standard tests as per IS code, TypesofTiles,standardtestsfortilesasperIScodesuchaswaterabsorption,tolerance,impact value, glazing.	7
II	**Cement and Lime :** Raw materials, constituents of cement and their role, type of cement, manufacture of OPC, Chemistry of setting and hardening, Various standard tests on Portland cements, as per IS code including consistency, setting time, fineness, soundness and strength. Lime: Classification, Manufacture, properties, tests for lime. **Mortar and Plaster:** Functions and types of sand, bulking of sand, tests for sand, classification, preparation method, tests, uses and properties of mortar and plaster.	8
III	**Timber:** Definitions of related terms, classifications and properties, conversion of wood, seasoning, preservation, fire proofing, Ply woods, fiber boards, defects in wood. **Plastics :**Introduction, properties, classification, uses. **Miscellaneous:** Properties and uses of glass, steel, aluminum, Asbestos, G.I., various types of paints and Varnishes, Prestressed and precast concrete.	8
IV	**Building Requirements:** Building components, their functions and requirements, classification, of building by occupancy and by types of construction, load bearing construction and framed structureconstruction. **Foundation: Purpose**, types of foundation, bearing capacity of soil, depth of footing, foundation for black cotton soil, causes of failure of foundation and remedial measure.	7
V	**Brick and Stone Masonry**: Basic principle of sound masonry work, different types of bonds, relative merits merit and demerits of English, single Flemish and double Flemish bond. Comparisonbetweenstoneandbrickmasonry.Generalprinciples,classificationofstonemasonry. **Pointing&Plastering:**DefinitionusesandRelativemerits,typesofpanting,typesofplastering. **Partition Wall:** Types, purpose and use of partition wall.	7

Reference Books:-

1. Building Material and Construction- By S.S.Bhavikatti
2. Building Materials- By S. K.Duggal
3. Fundamentals of Building Construction(Materials and Methods)- By Edward Allen, JosephIano

CE212 CONSTRUCTIONEQUIPMENTS&MATERIALMANAGEMENT C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours.
I	**Advance Construction Equipments** Different types of construction equipments viz. Earth moving equipments& their outputs, Dewatering equipments, Pumping equipments, Grouting equipments, Pile Driving equipments, Compaction equipments, Concreting equipments.	7
II	**Equipment Management** Planning of construction equipments, Forecasting equipment requirement, Operation & Utilization, Equipment replacement, Manpower planning & Maintenance of equipments	7
III	**Economics of ConstructionEquipments** Operation Cost & Its types. Investment Cost, Cost of Repairs, Overheads Cost accounting, Break-even point theory, Replacement ofequipment	7
IV	**Materials Management** Scope, objectives & importance of materials management, Selective control techniques, Disposal of surplus material.	7
V	**Inventory Control & Spare Part Management** Need, function, steps in inventory control. Advantages, Economic order quantity, Inspection & procurement of spares, stores & stock management	7

Reference Books:-

1. Construction Materials Management - GeorgeStukhart
2. Construction Equipment Management for Engineers, Estimators, and Owners- By Douglas D. Gransberg, Calin M. Popescu, RichardRyan
3. Construction Project Management: - By S. Keoki Sears, Glenn A. Sears, Richard H.Clough

CE214 **GREENBUILDINGTECHNOLOGY** **C(L,T,P)=3(3,0,0)**

UNIT	CONTENTS	Total Contact Hrs.
I	**Concept of green buildings:** objectives of green buildings, Sustainable site, water, energy, material and indoor environment issues for green buildings, Goals of green building, Energy efficiency, Water efficiency, Materials efficiency, Indoor environmental quality enhancement.	8
II	**Principles of energy conscious design of buildings**:Building Envelope, Orientation, Building Configuration, Basic Principles of Day-lighting, Embodied Energy of Building Materials, design guidelines, integration of emergingtechnologies.	8
III	**Heating and cooling load of buildings**: elements of heating and cooling load, load reduction approaches, thermal mass, Solar geometry and exposure: sun path diagram, shading analysis. Passive heating: Direct and indirect solar passive heating systems, solarium, trombe wall, trans-wall. **Passive cooling systems:** thermal mass, courtyard effect, wind tower design, earth air tunnel system, evaporative cooling, radiative cooling, Solar ventilation: stack effect, solar chimney for ventilation, absorber design, stack design, issues in opening design	8
IV	**Solar Radiation:** Basics of Solar Radiation, instruments for measuring solar radiation, solar radiation geometry, empirical equations, solar radiation on tilted surfaces. **ThermalmassSolargeometryandexposure**:Sunpathdiagram,shadinganalysis, graphical design tools, solar controlissues.	7
V	**EnergyConservationBuildingCode:**requirementsofcode,applicability,compliance options: prescriptive, trade-off, whole building performance routes for compliance, features of green building rating systems in India: LEED, GRIHA, ECBC. Concept of Net zero energy building, net zero community, building analysis professional software- ENERGY PLUS,case studies.	7

Reference Books:

1. Energy Efficient building in India, MiliMajumdar, TERI,2009
2. Handbook on Energy Conscious Buildings, J.K. Nayak& J.A. Prajapati, Ministry Of Non-Conventional Energy Sources,2006
3. Active Solar Collectors and Their Applications, Ari Rabl (Center for Energy and Environmental Studies Princeton Universitv), Oxford University Press,1985
4. Solar passive buildings, science and design, M.S. Sodha et.al., Pergamon Press,1986
5. GRIHA manual, TERI,2017
6. ECBC code, Bureau of Energy Efficiency,2017

CE216 **Town Planning** **C(L,T,P)=3(3,0,0)**

UNIT	COURSE CONTENTS	Hours
I	Introduction: Objective, scope and outcome of the course. Introduction: Definition of town planning, Evolution of towns, Objects of town planning, Economic Justification for town planning, Principles of town planning, Necessity of town planning, Origin, Growth and patterns of town development, distribution of land use, site for ideal town, powers required to enforce T.P. scheme	8
II	Civic Surveys: Definition, Necessity, collection of data, Types of surveys, methods adopted to collect data, Drawings, reports. Zoning: Definition, Use of land, Objects of zoning, Principles of zoning, Aspects, Advantages & Importance zoning, Transition zone, Zoning powers, Maps for zoning	**7**
III	Importance and Demand of housing, Classification, requirements and design of residential building, Housing agencies, Housing problems in India. Slums: Causes, characteristics and effects of slums, Slum clearance	**7**
IV	Industries: Classification of industry, Concentration of industry, requirements of the industry, Industrial townships. Public Buildings: Location, classification principle of design, town center, grouping of public buildings. Town Planning, CL-SPP/CL-DDU/Nadiad, Gujarat, INDIA 4	**7**
V	Re-planning of existing towns: Objects of re-planning, defects of existing town, data required for re-planning, Urban Renewal projects, De-centralization and Re-centralized, Garden city concept overview.	**7**
	Total	**36**

Reference Books:

1. Town planning by Rangwala
2. Research Design in Urban Planning: A Student's Guide Book by Stuart M. Farthing

CE252 **MATERIALTESTINGLAB** **C(L,T,P)=2(0,0,2)**

S.No.	List of Experiments	Hours
1	Tensile Strength Test – Mild Steel and HYSD bar	
2	Compressive Strength Test – Mild Steel and Cast Iron	
3	Compressive Strength Test – Cement Cubes and Concrete Cubes	
4	Compressive Strength Test – Bricks	
5	Compressive Strength Test – Wooden Blocks	
6	Hardness Test – Rockwell Hardness and Brinell Hardness	
7	Impact Test – Izod and Charpy	
8	Modulus of Rupture of Wooden Beam	
9	Fatigue Test	
10	Spring Test	
11	Torsion Test	

CE254 **HYDRAULICS & HYDRAULICS MACHINELAB** **C(L,T,P)=1(0,0,2)**

S.No.	List of Experiments	Hours
1	To determine the minor losses.	
2	To determine the friction factor.	
3	To determine Cd of Broad crested wier.	
4	To verify the momentum equation.	
5	To determine the discharge of venturimeter.	
6	To determine Manning's &Chezy's coefficient of roughness for the bed of a given flume.	
7	To plot characteristics curve of hydraulic jump.	
8	To plot characteristics curve of Pelton Wheel.	
9	To plot characteristics curve of Centrifugal Pump.	

CE256 **AUTO CAD (3D DESIGN) C (L,T,P) = 1 (0,0,2)**

S.No.	List of Experiments	Hours
1	Conventional signs OF 3D	
2	Plan, Section and Elevation of a single storied residential building in 3D design	
3	Learning Basic commands of CAD 3D software	
4	Drawing conventional signs	
5	Drawing basic building components like door, windows, foundations, Pitched roof like king post truss – 4No	
6	Using Blocks and W blocking	
7	Using layers in drawing	
8	Drawing Plan of a single storied residential building -2No	
9	Drawing Plan of a Two storied residential building using layers	
10	Generating Plan, section and Elevation of a single storied residential building	
11	Generating Plan, section and Elevation of a Two storied residential building	

CE258 **SURVEYLABII** **C(L,T,P)=2(0,0,3)**

S.No.	List of Experiments	Hours
1	To measure the horizontal and vertical angles by Theodolite.	
2	To determine the Height of an object by trigonometrical leveling (single plane method).	
3	To determine the Height of an object by trigonometrical leveling (two plane method).	
4	To shift the R.L. of known point by double leveling.	
5	To measure and adjust the angles of a braced quadrilateral.	
6	To prepare a contour map by indirect contouring.	
7	To prepare the map of given area by Auto Level	
8	To determine the Azimuth of a given line by ex-meridian observations of Sun.	
9	Survey Camp	

CE260 **ENG. MATERIAL &GEOLOGYLAB** **C(L,T,P)=1(0,0,3)**

S.No.	List of Experiments	Hours
	Part I	
1	Identification of Materials by Visual Inspection	
2	To Study the Procedure for Testing of Portland Cement (IS: 269-1967)	
3	To Study the Utilization of Fly Ash	
4	To Study the Procedure for Testing of Stone	
5	To Study the Fiber Reinforced Concrete	
6	To Study the Properties and Use Of Different Glasses	
7	To Study the Different Aluminum and Steel Sections	
8	To Study the Manufacture and Use of Concrete Hollow Blocks	
9	To Determine Compressive and Tensile Strength of Timber Parallel and Perpendicular To Grain	
10	To Study the Properties and Uses of Kota Stone	
11	To Find out the Water Absorption and Tolerance Limit of Bricks	
	Part II	
1	Physical Properties of Minerals	
2	Physical Properties of Rocks	
3	Identification of Minerals in Hand Specimen	
4	Identification of Rocks in Hand Specimen	
5	Identification of Geological features through wooden Models	
6	Structural Geological Diagrams	
7	Petrological Diagrams	
8	Engineering Geological Diagrams	
9	Interpretation of Geological Map (10 Nos.)	
10	Dip & Strike Problems (8 Nos.)	

SURESH GYAN VIHAR UNIVERSITY.
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

V YEAR **V SEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. (Hours)	Weightage (%)	
				L	T/S	P		CE	ESE
PROGRAMME CORE									
1	CE 401	Theory of Structures-I	4	3	1	-	3	40	60
2	CE 403	Design of Concrete Structures-I	4	3	1	-	3	40	60
3	CE 405	Design Steel Structures-I	4	3	1	-	3	40	60
4	CE 409	Quantity Surveying & Valuation	4	3	1		3	40	60
5	CE 351	Design of Steel Structure-I	4	-	-	3	3	60	40
6	CE 353	Structural Engineering Lab	1	-	-	3	3	60	40
7	CE 355	Design of Concrete Structures Lab-I	1	-	-	3	3	60	40
8	CE 357	STAAD Pro. LAb	1	-	-	3	3	60	40
9	CE 359	Estimation, Costing & Professional Practice	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
10	CE 311	Repair And Rehabilitation of Structures	3	3	-	-	3	40	60
11	CE 313	Remote Sensing and GIS	3	3	-	-	3	40	60
12	CE 315	Theory of Pre-stressed	3	3	-	-	3	40	60
UNIVERSITY CORE									
13	PC 301	Proficiency and Co-Curricular Activities – V	2	-	-	-	-	100	
14	EM 301	Employability Skills-IV	1	-	2	-	-	100	
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	30	15	6	15			

Theory (23 Credit) + Lab (04 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examinati**

CE401 THEORY OFSTRUCTURES-I C (L,T,P)= 4(3,1,0)

UNIT	COURSE CONTENTS	Hours
I	Introduction to Indeterminate structures, Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portal with & without sway etc.), releases in structures Maxwell'sreciprocaltheoremandBetti'stheorem.AnalysisofIndeterminateStructuresusing Moment Area method.	8
II	Analysis of Statically Indeterminate Structures using Slope-deflection method and Moment-distribution methods	7
III	Column Analogy method for indeterminate structures, determination of carry over factor for non-prismatic section. Conjugate beam method for analysis of indeterminate structures	7
IV	Energy methods and related theorems, solution of determinate & indeterminate structures using energy methods (i.e. determination of deflection and forces in structures)	7
V	Approximate methods for lateral loads: Analysis of multistory frames by portal method, cantilever method & factor method. Analysis of determinate space trusses by tension coefficient method.	7

Reference Books:

1. StrengthofMaterial&TheoryofStructures.Vol–I&II-B.C.Punmia
2. Mechanics of Structure - S.B.Junarkar.
3. Strength of Material - S.Ramamurtham
4. StrengthofMaterial&TheoryofStructures.Vol–I&II-R.S.Khurmi

CE403 **DESIGN OF CONCRETE STRUCTURES-I** **C (L,T,P) = 3(3,0,0)**

UNIT	COURSE CONTENTS	Hours
I	Design Philosophies: Working stress, ultimate strength and limit states of design. Introduction to working stress method. Analysis and Design of prismatic Sections in flexure using limit state methods: singly and doubly reinforced prismatic sections and lintels	8
II	Design of one way slabs. Shear and Bond: Behavior of beams in shear and bond, design for shear, anchorage, curtailment and splicing of reinforcement, detailing of reinforcement. serviceability Conditions: Limit states of deflection and cracking, calculation of deflections & crack width as per codal provisions	8
III	Design of two way slabs and flat slabs by direct design method.	7
IV	Design of Columns: Short and long rectangular and circular columns, eccentrically loaded columns.	7
V	Design of Column Footings: Isolated and combined column footings and circular raft foundations	7

Reference Books:

1. Design of R.C.C. Structures B.C.Punmia
2. Design of R.C.C. Structures H.J.Shah
3. Design of R.C.C. Structures A.K.Jain

CE405 **DESIGN STEELSTRUCTURES-I** **C (L,T,P) = 3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Introduction:** Types of steels and their permissible stresses **Connections:** Design of riveted, bolted and welded connections under axial and eccentric loadings	7
II	**Compression Member**: Design of compression member; Axially and eccentrically loaded compression members, built up columns, design of lacings and battens.	7
III	**Beams**: Design of beams; simple and compound sections, main and subsidiary beams and their connections, grillage foundation	7
IV	**Tension Members**: Design of axially and eccentrically loaded tension members. **Column Bases**: Design of column bases, Slab base, gusseted base.	**7**
V	Plastic analysis of steel structures, fundamentals, static and mechanism method of analysis, bending of beams of rectangular and I sections beams, shape factor, design of simply supported beams, fixed beams, continuous beams and single spanrectangular Frames	8

REFERECE BOOKS:

1. Limit state Design ofSteelStructure Dr.V.L. Shah & Prof. VeenaGore
2. Limit state Design ofSteelStructure Subramanian

CE409 QUANTITY SURVEYING&VALUATION C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Introduction:** Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill ofquantities.Typesofestimate,plintharearate,cubicalcontentate,preliminary,original,revised and supplementary estimates for different projects.	7
II	**RateAnalysis:**Taskforaverageartisan,variousfactorsinvolvedintherateofanitem,material andlaborrequirementforvarioustrades;preparationforratesofimportantitemsofwork. Current schedule of rates. (C.S.R.)	7
III	**Estimates:** Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.	7
IV	**Cost of Works:** Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building.	7
V	**Valuation:** Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.	7

Reference Books:

1. Estimating & Costing -Chakerborty
2. Estimating & Costing -Vazirani&Chandola
3. CivilEngg.Estimating&Costing–Mahajan
4. CivilEngg.Estimating&CostingG.S.Birdie

CE311 REPAIR AND REHABILITATIONOFSTRUCTURES C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours
I	**Deterioration of concrete in structures:** physical processes of deterioration like F & T abrasion, erosion, pitting, chemical processes like carbonation, chloride ingress, corrosion, alkali aggregate reaction, sulphate attack; their causes, mechanism, effect, preventive measures. **Cracks:** Cracks in concrete, type, pattern, quantification, measurement& preventive measures etc.	8
II	**N.D.T.:**Nondestructivetestmethodsforconcreteincludingreboundhammer,ultrasonicpulse velocity, rebar locator, corrosion meter, penetration resistance and pull out test, core cutting etc. **Corrosion:** Methods for corrosion measurement and assessment includinghalf-cell potential and resistivity, Mapping of data	7
III	**Materials for repair**: polymers and resins, self curing compound, FRP, Ferro cement etc; properties, selection criterion, bonding aspect	7
IV	**Repair Techniques**: grouting, jacketing, shotcrete, externally bonded plates and under water repair; materials, equipments, precautions process etc	7
V	**Investigation for structures**: Distress, observation and preliminary test methods. **Case studies:** related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion damaged structures	7
	Total	**36**

Reference books-:

1. RRS :- V. M.Malhotra

CE313 **REMOTE SENSING&GIS** **C(L,T,P) =3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Deteriorationofconcreteinstructures:** physicalprocessesofdeteriorationlikeF&T abrasion,erosion,pitting,chemicalprocesseslikecarbonation,chlorideingress,corrosion, alkali aggregate reaction, sulphate attack; their causes, mechanism, effect, preventive measures. **Cracks:** Cracks in concrete, type, pattern, quantification, measurement & preventive measures etc.	8
II	**N.D.T.:**Nondestructivetestmethodsforconcreteincludingreboundhammer,ultrasonic pulsevelocity,rebarlocator,corrosionmeter,penetrationresistanceandpullouttest,core cuttingetc. **Corrosion:** Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.	7
III	**Materials for repair**: polymers and resins, self curing compound, FRP, Ferro cement etc; properties, selection criterion, bonding aspect.	7
IV	. **Repair Techniques**: grouting, jacketing, concrete, externally bonded plates and under water repair; materials, equipments, precautions process etc.	7
V	. **Investigation for structures**: Distress, observation and preliminary test methods. **Case studies:** related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion damaged structures.	7

REFERENCE BOOK:-

1. Remote sensing & GIS :-KaliCharanSahu

CE315 **THEORY OFPRESTRESSED** **`C(L,T,P)=3(3,0,0)**

	Course Contents	**Total Contact Hrs.**
I	**Introduction:** Systems of pre-stressing in detail, pre-stressing techniques, transfer of pre-stress, types of commercially available jacks, computation of losses of pre-stress. **Anchorage Zone:** end block stresses, design	6
II	**Cable profiles:** Concordant and non-concordant cable profile and associated factors in continuous members. Modern cable laying: materials & practices, precautions etc. Computation of deflection in pre-stressed concrete members.	6
III	**Design of Pre-stressed Concrete Sections:** Flexural, shear and torsion resistance of members, preliminary and final design of sections, design of pre and post tensioned flexural members; simply supported and continuous members.	7
IV	**Pre-stressed Slab:** Design of slabs, tendon layout, precast slab, production and their applications. **Partial Prestressing:** Principles and advantages, methods, practices and design	10
V	Design of circular pipes and circular water retaining structures etc. Case study of one bridge girder with design and constructional features	8

Reference Books:-

1. Theory of Pre-stress:-RAMAMURTHAM

CE351 **DESIGN OF STEELSTRUCTURESI** **C (L,T,P)=1(0,0,3)**

S.No.	List of Experiments	Hours
1	Design as per syllabus of theory.	

CE353 **STRUCTURALENGINEERINGLAB** **C (L,T,P) =1(0,0,2)**

S.No.	List of Experiments	Hours
1	Deflection of a truss	
2	Clark-Maxwell reciprocal theorem with truss	
3	Funicular polygon for flexible cable	
4	Analysis of redundant frame	
5	Deflection of curved members	
6	Buckling of columns	
7	Clark-Maxwell reciprocal theorem with simply supported beam	
8	ILD for deflection in a steel beam using unit load method	
9	ILD for support reaction using Muller-Breslau Principle	
10	Unsymmetrical bending	

CE353 **DESIGN OF CONCRETESTRUCTURESI** **C(L,T,P)=2(0,0,3)**

S.No.	List of Experiments	Hours
1	Design as per syllabus of theory.	

SURESH GYAN VIHAR UNIVERSITY
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session2021-2022

IIIYEAR **VISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage (%)	
				L	T	P		CE	CE
PROGRAMME CORE									
1	CE 402	Theory of Structures – II	4	3	1	-	3	40	60
2	CE 404	Design of Concrete Structures-II	4	3	1	-	3	40	60
3	CE 406	Design of Steel Structures-II	4	3	1	-	3	40	60
4	CE 408	Environmental Engineering– I	4	3	1	-	3	40	60
5	CE 310	Transportation Engineering-I	4	3	1	-	3	40	60
6	CE 354	Design of Concrete Structures Lab-II	1	-	-	3	3	60	40
7	CE 356	Design of Steel Structures Lab-II	1	-	-	3	3	60	40
8	CE 358	Environmental Engg. Design & Lab. I	1	-	-	3	3	60	40
9	CE 360	Road Materials Testing Lab.	1	-	-	3	3	60	40
ELECTIVE (Select one subject)									
10	CE 312	Modern concrete technology and practice	3	3	-	-	3	40	60
11	CE 314	Construction Equipments and Material Management	3	3	-	-	3	40	60
12	CE 316	Solid Waste Management	3	3	-	-	3	40	60
UNIVERSITY CORE									
13	PC 301	Proficiency and Co-Curricular Activities-VI	2	-	-	-	-	100	
14	EM 301	Employability Skills-IV	1	-	2	-	-	100	
UNIVERSITY ELECTIVE									
15	PC 302	Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**30**	**18**	**5**	**12**			
		Grand total		**32**					

Theory (23 Credit) + Lab (27 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

CE402 THEORYOFSTRUCTURES–II C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Influence line diagram & Rolling load:** ILD for beams & frames, Muller-Breslau principle and its application for drawing ILD, Rolling load, maximum stress resultants in a member/section, absolute maximum stress resultant in a structure	7
II	**Arches**: analysis of three hinged two hinged and fixed type parabolic arches with supports at the same level and at different levels	**7**
III	**Cable and Suspension bridges**: Analysis of cables with concentrated and continuous loading, analysis of two & three hinged stiffening girder.	**7**
IV	**Kani's Method**: Analysis of beams and frames with & without sway by Kani's method	**7**
V	**Unsymmetrical bending**: Definition, location of NA, computation of stresses and deflection, shear center and its location. **Composite Sections:** Flexural analysis of composite sections.	**7**
	Total	**35**

Reference Books:

1. Strength of Material & Theory of Structures. Vol – I& II - B.C. Punmia
2. Mechanics of Structure - S.B.Junarkar.
3. Strength of Material - S.Ramamurtham
4. StrengthofMaterial&TheoryofStructures.Vol –I&II-R.S.Khurmi

CE404 **DESIGN CONCRETESTRUCTURES-II** **C (L,T,P) =4(3,1,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Elements of Pre-stressed Concrete:** Principles and systems, material properties, losses of pre-stress, I.S. specifications, analysis and design of sections for flexure and shear, Introduction to continuous beams.	7
II	**Torsion:** Design of beams for torsion. **Continuous and Curved Beams:** Design of continuous R.C. beams, moment redistribution, beams curved in plan	7
III	**Circular Domes:** Circular domes with u.d.l. & concentrated load at crown. **Yield Line Theory:** Application of Y.L.T. to slabs with simple support conditions.	7
IV	**Water Tanks and Towers:** Water Tanks and Water Towers-design of rectangular, circular and Intze type tanks, column brace type staging.	7
V	**Culverts and Bridges:** Design of slab culverts for I.R.C. loading. Cantilever Retaining Walls: Design of cantilever type retaining walls & introduction and stability analysis of counter-fort and buttress type retaining walls	7
	Total	35

Reference Books:

1. Design of R.C.C. Structures B.C.Punmia
2. Design of R.C.C. Structures H.J.Shah
3. Design of R.C.C. Structures A.K.Jain
4. Design of R.C.C. Structures N. KrishnaRaju

CE406 **DESIGN STEELSTRUCTURES–II** **C (L,T,P) = 3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	Design of gantry girder, Design of roof trusses	7
II	**Design of plate girder**: design of section, connections for flange plate to flange angles & flange angles to web, web and flange splicing. Vertical, Horizontal, Intermediate and Bearing stiffeners. Curtailment of plates.	7
III	**Bridges**: Standard loading for railway bridges, design of Deck type plate-girder bridges, design of bracings and frames. Application of ILD to the design of bridges, design of through type truss bridges, design of members and joints, design of stringers, cross girder, lateral, sway and portal bracings	8
IV	Water tanks, circular tanks with segmental bottoms, rectangular tanks, pressed steel tanks, design of staging.	7
	Total	29

REFERECE BOOKS:

1. Limit state Design ofSteelStructure Dr.V.L. Shah & Prof. VeenaGore
2. LimitstateDesignofSteelStructure Subramanian

CE408 ENVIRONMENTALENGINEERING-I C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**General:**Environmentanditscomponents,Importanceofwater,RoleofanEnvironmental Engineer, Historical overview. **Water Demand:** Design flow, design periods, design population, factors affectingwater consumption, variation in water demand, design capacities for various water supply components.	7
II	**Source of water and collection works:** Alternative sources i.e. rain, surface and ground water, Assessment of yield and development of the source. **Quality of water:** The hydrological cycle and water quality, physical, chemical and biological water quality parameters, water quality requirements, Indian Standards	7
III	**Transmission of water:** Hydraulics of conduits, selection of pipe materials, pipe joints, pumps, pumps station. **Preliminary Treatment of Water:** Historical overview of water treatment, water treatment processes (theory and application): aeration, solids separation, settling operations, coagulation, softening,	7
IV	**Advanced Treatment of Water:** filtration, disinfection, other treatment processes, dissolved solids removal, treatment plant design, preparation of hydraulic profiles.	7
V	**Distribution of water:** Method of distributing water, distribution reservoirs, distribution system,distributionsystemcomponents,capacityandpressurerequirements,designof distribution systems, hydraulic analysis of distribution systems, pumping required forwater	7
	supply system. **Plumbing of Building for water supply:** Service connections, fixture units, simultaneous flow, design of plumbing system.	
	Total	**35**

Reference Books:

1. EnvironmentalengineeringI–Sanjeevsipani(Jainpublications)
2. Environmental engineering & management – Dr. Suresh k.Dhameja

CE310 **TRANSPORTATIONENGINEERING–I** **C (L,T,P) = 3(3,0,0)**

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Introduction**: Importance and Role of Transportation Systems, Technological and Operating Characteristics of Transportation Systems, Components of transportation Systems, Transportation Coordination, Transportation Modes and their comparison. **Highway Planing**: Highway Planning Process, specifically in India, Transport or Highway related Agencies in India, Classification of Roads and Road Development Plans, Road Patterns, Controlling Factors and Surveys for HighwayAlignment.	8
II	**Highway Materials and Construction**: Desirable Properties, Testing Procedures, Standards and standard values relating to Soil, Stone Aggregates, Bitumen and Tar, fly-ash/pond-ash. Methods of constructing different types of roads viz. Earth roads, Stabilized roads, WBM roads, fly ash embankments, Bituminous roads and Concrete roads.Specific features of rural roads	7
III	**Highway Geometric Design**: Cross Sectional Elements, camber, Sight Distances – definition and analysis of SSD and OSD, Design of Horizontal Alignment – Super elevation, extra widening, transition curves. Design of Vertical Alignment – Gradients, Verticalcurves.	7
IV	**Elementary Traffic Engineering**: Significance of different Traffic Engineering Studies viz. Speed, Volume, O & D, Parking and Accident's Study. Importance and types of Traffic Signs, Signals, Road Markings and Road Intersections.	7
V	**Structural design of Highway Pavements**: Design of Flexible Pavements by G. I. and CBR methods. Design of Rigid Pavements by Westergard and modified methods. (As per guidelines of IRC) **Hill Roads**: Special factors in Alignment and Geometric design, Drainage and maintenance of Hill roads. Road side Arboriculture and Landscaping. Recent Developments in Urban Roads and their role in economicdevelopments.	**7**
	Total	**36**

Reference Books:

1. Transportation engineering -S.P.Chandola
2. Transportation engineering- Sanjeevsipani, Rajeevsipani

CE312 MODERN CONCRETE TECHNOLOGYANDPRACTICE C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Total Contact Hrs.
I	**Strength of Concrete:** Strength- porosity relationship, factors affecting compressivestrength, behaviour of concrete under uniaxial, biaxial and triaxial stress states, SplitTensile strength and modulus of rupture -test methods and empirical formulae for theirestimation. Mineral and Chemical admixtures in Concrete: types and their uses.	7
II	**Concrete Production:** Vibrator compacted concrete in buildings, pavements andinfrastructure projects etc., pumpable concrete, roller compacted concrete and ReadyMixed Concrete- methods, specific features and uses etc. **Rheology of Concrete**: Flow ability, Segregation, Bleeding and Viscosity etc. - Factors affecting, methods of determination, related standards etc.	7
III	**Elasticity, Creep and Shrinkage of Concrete:** Elastic behaviour, Method of determination of Elastic modulus, factors affecting modulus of elasticity, early volume change in concrete due to plastic shrinkage, autogeneous shrinkage and drying shrinkage- factors affecting them, typical values and their methods of determination. Creep of concrete- specific creep, typical values, creep recovery, factors affecting creep and its determination with available standard.	8
IV	**Microstructure of Concrete:** Interfacial transition zone, hydration kinetics, hydrated cement paste (hcp), calcium hydroxide, presence of micro-cracks in concrete mass - their characteristics and significance on performance of concrete **Penetrability of Concrete**: Permeability, sorptivity and diffusion in concrete- test methods and significance. **Durability of Concrete**: Physical and chemical processes, recently employed methods of tests for ensuring longer and durable concrete structures- case studies.	7
V	**SpecialAggregates:**Lightweight,heavyweight-theircharacteristicsandusesinconcrete.Specific purpose Concretes and Cement based composites: Self Compacting Concrete,Fiber cements and fiber reinforced cement based composites, Mass Concrete andPolymer Concrete etc.- materials, production and applicationareas. **High performance concrete**- performance characteristics in fresh and hardened states, production precautions - some case studies of specific tailored HPC in India	7

Reference Books

1.MCTP:- P. KUMARMEHTA

CE314 CONSTRUCTIONEQUIPMENTS&MATERIALMANAGEMENT C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours.
I	**Advance Construction Equipments** Different types of construction equipments viz. Earth moving equipments& their outputs, Dewatering equipments, Pumping equipments, Grouting equipments, Pile Driving equipments, Compaction equipments, Concreting equipments.	7
II	**Equipment Management** Planning of construction equipments, Forecasting equipment requirement, Operation & Utilization, Equipment replacement, Manpower planning & Maintenance of equipments	7
III	**Economics of ConstructionEquipments** Operation Cost & Its types. Investment Cost, Cost of Repairs, Overheads Cost accounting, Break-even point theory, Replacement ofequipment	7
IV	**Materials Management** Scope, objectives & importance of materials management, Selective control techniques, Disposal of surplus material.	7
V	**Inventory Control & Spare Part Management** Need, function, steps in inventory control. Advantages, Economic order quantity, Inspection & procurement of spares, stores & stock management	7

Reference Books:-

1. Construction Materials Management - GeorgeStukhart
2. Construction Equipment Management for Engineers, Estimators, and Owners- By Douglas D. Gransberg, Calin M. Popescu, RichardRyan
3. Construction Project Management: - By S. Keoki Sears, Glenn A. Sears, Richard H.Clough

CE316 **SOLIDWASTEMANAGEMENT** **C(L,T,P)=3(3,0,0)**

UNIT	COURSE CONTENTS	Hours
I	**General:** Problems associated with Solid Waste Disposal. **Generation of Solid Waste:** Goals and objectives of solid waste management, Classification of Solid Waste. Solid Waste Generation, Factors Influencing Generation of Solid Waste, Characteristics of Solid Waste, Analysis of SolidWaste.	8
II	**Onsite Handling, Storage and Processing:** Public Health and Aesthetics, Onsite Handling, Onsite, Storage, Dust bins, Community Containers, Container Locations, On-site Processing Methods	**7**
III	**Solid Waste Collections, Transfer and Transport:** Collection Systems, Equipment and Labor requirement, Collection Routes, Options for Transfer and Transport Systems	**7**
IV	**Processing and Disposal Methods:** Processing Techniques and Methods of Disposal, Sanitary land filling, Composting and Incineration, Bioremediation.	**7**
V	**Recovery of Resources, Conversion, Products and Energy:** Material Recovery, Energy Generation and Recovery Operation, Reuse in other industry **Industrial Solid Waste:** Nature, Treatment and Disposal Methods	**7**
	Total	**36**

Reference Books:

1. Solid waste management - SanjeevSipani
2. Solid Waste Management: Principles and Practice-By Ramesha Chandrappa, DigantaBhusanDas
3. Sustainable Solid Waste Management- Jonathan W. C. Wong, Rao Y.Surampalli,
4. Solid and Hazardous Waste Management: Science and Engineering- ByM.N. Rao, Razia Sultana, Sri HarshaKota

S.No.	List of Experiments	Hours
1	Design as per syllabus of theory.	

CE356 DESIGN OF STEELSTRUCTURESII C (L,T,P) = 2(0,0,2)

S.No.	List of Experiments	Hours
1	Design as per syllabus of theory	

CE358 **ENVIRONMENTAL ENGINEERING DESIGN &Lab.I** **C(L,T,P) =1(0,0,3)**

S.No.	List of Experiments	Hours
1	To determine the pH of the given sample of water.	
2	To determine the turbidity of the given sample of water	
3	To determine Total Solids of the given water sample.	
4	To determine the Total Dissolved Solids of the given water sample.	
5	To find out conductivity of the given water sample	
6	To determine hardness of the given water sample	
7	To find out chloride of the given water sample.	
8	To determine alkalinity of the given water sample.	
9	To find out acidity of the given water sample.	
10	To determine hardness of the given water sample	
11	To determine the optimum dose of alum by Jar test.	
12	To study various water supply Fittings	

CE360 **ROAD MATERIALTESTINGLAB** **C(L,T,P) =1 (0,0,3)**

S.No.	List of Experiments	Hours
1	Aggregate impact test	
2	Angularity number test	
3	To determine fineness modulus of a given sample of coarse aggregate.	
4	Los angles abrasion test	
5	Aggregate crushing value test	
6	Standard tar viscometer test	
7	Specific gravity and water absorption test	
8	To determine the elongation index for given sample of aggregate.	
9	determine the flakiness index of given sample of aggregate	
10	Ductility test	
11	To determine the softening point for give sample of bitumen	
12	Marshell stability test	
13	Float test	

SURESH GYAN VIHAR UNIVERSITY
Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

VI YEAR **VIISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage (%)	
				L	T	P		CE	ESE
PROGRAMME CORE									
1	CE 401	Geotechnical Engineering – I	4	3	1	-	3	40	60
2	CE 403	Water Resources Engineering –I	4	3	1	-	3	40	60
3	CE 405	Environmental Engineering– II	4	3	1	-	3	40	60
4	CE 407	Building Design	4	3	1	-	3	40	60
5	CE 409	Transportation Engineering – II	4	3	1	-	3	40	60
6	CE 451	Geotechnical Engg. Design & Lab.-I	1	-	-	3	3	60	40
7	CE 453	Water Resources Engineering Design-I	1	-	-	3	3	60	40
8	CE 455	Environmental Engg. Design & Lab. II	1	-	-	3	3	60	40
9	CE 457	Industrial Training &Seminar	2	-	-	3	3	60	40
10	CE 459	Project-Stage I	2	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 411	Earthquake Resistant buildingDesign	3	3	-	-	3	40	60
12	CE 413	Ground Improvement Techniques	3	3	-	-	3	40	60
13	CE 415	Smart cities and Automation	3	3	-	-	3	40	60
UNIVERSITY CORE									
14	PC 301	Proficiency and Co-Curricular Activities-VII	2	-	-	-	-	100	
15	EM 301	Employability Skills-VI	1	-	2	-	-	100	
UNIVERSITY ELECTIVE									
16		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**30**	**18**	**5**	**15**			

Theory (23 Credit) + Lab (07 Credit) +Proficiency in Co-curricular Activities (2 Credit) + Employability skills (01 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

CE401 **GEOTECHNICALENGINEERING-I** **C (L,T,P) = 4(3,1,0)**

UNIT	COURSE CONTENTS	Hours
I	Soilandsoil-massconstituents,watercontent,specificgravity,voidratio,porosity,degreeof saturation, air void and air content, unit weights, density index etc. Inter-relationships of the above.Determinationofindexpropertiesofsoil:watercontent,specificgravity,particlesize distribution,sieveandsedimentationanalysis,consistencylimits,voidratioanddensityindex. Classificationofsoilforgeneralengineeringpurposes:particlesize,textural,H.R.B.Unified and I.S. Classification systems	8
II	Clay mineralogy: Soil structure; single grained, honeycombed, flocculent, and dispersed, structure of composite soils, clay structure; basic structure, mineral structures, structures of Illite Montmorilinite and kaolinite and their characteristics. Soil water absorbed, capillary and freewater,Darcy'slawof permeabilityof soilanditsdeterminationinlaboratory.Field pumping out tests, factors affecting permeability, permeability of stratified soil masses.	7
III	Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quicksand phenomenon. Seepage and Seepage Pressure, Laplace'sequation forseepage.Flownetandits construction.Upliftpressure,piping,principle of drainage by electro Osmosis, phriatic line, Flow net through earth dam	6
IV	Mohr's circle of stress, shearing strength of soil, parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear Box. Triaxial and unconfined compression test apparatuses. Typical stress-stain curves for soils. Typical failure envelopes for cohesion less soils and normally consolidated clay soils	7
V	Principles of soil compaction,laboratory compactiontests; Proctor'stestModifiedProctortests, Measurement of field compaction, field methods of compaction and its control, dry and wet of optimum, factors affecting compaction. Soil stabilization, Mechanical Stabilization. Stabilization with cement, lime and bitumen	7
	Total	**35**

Reference Books:

5. **Soil mechanics:-GopalRanjan**
6. **Geotechnical engineering -B.C.P.,- Arunkumarjain, Ashokkumarjain**

CE403 WATER RESOURCES ENGINEERING–I C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Hours
I	Introduction: Definitions, functions and advantages of irrigation, present status of irrigation in India, classification for agriculture, soil moisture and crop water relations, Irrigation water quality. Consumptive use of water, principal Indian crop seasons and water requirements, multiple cropping, hybrid crops, water harvesting and conservation	8
II	Canal Irrigation: Types of canals, parts of canal irrigation system, channel alignment, assessment of water requirements, estimation of channel losses, design of channels, regime and semi theoretical approaches (Kennedy's Theory, Lacey's Theory), cross section of channels,silt control in canals. Water Distribution System: Rotational delivery (Warabandi, JamaBandi, KhasraBandi,SajraSheets),continuousdeliveryanddeliveryondemand,Roleofcommand area development authority, Functions and organizational structures	9
III	Distribution of Canal Water: System of regulation and control, outlets, assessment of canal revenue. Hydraulics of Alluvial Rivers : Critical tractive force, regimes of flow, resistance relationship for natural streams, bed load, suspended load and total equations, different stages of rivers, meandering, aggradations, and degradation, river training & bank protection works	7
IV	Water Logging: Causes, preventive and curative measures, drainage of irrigated lands, saline and alkaline lands, types of channels lining and design of lined channel. Well Irrigation: Open wells and tube wells, types of tube wells, duty of tube well water	7
V	Hydrology:Definition,Hydrologiccycle,ApplicationtoEngineeringproblems,measurementof rainfall, rain gauge, peak flow, flood frequency method, catchment area formulae, Flood hydrograph,Rainfallanalysis,Infiltration,Runoff,Unithydrographanditsdetermination, Estimation of run off	7
	Total	**38**

Reference Books:

1. **Water resources engineering – Murty,challasatya**
2. **Water supply and sanitary installations – Panchdhari,A.c.**

CE405 **ENVIRONMENTALENGINEERING-II** **C (L,T,P) = 4(3,1,0)**

UNIT	COURSE CONTENTS	Hours
I	General: Terms: sewerage, domestic sewage, sewage treatment, disposal scope, Role of an Environmental engineer, historical overview. Sewage Characteristics: Quality parameters: BOD, COD, TOC, Solids, DO, Nitrogen, Phosphorus, Standards of disposal into natural watercourses and on land, Indian standards	8
II	Collection of Sewage: Systems of sewerage, Separate, combined, and partially separate, components of sewerage systems, systems of layout, quantity of sanitary sewage and variations, quantity of storms water, rational method, shapes of sewer, Hydraulic design of sewers: diameter self cleansing velocity and slopes, construction and testing of sewer line, Sewer materials, joints and appurtenances, Sewage pumping and pumping stations, maintenance of sewerage system	8
III	Sewage Treatment: Various units: their purpose, sequence and efficiencies, preliminary treatment, screening and grit removal units, oil and grease removal, primary treatment, secondary treatment, activated sludge process, trickling filter, sludge digestion and drying beds, stabilization pond, septic tank, soakage systems, recent trends in sewage treatment, advanced wastewater treatment :nutrient removal, solids removal	8
IV	Wastewater Disposal and Reuse: Disposal of sewage by dilution, self-purification of streams, sewage disposal by irrigation sewage farming, waste waters reuse. Plumbing for Design of Buildings: Various systems of plumbing – one pipe, two pipes, single stack, traps, layout of house drainage	7
V	Air and Noise Pollution: Air quality, Emission standards, vehicular pollution, Effect of air pollution on human health, Noise Pollution, global effect of air and noise pollution, green house effect, acid rain etc	7
	Total	**38**

Reference Books:

1. Environmental engineering I – Sanjeevsipani (Jain publications)
2. Environmental engineering & management – Dr. Suresh k.Dhameja

CE407 **BUILDINGDESIGN** **C(L,T,P)= 4(3,1,0)**

UNIT	COURSE CONTENTS	Hours
I	Design Loads: Design loads for different types of buildings. (IS-875 part 1 & 2). Load distribution & concept of load flow to different structural components. Structural Systems: Assumption of integrity aspect ratios & over turning resistance, strength & stiffness of buildings, symmetry and Asymmetry in building forms, Vertical and lateral load resting elements, shear walls, framed tubes and various multistory configurations.	8
II	Lateral loads: Wind loads & calculation of wind load on structures (IS: 875-Part 3)	7
III	Lateral loads: Earthquake loads & calculations of earthquake loads on buildings masonry & framed structures. (IS: 1893 – Part 1)	7
IV	Masonry and Framed Buildings: Design of masonry buildings and framed buildings, Earthquake resistant construction of buildings, and various provisions as per IS codes; IS-4326, IS-13827, IS-13828, IS-13920,IS-13935	7
V	Mass Housing: Prefabricated construction for mass housing. Special Roofs: Introduction to folded plates, cylindrical shells, north-light shell roofs, grid and ribbed floors.	7
	Total	**36**

Reference Books:

1. Building planning & design of RCC structure –Kumarjitsingha
2. Construction planning &management – Dhir,B.M.
3. Engg. Drawing + Auto CAD – Venugopal,K.

CE409 **TRANSPORTATION ENGINEERING–II** **C (L,T,P) = 4(3,1,0)**

UNIT	COURSE CONTENTS	Hours
I	Introduction and Permanent Way Components: Types and Selection of Gauges, Selection of Alignment, Ideal Permanent Ways and Cross-sections in different conditions, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings. Study of Specific Aspects: Coning of Wheels, Creep, Wear, failures in Rails, Rail Joints, Length of Rail, Sleeper Density and Spacing, Stations, Yards and Sidings, Turn-Table, Signaling	8
II	Points and Crossings: Types of Turnouts, Points or Switches, layout Plans of different types of Crossings, Design calculations of turnouts. Railway Systems Specific to Urban Movements: Surface railways (sub urban railway system of Mumbai, Chennai and Delhi), Underground system (Metro of Kolkata/ Delhi), Elevated Systems (as Proposed for Jaipur, Delhi, Mumbai), Light Rail System (MRTS, Thane). Recent Developments in Railway Networking	8
III	Geometric Design: Gradient and Grade Compensation, Super elevation and cant, cant deficiency, Types of Curves, Transition curves, their designs, Widening of Gauges	7
IV	Airport Engineering:-Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size, Obstructions, Zoning. Planning and Design of Airport: Requirements of Airport, Planning of Terminal Area, and different Layouts, Location of Gates, Types of Runway patterns, Runway Layout, Runway Length, Geometric Design of Runways, Layout of Taxiways, Geometric Standards, Exit or Turnaround Taxiways, Apron and Hangers	7
V	Airport Pavement Design: Factors Affecting Pavement Design, Design methods of Flexible Pavements, Design methods of Rigid Pavements	7
	Total	**37**

Reference Books:

1. **Transportation engineering -S.P.Chandola**
2. **Transportation engineering- Sanjeevsipani, Rajeevsipani**

CE411 EARTHQUAKE RESISTANT DESIGN&CONSTRUCTION C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours
I	Introductory Seismology: Various terminology related with earthquake, Causes of earthquake, plate tectonics, Tsunami. Seismic wave propagation. Magnitude, intensity & energy of earthquake, magnitude & intensity scales, classifications of earthquakes, Seismic zoning case histories of earthquakes. Seismic hazards, induced hazards.	8
II	Earthquake recording, Seismic instruments, Seismographs & Seismograms. Basic concept of liquefaction and isolation. Introduction to various IS related codes. Structural systems, Effects of earthquake on buildings in general, structural and nonstructural failures. Dynamic characteristics of buildings, natural period of vibration, damping, stiffness etc. Seismic performance of traditionally built masonry constructions, typical failure mechanism of masonry buildings under earthquakes	8
III	IS 4326: 1993: Planning consideration & architectural concept, provisions for earthquake resistant construction/ seismic strengthening of masonry constructions	7
IV	Seismic performance of reinforced concrete buildings. Plan, elevation & stiffness irregularities & their effects. Typical earthquake damages of RC constructions, short column effect, soft storeyeffect,strongcolumn-weakbeamanalogy.IS13920:1993:Ductiledetailingofreinforced concrete buildings and shear wall concept	7
V	Seismic design philosophy, IS 1893 (part I):2002 codal provisions : Load combinations, Design lateral loads, response reduction factors, structural modeling of building frames, equivalent load method for earthquake analysis of multistoryframes	7
	Total	**37**

Reference Books:

1. **Earthquake Geography – Srivastava,H.N.**
2. **Earthquake Resistant Design of Structures by Aggarwal P**
3.

CE413 GROUNDIMPROVEMENTTECHNIQUE C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours
I	Introduction: Formation of soil, major soil types, collapsible soil, expansive soil, reclaimed soil, sanitary land fill, ground improvements; objective, potential. General principles of compaction: Mechanics, field procedure, quality control in field	7
II	Ground Improvement in Granular soil: In-place densification by (a) Vibro floatation (b) Compaction piles in sand(c) Vibro compaction piles (d)Dynamic compaction (e) Blasting	7
III	Ground improvement in cohesive soil: Preloading with or without vertical drains. Compressibility vertical and radial consolidation, Rate of consolidation, Preloading methods. Types of drains, Design of vertical drains, Construction techniques. Stone column: Function, Design principles, load carrying capacity, construction techniques, settlement of stone column foundation.	8
IV	Ground Improvement by Grouting & Soil Reinforcement : Grouting in soil: Types of grout, desirable characteristics, Grouting pressure, Grouting methods. Soil Reinforcement – Mechanism, Types of reinforcing elements, Reinforcement- Soil interaction, Reinforcement of soil beneath roads, foundation	8
V	Soil Stabilization: Lime Stabilization – Base Exchange mechanism, Pozzolonic reaction, lime-soil interaction, lime columns, Design of foundation on lime column. Cement stabilization-Mechanism, amount, Age and curing. Fly ash-Lime stabilization Soil bitumen stabilization	7
	Total	**37**

Reference books-: Dr. P. Purushothama Raj

CE415 **SMARTCITIESANDAUTOMATION** **C(L,T,P)=4(3,1,0)**

UNIT	CONTENTS	Total Contact Hrs.
I	**Smart Cities and the Data Revolution: Past, Present and Future**: Historical relationshipbetweenurbanizationandinformationtechnology,contemporaryurbanization, riseofubiquitouscomputing,the"smartcities"movement,keystakeholders,model"smart cities"inKoreaandAbuDhabi,bigurbandata,emergingconflictsandprecedentsin20th urban policy, planning and design.	8
II	**Technology and Local Government:** Local government emergent role as master integrator of smart city solutions, Application areas for technology-enabled infrastructure, service deliveryandgovernancesolutions,Leadingcities,Opengovernmentmovementandopen data, Long-range technology strategy and digital master planning.	8
III	**Urban Automation & Predictive Analytics:** Origins of cybernetics and computer simulation of citiesandurbanpolicy,theriseandfall of bigurbanmodels,evolution of GIS andplanningsupportsystems,decision-supportsystems,predictiveurbananalyticsandbig urbandata,role of technology companies,thinktanks,anduniversitiesastechnicaladvisors tocitygovernments,NYCMoDA,IBM'sPortlandsystemdynamicsmodel.	8
IV	**Urban Innovation: New Leadership Roles:** Driving forces behind city government digital servicesandinfrastructureinnovation,newinnovationleadershiproles,responsibilitiesand initiativestheyhavepursued, emergingnetworksforharvesting,standardizingandcross-fertilizinggoodideasforintelligentcitypolicy,planninganddesign,CityMartandCodefor America,thelinkagebetweeneconomic developmentpolicyandurbanplanningandlocal technology innovation clusters.	7
V	**Intelligent Cities of the Future: Science and Design** Smart cities as enablers of data-driven urban research, the new urban science, institutions and implications, social physics, past and present, critiques, citizen urban science movement, emerging models for collaborative university-government-citizen research, Patrick Geddes andtheGardenCitymovement,civicprinciplesforsmart-citymaking,forecastingurban futures and future-proofing intelligent systems and policy.	7

Reference Books:

1. Smart Cities: Foundations, Principles, and Applications By Houbing Song, Ravi Srinivasan, Tamim.
2. SmartCities:DevelopmentandGovernanceFrameworksbyZaighamMahmood

CE451 GEOTECHNICAL ENGG.DESIGN AND LABI- C(L,T,P)= 1(0,0,3)

S.No.	List of Experiments	Hours
1	Grain size distribution by sieving.	
2	Determination of water content by Pycnometer.	
3	Determination of specific Gravity by Pycnometer.	
4	DeterminationofliquidlimitbyCasagrande'sapparatus.	
5	Determination of liquid limit by cone penetrometer.	
6	Determination of plastic limit	
7	Determination of shrinkage limit	
8	Determination of field density by core-cutter	
9	Determination of field density by sand replacement method	
10	Determination of compaction properties by standard Proctor Test Apparatus	
11	Determination of C-Ø values by Direct Shear Test Apparatus	
12	Determination of unconfined compressive strength by unconfined compression Test .Apparatus Design as per syllabus of theory.	

CE453 WATERRESOURCESENGINEERINGDESIGN–I C(L,T,P)=1(0,0,3)

S.No.	List of Experiments	Hours
1	Design as per syllabus of theory.	

CE455 ENVIRONMENTAL ENGG. LAB.& DESIGN–II C(L,T,P)=1(0,0,3)

S.No.	List of Experiments	Hours
1	To determine the pH of the given sample of sewage.	
2	To determine Total Solids of the given sewage sample	
3	To determine the Total Dissolved Solids of the given sewage sample.	
4	To find out Total Settle-able Solids of the given sewage sample.	
5	To determine Total Suspended Solids of the given sewage sample.	
6	Tofind outtheQuantity of DissolvedOxygenpresentinthegivenwatersamplebyWinkler's Method.	
7	To determine Biochemical Oxygen Demand exerted by the given wastewater sample	
8	To find out Chemical Oxygen Demand of the waste water sample.	
9	To study various Sanitary Fittings	
10	Design as per syllabus of theory	

SURESH GYAN VIHAR UNIVERSITY

Department Of Civil Engineering
Teaching and Examination Scheme for B.Tech Civil Engg.
Session 2021-2022

IVYEAR **VIIISEM**

S.No.	Course Code	Course Name	Credits	Contact Hrs/ Wk.			Exam. Hours	Weightage (%)	
								CE	ESE
				L	T	P			
PROGRAMME CORE									
1	CE 402	Geotechnical Engineering–II	4	3	1	-	3	40	60
2	CE 404	Water Resources Engineering-II	4	3	1	-	3	40	60
3	CE 406	Project Planning & Construction Management	4	3	1	-	3	40	60
4	CE 452	Geotechnical Engg. Design & Lab.-II	1	-	-	3	3	60	40
5	CE 454	Water Resources Engineering Design-II	1	-	-	3	3	60	40
6	CE 456	Professional Practice and Estimating	1	-	-	3	3	60	40
7	CE 458	Design of Foundations Lab	1	-	-	3	3	60	40
8	CE 460	Revit Architecture	1	-	-	3	3	60	40
9	CE 462	Seminar	1	-	-	3	3	60	40
10	CE 464	Project-Stage II	2	-	-	3	3	60	40
ELECTIVE (Select one subject)									
11	CE 408	Bridge Engineering	3	3	-	-	-	-	-
12	CE 410	Advance Foundation Engineering	-	-	-	-	-	-	-
13	CE 412	Advanced Transportation Engg.	-	-	-	-	-	-	-
UNIVERSITY CORE									
14	HS 402	Intellectual Property Rights	2	2	-	-	3	40	60
UNIVERSITY ELECTIVE									
15		Students can opt from the list of university Elective	1	-	-	-	-	-	-
		Total	**22**	**14**	**3**	**21**			

Theory (17 Credit) + Lab (08 Credit) = 30 Credit

L= Lecture **T=Tutorial** **CE=Continuous Evaluation**
S= Seminar **P= Practical** **ESE= End Semester Examination**

CE402 **GEOTECHNICAL ENGINEERING–II** **C (L,T,P) = 3(3,0,0)**

UNIT	COURSE CONTENTS	Hours
I	Stresses in Soil under surface loading: Bossinesq's and Westergaard's analysis for vertical pressure and its distribution in a soil mass. Vertical stresses due to concentrated loads, Horizontal and shear stresses due to concentrated loads. Isobar diagram, Vertical stress distribution on a horizontal plane. Influence diagram. Vertical stresses at point under line load and strip load. Vertical stresses at a point under circular and rectangular loaded area. Approximatemethods of obtainingverticalpressureduetosurfaceloading.Newmark's chart, Fensk's Chart. Pressure bulb and its significance in Foundation exploration. Contact pressure below foundations	8
II	Compressibility and Consolidation: Introduction to consolidation, comparison of compaction and consolidation, Spring Analogy Terzaghis one dimensional consolidation theory, Degree of consolidation, consolidation test, Compressibility parameters, co-efficient of consolidation. Preconsolidation pressure and its determination. Normally, over and under consolidated soils. Methods of predicting Settlement and its rate. Total and differential Settlement.	7
III	Stability of Slopes: Classifications of slopes, Stability analysis of infinite slopes. Stability of finiteslopesbySwedishandFriction circlemethod.Taylor'sstabilitynumber curves.Stability of slopes of earthen embankments under sudden draw down, steady seepage and during construction. Bishop's method of stability analysis. Site Investigations: Methods of explorations. Planning of Investigations, Depth of exploration, Number of boreholes, Undisturbed and Disturbed samples. Types of samplers. Brief description of procedures of sampling, Transportation and Storage of samples. Geophysical methods of Investigations	8
IV	Earth Pressure: Active, passive and earth pressure at rest. Rankine's and Coulomb's theories. Rebhann'sandCulman'sgraphicalmethods foractiveearthpressure forverticalandinclined back retaining walls, horizontal and inclined cohesion less back fill. Stability analysis of retaining walls. Earth pressure on cantilever sheet piles, rigid bulk heads	8
V	Bearing Capacity of Soils: Terminology related to bearing capacity, Common types of foundations. Terzaghi and Meyehoff's theory for bearing capacity. Rankine's method for minimum depth of foundation. Skempton's method. Effect of eccentricity and water table on bearing capacity. IS code method, Plate load and penetration tests for determining bearing capacity. Introduction to pile, well and machine Foundations.	8
	Total	**39**

Reference Books:

3. **Soil mechanics:-GopalRanjan**
4. **Geotechnical engineering -B.C.P.,- Arunkumarjain, Ashokkumarjain**

CE404 WATER RESOURCESENGINEERINGII C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Hours
I	Regulationofworks:Falls,Classificationoffalls,Designoffalls,Distributoryheadregulator and cross-head regulator, Escape, bed bars. Cross-Drainage Structure: Necessity of Cross-drainage structures, their types and selection, comparative merits and demerits, design of varioustypesofcross-drainagestructure-aqueducts,syphonaqueduct,superpassagesyphon, level crossing and other types	8
II	DiversionHeadworks:Designforsurfaceandsubsurfaceflows,Bligh'sandKhosla'smethods. Selection of site and layout, different parts of diversion headworks, types of weirs and barrages, design of weirs on permeable foundation, silt excluders and different types ofsilt ejectors. Energy dissipation.	8
III	EmbankmentDams:Suitablesites,causesoffailures,stabilityandseepageanalysis,flownet, slope stability analysis, precautions of piping, principles of design of earth dams. Gravity Dams: Force acting on a gravity dam, stability requirements,Instrumentation.	7
IV	Spillways: Spillway capacity, flood routing through spillways, different types of spillways and gates, energy dissipation below spillways. Hydro Power Plant: General features of hydroelectricschemes,elementsofpowerhousestructure,selectionofturbines,drafttubeand setting of turbine, cavitations	7
V	Reservoirs: Evaluation of impact of water projects on river regimes and environment. Reservoir sedimentation and water shed management. Optimization: Introduction to optimization techniquesandsystemapproach.IntroductiontoG.I.S.andComputeraidedirrigationdesign	7
	Total	**37**

Reference Books:

3. **Water resources engineering – Murty,challasatya**
4. **Water supply and sanitary installations – Panchdhari,A.c.**

CE406 PROJECT PLANNING &CONSTRUCTIONMANAGEMENT C (L,T,P) = 4(3,1,0)

UNIT	COURSE CONTENTS	Hours
I	FINANCIALEVALUATIONOFPROJECTSANDPROJECTPLANNING:Capitalinvestment proposals, criterions to judge the worth whileness of capital projects viz. net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure. Categories of construction projects, objectives, project development process, Functions of projectmanagement,Projectmanagementorganizationandstaffing,Stagesandstepsinvolved in project planning, Plan development process, objectives of construction project management.	8
II	PROJECTSCHEDULING:Importanceofprojectscheduling,projectworkbreakdownprocess– determining activities involved, work breakdown structure, assessing activity duration, durationestimateprocedure,Projectworkscheduling,Projectmanagementtechniques–CPM and PERT networks analysis, concept of precedence network analysis	7
III	PROJECT COST AND TIME CONTROL: Monitoring the time progress and cost controlling measuresinaconstructionproject,Timecosttrade-offprocess:directandindirectprojectcosts, cost slope, Process of crashing of activities, determination of the optimum duration of aproject, updating of project networks, resources allocation	8
IV	CONTRACT MANAGEMENT: Elements of tender operation, Types of tenders and contracts, Contract document, Legal aspects of contracts, Contract negotiation & award of work, breach of contract, determination of a contract, arbitration	7
V	SAFETY AND OTHER ASPECTS OF CONSTRUCTION MANAGEMENT: Causesand prevention of accidents at construction sites, Safety measures to be followed in various construction works like excavation, demolition of structures, explosive handling, hot bitumen work. Project Management Information System – Concept, frame work, benefits of computerized information system. Environmental and social aspects of various types of construction projects	8
	Total	**38**

Reference book :- Dr. sanjeevsipani

CE408 BRIDGEENGINEERING C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours
I	Introduction: Type of bridges & classification of road & railways bridges. IRC & Railway loadings for bridges, wind load & Earthquake forces. Steel bridges Design of through type & deck type steel bridges for IRC loading. Design of deck type & through type truss bridges for railway loadings	7
II	Reinforced concrete culverts & bridges: Reinforced concrete slab culvert, T-beam bridges-courbons& Hendry-Jaegar methods. Design of balanced cantilever bridge	7
III	Prestressed Concrete bridges: Prestressed& Post stressed concrete bridges Design of deck slab & girder sections	7
IV	Bearings: Bearings for slab bridges and girder bridges. Elastomeric bearings, design concepts as per IRC 83 (Part II)	7
V	Joints: Expansion joints	7
	Total	**35**

Reference Books:

1. **Bridge Engg. S.P.Bindra**
2. **Railway Bridges and Tunnels Vazirani andChandola**
3. **Railway Bridges and Tunnels G.C.Singh**

CE410 ADVANCEDFOUNDATIONENGINEERING C (L,T,P) = 3 (3,0,0)

UNIT	COURSE CONTENTS	Hours
I	Shallowfoundation:Methodsofestimationofbearingcapacitycomputationofbearingcapacity factors, Effect of eccentric and inclined loads effect of water table on bearing capacity, Meyerhof's analysis, Bearing capacity of stratified soils, Methods of estimation of settlementof footings	6
II	Limits of settlements for various structures, Indian Standard Code Provisions (IS: 1904, 6403, 8009).DeterminationofallowablebearingcapacityasperIScode.Schemartman'smethod,Dee beer'sandMortinmethodoffindingoutsettlementfromstaticconepenetrationtest.Methods of finding out bearing capacity from plate load test, standard penetration test data	7
III	Pile foundations: types of pile and their use, modes of failure. Bearing capacity and settlement of pile foundation. Types of piles, Allowable load, Pile load test, Dynamic and static formulae. Bearing Capacity factors. Pile group bearing capacity and settlement. Negative skin friction. Behaviorof pilesunderlateralloading.Winkler'sassumption.Pileresistanceanddeflection under lateral loads, elastic method, Brooms method	8
IV	Foundation on difficult Soils: Collapsible soil; identification, Collapse settlement: foundation design. Sanitary land fills settlement of sanitary land fill. Expensive soils: Behaviour of expansive soil, foundation practices, under-reamed piles. Methods of finding out load carrying capacity of under reamed piles in clayey and sandy soil. Provision of IS 2911 Part III-1980 for design of under-reamed pile foundations	8
V	Raft foundation: common types of raft, combined footing. Bearing capacity of raft, differential settlement of raft; semi empirical method of design of raft foundation. Well foundations: design and construction. Bearing capacity, settlement and lateral resistance. Tilts and shifts, IS and IRC codes methods	7
	Total	**36**

Reference Books:

1. Advanced foundation Engineering by B.C Pun

CE412 ADVANCETRANSPORTATIONENGINEERING C (L,T,P) = 3(3,0,0)

UNIT	COURSE CONTENTS	Hours
I	Traffic Studies: Road inventories, Traffic Volume Studies, Spot Speed Studies, Travel Time and delay Studies, Origin-Destination studies, Methodology and Analysis of O-D data, Traffic capacity,Parkingstudiesandcharacteristics,Accidentstudiesandcharacteristics,causesand preventive measures	7
II	Statistical Methods for Traffic Engineering: Elementary concepts and Probability, Mean, Standard Deviation and variance, Poisson and Binomial Distribution, Normal distribution, sampling Theory and Significance testing, Linear Regression and correlation	7
III	Traffic Characteristics: Macroscopic and Microscopic Characteristics related to Volume, Speed and Density, their relationships, Road User Characteristics – Human and vehicular Characteristics. Traffic Engineering Design: Principles of Road Junction design, Design of Roundabouts, Bus Stops and Parking Lots, Design of Signals	8
IV	Traffic Management: Traffic Laws, Regulations and Ordinances for Drivers, Pedestrians and Mixed Traffic. Traffic control Measures – One Way streets, Kerb Parking Control, Intersection Control, Speed Control, Access Control. Expressways. Traffic Control Devices – Traffic Markings, Signs, Signals, Traffic Islands, their Classification, types and Sketches, Street Lighting	8
V	Traffic and Environment: Detrimental Effects of Traffic on the environment – air pollution, noise pollution, visual intrusion, aesthetics etc. Road Safety: The identification of problem, causation and Prevention, Road layout and Improvements, Safety equipment	7
	Total	**37**

Reference Books:

1. **Transportation engineering -S.P.Chandola**
2. **Transportation engineering- Sanjeevsipani, Rajeevsipani**

CE452 GEOTECHNICAL ENGG. DESIGN AND LAB.–II C (L,T,P)=1(0,0,2)

S.No.	List of Experiments	Hours
1	To determine the differential free swell index of soil.	
2	To determine the compressibility parameters of soil by consolidation test.	
3	To determine the swelling pressure of soil.	
4	. To determine the shear strength parameters of soil by tri-axial test.	
5	To determine the permeability of soil by constant and falling head methods	
6	To determine the CBR of soil.	
7	To determine the grain size distribution of fine grained soil by Hydrometer. Design as per syllabus of theory.	

CE454 WATER RESOURCES ENGINEERING DESIGN–II C (L,T,P) =2(0,0,2)

S.No.	List of Experiments	Hours
	Design as per syllabus of theory.	

CE456 PROFESSIONAL PRACTICESANDESTIMATING C(L,T,P) =1(0,0,2)

S.No.	List of Experiments	Hours
1	Estimates – Methods of building estimates, types; site plan, index plan, layout plan, plinth area, floor area; Technical sanction, Administrative approval; estimate of buildings, roads, earthwork and R.C.C. works.	
2	Analysis of rates- for earthwork, concrete work, D.P.C., stone masonry,, plastering, pointing and roadwork	
3	Specifications- For different classes of building and Civil Engineering works	
4	Types of contracts – Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and work order.	
5	Arbitration	
6	Valuation of real estate	

CE458 DESIGNOFFOUNDATION C (L,T,P) = 1(0,0,3)

S.No.	List of Experiments	Hours
1	Design of isolated shallow footings, combined footings, raft foundations.	
2	Design of pile foundations.	
3	Design of wells and cessions	
4	Design of machine foundation.	
5	Design of retaining structures etc.	

CE460 REVITARCHITECTURE C (L,T,P) =1(0,0,3)

S.No.	List of Experiments	Hours
	Design as per Revit Insight 360(latest Version)	