।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

Phone: (02462) 229542
Fax : (02462) 229574

Website: www.srtmun.ac.in

E-mail: bos.srtmun@gmail.com

संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील अभियांत्रीकीच्या पदवी स्तरावरील अंतीम वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील अभियांत्रीकीच्या पदवी स्तरावरील अंतीम वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

B. E. final year - Electrical Engineering

B. E. final year - Computer Engineeing

B. E. final year - Mechanical Engineering

B. E. final year - Civil Engineering

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.

जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/८९

दिनांक : २४.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

CURRICULUM

For

UNDERGRADUATE DEGREE COURSES IN

FOURTH YEAR

CIVIL ENGINEERING

(Engineering & Technology)

[Proposed from 2021-22]

For

Swami Ramanand Teerth Marathwada University Nanded

Semester VII (Fourth Year)
Branch/Course B.Tech Civil Engineering

Sr. No.	Category	Code	Course Title	Hours per week				Marking Scheme					Theory Total
				L	T	P	C	PR	OR	TW	MSE	ESE	
1	Professional Elective courses	PEC-CEEL701	Elective III A. Irrigation Engineering & Plumbing Techniques B. Advance Concrete Technology	3	1	0	4	-	-	25	30	70	125
2	Professional Core courses	PCC-CE702	Architectural & Town Planning	3	0	2	4	-	-	25	30	70	125
3	Professional Core courses	PCC-CE703	Quntity Surveying, & Contracts	3	0	2	4	-	-	50	30	70	150
4	Professional Core courses	PCC-CE704	Transportation Engineering-II (Railways, Dock & Harbours)	3	1	0	4	-	-	25	30	70	125
5	Humanities and Social Sciences including Management courses	HSMC705	Interview Techniques & Mock Exercises	0	0	2	1	-	50 @	25	-	-	75
6	Professional Core courses	PCC-CE706	Structural Analysis/Ground Water Modelling (only Software)	0	0	2	1	25#	25	-	-	-	50
7	Project	PROJ-CE707	Project-I (Project work & Seminar)	0	0	6	3	-	50 @	50	-	-	100
8	Humanities and Social Sciences including Management courses	HSMC708	Assessment of Industrial Internship (at start of Semester VII)	0	-	-	2	-	25#	25	-	-	50
Total				**12**	**1**	**16**	**23**	**50**	**125**	**225**	**120**	**280**	**800**
Grand Total				**29**									

Symbols to remember: -@ - Internal Assessment, # - External Assessment T – Theory , P– Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination.

Dr. M. L. Waikar,	**Dr. N. H. Kulkarni**	**Dr. P. B. Ullagadd**	**Dr. Vijay Pawar**	**Prof. Zaker Ullah Khan**
Shri Guru Govind Singhji	Head of Department	Professor	Gramin College	Gramin College
Institute Of Engineering	SGGS I.E	SGGS I.E	of Engineering	of Engineering
And Technology	And Technology	And Technology	Vishnupuri ,Nanded.	Vishnupuri ,Nanded.
Vishnupuri ,Nanded.	Vishnupuri ,Nanded.	Vishnupuri ,Nanded.		

Chairman

Dean Engineering
SRTM University
Nanded

Semester VIII (Fourth Year)
Branch/Course B.Tech. Civil Engineering

Sr. No.	Category	Code	Course Title	Hours per week			Cred-its	Marking Scheme					Theory Total
				L	T	P	C	PR	OR	TW	MSE	ESE	
1	Professional Elective course	PEC-CEEL801	Elective IV A. Design of Hydraulic Structures B. Ground Improvement Techniques	3	1	0	4	-	-	50	30	70	150
2	Professional Core course	PCC-CE802	Construction Management	3	1	0	4	-	-	25	30	70	125
3	Professional Elective courses	PEC-CEEL803	Elective V A. Human Resource Development & organization Behaviour B. Sustainable Engineering & Technology	3	1	0	4	-	25 @	25	30	70	150
4	Open Elective courses	OEC-804	Open Elective VI A. Cyber Law and Ethics B. Engineering Mobile Applications (Apps.)	2	0	2	3	-	50 @	-	-	-	50
5	Humanities and Social Sciences including Management courses	HSMC805	Enterpreneurship Development	0	0	2	1	-	50 @	25	-	-	75
6	Project	PROJ-CE806	Project-II (Continued from VIIth Semester, Project work, Seminar)	0	0	8	4	-	200 #	50	-	-	250
Total				**11**	**5**	**12**	**20**	**-**	**325**	**175**	**90**	**210**	**800**
				25									

Symbols to remember: -@ - Internal Assessment, # - External Assessment T – Theory , P– Practical, T – Tutorial , CR – Credit , OR – Oral , TW – Term work, MSE – Minor Semester Examination, ESE – End Semester Examination

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Vishnupuri ,Nanded.	Vishnupuri ,Nanded.	Vishnupuri ,Nanded.		

Chairman

Dean Engineering
SRTM University
Nanded.

PEC-CEEL701	A) IRRIGATION ENGINEERING & PLUMBING TECHNIQUES	3L:1T:0P	4 credits

Objectives:

The students are exposed to different phases in irrigation practices and planning and management of irrigation, effects of climate change. Further they will be imparted required knowledge Plumbing, Plumbing fixture and systems and water shed management.

Content

Module 1: **IRRIGATION MANAGEMENT, CLIMATE CHANGE & ADAPTATION** **(06 Hours)**

Irrigation Water Management - Farmer's organization – Water Users' Associations – Basics of climate change - effects of climate change - Impacts on Agriculture - Challenges of climate change in irrigation Season based irrigation practices - Adaptation to changes - Sustainable irrigation practices and cropping pattern.

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Module 2: DRIP IRRIGATION DESIGN **(05 Hours)**

Drip irrigation - Components- Dripper- types and equations governing flow through drippers - Operation and maintenance of Drip irrigation system. - Design of surface and sub-surface drip irrigation.

Module 3: SPRINKLER IRRIGATION DESIGN (**05 Hours)**

Sprinkler irrigation- Components and accessories - Hydraulic design - Sprinkler selection and spacing - types - Sprinkler performance- Sprinkler discharge - System maintenance

Module 4: TUBEWELL IRRIGATION (**06 Hours)**

Introduction, occurrence of ground water, location and command, advantages and disadvantages, comparison with canal irrigation- Tubewells, explanation of terms: water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers.

Module 5: PLUMBING MATERIALS AND FIXTURES (**04 Hours)**

Pipe Materials and Joining Methods - Plumbing Fixtures - Potable Water & Distribution Piping Systems - Rural Water Systems - Drain, Waste and Vent Systems.

Module 6: WATERSHED MANAGEMENT (**06 Hours)**

Introduction- concept of watershed development, objectives of watershed Management, need for watershed development in India-Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology. Factors affecting watershed management – causes of watershed deterioration and their result - watershed management practices.

Outcomes:

Students will be able to

- Understand the methods and management of irrigation.
- Gain knowledge on Ground water structures.
- Understand methods of irrigation & Their Design.
- Get knowledge of plumbing materials and fixtures.
- Get knowledge on water shed management & its need.

Text/Reference Books:

1. Dilip Kumar Majumdar, "Irrigation Water Management", Prentice-Hall of India, New Delhi, 2008.
2. Punmia B.C., et. al; Irrigation and water power Engineering, Laxmi Publications, 16th Edition, New Delhi, 2009
3. Garg S. K., "Irrigation Engineering and Hydraulic structures", Khanna Publishers, 23rd Revised Edition, New Delhi, 2009
4. Michael, A.M., "Irrigation Theory and Practice", Vikas Publishers, New Delhi, 2002.
5. Sivanappan R.K., "Sprinkler Irrigation", Oxford and IBH Publishing Co., New Delhi, 1987
6. S. G Deolalikar., "Plumbing Design& Practice", McGraw-Hill Education – Europe.

PCC-CEEL701	B) Advanced Concrete Technology	3L:1T:0P	4 credits

Objective:

1.To understanding of concrete making materials including supplementary cementetious materials.

2. To study recent developments in concrete materials.

3. To study and develop adequate understanding on concrete production process, properties and uses of concrete as a modern material of construction.

4. The courses will enable one to make appropriate decision regarding ingredient and admixture selection for concrete

5. The course gives information of concrete mix design , its durability and Inspection technique of hardened concrete

Module 1: (06 hrs.)

Supplementary cementing materials and pozzolans. Fly ash, blast furnace slag, silica fume, and met kaolin - their production, chemical composition; physical characteristics; chemical and physical processes of hydration ,effects on properties of concretes

Module 2: (5 hrs.)

Special concretes: Properties and applications of: High strength - high performance concrete, reactive powder concrete, Lightweight, heavyweight, and mass concrete; fibre reinforced concrete; self compacting concrete, shotcrete, roller compacted concrete, jet cement concrete ferrocement, sulphur concrete and sulphur infiltrated concrete

Module 3: (6 hrs.)

Admixtures – Property and application Special admixtures- Accelerator, retarder, grouting admixtures, air entraining admixtures, Gas forming admixtures, corrosion inhibiting admixtures, shrinkage reducing admixtures, Bonding admixtures

Module 4: (6 hrs.)

Introduction of high strength concrete ,pumpable concrete , self compacting concrete. , their properties and function . Design of high strength concrete mixes, Design of pumpable concrete mixes and Design of self compacting concrete.

Module 5: (5 hrs.)

Ready-mixed concrete. Types of plant; truck-mixer efficiency; effects of prolonged agitation; quality control: acceptance and compliance. Batching plant and ancillary equipment for improving accuracy; mixers; distributing plant.

Module6: (6 hrs.) Durability of concrete Introduction to durability, relation between durability and permeability. Chemical attack of concrete, corrosion of steel rebar, Other durability issues. Assessment of concrete construction. Inspection of concrete and investigation of failures; assessment of concrete strength in structures; surface blemishes - causes and remedies. Destructive and non destructive test

Tutorial Work: List of Tutorials/Visits (Minimum 06 Tutorial out of 8)

01. Concrete mix design and production in lab of any one – Self compacting concrete, Fiber reinforced concrete, high strength or ultra-high strength concrete . Comparison with traditional concrete mix is to be clearly stated in the report.
02. Visit reports on minimum two site visits - exploring the field and practical aspects of concrete technology.
03. Report on at least one patent (national/international)– on any topic related to concrete technology.
04. Mix Design by I.S. Code method (with OPC Cement)
05. Mix Design by I.S. Code method (with Slag Cement)
06. Mix Design by I.S. Code method (with Admixtures Cement)
07. Demonstration of Determination of Compressive strength of concrete by non destructive test – Rebound Hammer.
08. Determination of compressive strength of concrete by adding fly ash, silica fume and blast furnace slag.

Outcomes:

After successfully studying this course, students will:

CO1. Students are able to decide the use of supplement cementatious in concrete, use of different admixture and its application as per requirement.

CO2. Students are capable to understand the special concrete, its properties and application as per requirement.

CO3. Students are able to do concrete mix design for required strength of concrete with different approach.

CO4. Students are able to know details of ready mix concrete plant.

CO5. Students are able to understand the durability of concrete, assessment and inspection of hardened concrete.

Text / Refrence Books:

1. Newman John & Ban Sang Choo. "ADVANCED CONCRETE TECHNOLOGY " Elsevier 2003.

2. Handbook on Advance concrete technology by N.V. Nayak & A.K. Jain

3. Concrete Technology --M.S. Shetty, S. Chand Publications.

4. Concrete Technology -- A R Santhakumar, Oxford University Press.

5. Concrete technology -- M. L. Gambhir, Tata Mcgraw Hill Publications. 4. Fiber Reinforced Cement Composite- P.N.Balguru & P.N.Shah.

6. Concrete: Microstructure, Properties and Materials-- P. Kumar Mehta and P. S. M. Monteiro-- Tata Mc-Graw Hill Education Pvt. Ltd

7.Handbook on Advanced concrete Technology Edited by N V Nayak,A .K.Jain, Narosa Publishing House .

8. Properties of concrete by A. M. Neville, Longman Publishers. 3. Concrete Technology by R.S. Varshney, Oxford and IBH.

9. Concrete technology by A M. Neville, J.J. Brooks, Pearson

10. Ferrocement Construction Mannual-Dr. D.B.Divekar-1030,Shivaji Nagar,Model Colony, Pune

11. Concrete Mix Design-A.P.Remideos--Himalaya Publishing House (ISBN-978-81-8318- 996 5
12. Concrete, by P. Kumar Metha, Gujrat Ambuja.
13. Learning from failures ---- R.N.Raikar
14. Structural Diagnosis ---- R.N.Raikar 10. Concrete Mix Design---Prof. Gajanan Sabnis

PCC-CE702	Architecture and Town Planning	3L:0T:2P	4 credits

Objective:

1. The course is intended to develop: an appreciation of the scope and breadth of planning practice as it has emerged historically and in its contemporary manifestation in India and abroad.
2. Awareness of the relevant codes, regulations and standards for planning, design, construction, health, safety and use of built environments.
3. Awareness of philosophy, politics, and ethics as related to Architecture.
4. To create and promote healthy conditions and environments for the public.
5. To make right use of the land for the right purpose of zoning.
6. To ensure orderly development.
7. To avoid encroachment of one zone over the other.
8. To introduce the students the planning and design of large-scale buildings with high degree of complexity by understanding architectural, socio-cultural, and economic issues connected with architecture. lntegrated approach to design encompassing site planning, building design, environment and services.

Module 1:

Fundamentals of planning: Necessity and scope of Town Planning,Town Forms Layout: Circular towns, star shaped Towns, Linear Towns, Radial and Grid Iron Patterns ,. surveys and Data collection for regional and town plans, sources and methods of gathering information, land Use survey population base and projection services and amenities, Layout of Residential Units, Neighborhood Unit Planning, Radburn Plan, Growth Pattern of Towns, Concentric Satellite, Ribbon Development, Scattered growth module, Zoning .(06 hours.)

Module 2:

Development of Contemporary Architecture: Principles and elements of Architectural Composition,Qualities of Architecture: user friendly, contextual , ecofriendly, utility of spaces,future growth etc. spatial organization, utility, demand of the area and supply. (06 hours)

Module 3: (06 hrs.)

Introduction to Planning Legislation :Introduction to M.R.T.P. Act of 1966, Land Acquisition Act of 1894, Maharashtra Slum Redevelopment Act, Urban Arts Commission Act, M.I.D.C. Act, Mhada Act.

Introduction of Town planning scheme-Procedure and regulations of layout of TP Scheme Development Control Rules for A, B, C Class Towns, and Municipal Corporations. Development Control Rules of Local Municipal Corporations. Development Plan and Regional Plan

City planning:
Evolution of cities; principles of city planning; types of cities & new towns; planning regulations and building byelaws; eco-city concept; sustainable development. (08 hours)

Module 4:
Landscape Design: Principles of landscape design and site planning; history of landscape styles; landscape elements and materials; plant characteristics & planting design; environmental considerations in landscape planning. (04 hours)
Module 5:
Professional Bodies and Building Bye laws: Introduction about Professional Bodies in planning profession such as T.C.P.O. and I.T.P.I. etc. Various Planning authorities like D.D.A., CIDCO, MMRDA, and PCNTDA etc. Introduction to Local and Self Government in urban as well as rural areas, introduction to 73rd and 74th amendment to the constitution .Introduction of minimum plot areas, road width open space, Byelaws of Municipal Corporation applicable to residential and commercial buildings. Centralization and Decentralization concepts (6 Hrs.)
Module 6:
Visual and Urban Design: Principles of visual composition; proportion, scale, rhythm, symmetry, harmony, datum, balance, form, colour, texture; sense of place and space, division of space; barrier free design.
Urban Renewal, Redevelopment and Rural Development: Problems of slums and improvement, Traffic problems, optimum city population, Ecological and Sociological aspect town planning.Integrated Rural Development Approach, various schemes for rural development (6 Hrs.)
.
Practical Work:
List of Experiments (Minimum 06 Practical out of 9)

1. Subdivision of plots (including conversion of land to Non Agriculture use) .
2. Study report on Town Planners and towns designed by them.
3. Neighborhood layout.
4. Redevelopment of existing slum area of the city.
5. Project based on Urban Design and Landscape Design aspect in planning.
6. Case studies of various types of housing.
7. Visit to any of the planning organizations, builders and promoters.
8. Study of existing Town and Town Planning proposals.
9. Urban renewal scheme 10.Social and environmental problems of sporadic and unplanned growth of urban and rural areas.

Outcomes:
After successfully studying this course, students will:

1. To learn fundamentals of town planning.
2. Understanding of application of technology, design of structure involving services & interior & landscape design of the concerned project.

3. Study of urban structures, urban continuity, movement structure, landscaping, people & vehicular movement's system design, economics, Architectural aesthetics & details.
4. The students shall have acquired knowledge of the process involved in addressing a design problem with emphasls on slte planning.
5. Understanding fundamental design principles &architectural expression; appropriate to place &Introduction to time-line to understand the role of resources and emergence of architecture.
6. The students would have understood the fundamental concepts and theories of urban design and different applications in design projects.

Text/Refrence Books:

1. Text Books Town and Country Planning By M.K. Gandhi Hiraskar G.K.,
2. "Town and country Planning" RangawalaS.C.,
3. "Town Planning", Charotar Publications, Anand Sundaram K.V.,
4. "Urban and Regional Planning in India", Vikash Publishing House Pvt. Ltd. MRTP Act 1966 Land Acquisition Act -1894 Misra S.N.,
5. "Rural Development Planning-Design and Method", Satvahan Publications, N. Delhi
6. Town Planning –Law, Administration and Professional Practice –G. R. Diwan Reference Books
7. The Urban Pattern: City Planning and Design,By Gallion Arthur B., Eisner S., (CBS Pub. andDistributors, Delhi, 1984.)2)
8. The Text Book of Town Planning, By Bandopadhyay Abir, (Books and Allied (P) Ltd, Kolkata,2000).3)
9. Town and Country Planning & Housing,By Modak &Ambdekar(Orient Longman Ltd 1971)
10. Lewis Kuble, "Town and Country Planning"
11. Gallion, "The Urban Pattern", Eisner.
12. Image of City –Kevin Lynch
13. P.W.D. Handbook of Town Planning8. Development Plan and Regional Plan Reports

PCC-CE703	Quantity surveying and Contracts	3L:0T:2P	4 credits

Course Objectives:

1. Quantity surverying provides specialist knowledge in cost planning, procurement processes and the management of construction projects.
2. Provides knowledge of works and their units and specifications.
3. Provides knowledge to Prepare tender documents and to audit civil engineering structurs.

UNIT 1: Introduction to quantity surveying, Unit of measurements andSpecifications -- Duration: 8hrs

1. Quantity surveying – Definition of estimate – Need for estimation – Types of estimates - Approximate estimate – Detailed estimate – Abstract estimate – Duties of Quantity Surveyor – Elements of a structure – Item of Work – Materials of construction – Line diagram for preparation of abstract estimate
2. Units of measurements for various items of Civil engineering works as per IS :1200
3. Degree of accuracy in measurement – Deductions for openings in masonry, RCC and Plastering – Painting coefficients
4. Specifications – Necessity – Types of specifications – General specifications of:
    i. Earth works
    ii. Brick / Stone Masonry with C.M
    iii. Reinforced Cement Concrete
    iv. Plastering with C.M
    v. Floor finishes with ceramic tiles and marbles
    vi. White washing / Color washing
5. Types of estimates – Preliminary or Approximate Estimate – Detailed Estimate, Abstract Estimate – Definitions – Formats for detailed and abstract estimates.
6. Preliminary or Approximate Estimate – Plinth area method – Cubic rate method – Service Unit method
7. Problems in Preliminary estimate.

UNIT 2: Detailed Estimates of Building, Roads and Culverts -Duration: 10 Hrs

1. Detailed estimate of building with abstract, lead statement and quarry chart.
2. Detailed estimate of concrete road with abstract, lead statement and quarry chart.
3. Detailed estimate of W.B.M road with abstract, lead statement and quarry chart.
4. Detailed estimate of R.C.C culvert with abstract.

UNIT 3: Earth Work Calculations -Duration: 6 Hrs

1. Lead and Lift – Initial and subsequent values-Standard values.
2. Mid- sectional Area Method – Mean Sectional Area Method – Trapezoidal Rule - Prismoidal Rule for computing volumes in level sections for roads and Canals and their limitations.
3. Taking out quantities from Longitudinal Section and Cross Section in cutting and embankment of level sections -Calculation of Areas.
4. Capacity of Reservoir from the table of areas and contours.

UNIT 4: Detailed Estimates of Public Health engineering works -Duration: 06 Hrs

1. Open well with masonry staining.
2. R C Over head tank.
3. Septic tank and soak pit.

UNIT 5: Civil engineering contracts –Duration: 06

: 1. Contracts- meaning, object, Requirement of valid contract, types of civil engineering contract, EPC contract, introduction to FIDIC condition of contract.

2. B.O.T, registration of contractor, classification of contractor.

3. Tender and tender document- types of tender, tender notice, corrigendum to tender notice tendering procedure (filling, opening, awarding), e-tendering.

4. Government procedure for work execution- Administrative approval, technical sanction and budget provision, running account bill, final bill, Measurement book, NMR, account of work, store procedure.

5. New construction work and document: Building byelaws, apartment acts, municipal norm for building permission, real estate and RERA

UNIT 6: Introduction to structural health monitoring & smart material –Duration: 06 Hrs

Motivation and objectives of structural health monitoring, Working principles of smart materials used for sensors and actuators, Structural Health Monitoring verses Non Destructive Testing, Piezoelectric materials(Constitutive relation, unimorph, bi-morph, Electromechanical coefficient, resonance/anti-resonance), Electrostrictive materials (Constitutive relation, sensor, actuator, figures of merit), Magnetostrictive materials (Constitutive relation, sensor, actuator, figures of merit), Optical Fiber (Fiber Bragg grating, strain sensing, ultrasonic sensing).

Practical assignment / works: (Any 10 Practicals)

1. Prepare approximate estimate for building, road, and irrigation work.
2. Prepare detailed estimate from the given set of drawing using standard measurement sheet and abstract form for load bearing residential building.
3. Prepare detailed estimate from the given set of drawing using standard measurement sheet and abstract form for RCC framed structure.
4. Prepare detailed estimate for C.C Road.
5. Prepare detailed estimate for RCC culvert.
6. Prepare detailed estimate for RC over head tank.
7. Prepare detailed estimate for open well.
8. Prepare detailed estimate of W.B.M road of one kilometer length from the given drawing.
9. Prepare detailed estimate of small septic tank from the given drawing.
10. Interpret the given set of tender document to comment on the components reflect in it.
11. Prepare tender document for given civil engineering work.
12. Interpret the conditions and data furnished for e-tendering of the given project.
13. Prepare a report of structural health monitoring for any one civil engineering work.

Course Outcomes:

Upon completion of the Course, the student will be able to

1. CO- Identify different items of works and their units and specifications.
2. CO- Prepare approximate and detailed estimates, estimate of quantities of different items of works.

3. CO- Prepare data sheets for different items of works and abstract estimate.
4. CO- Prepare leads statement, and determines the quantity of earth work by various methods.
5. CO- Prepare detailed estimates of Building, Roads and Culverts.
6. CO- Prepare detailed estimate for public health engineering works.
7. CO- Prepare tender documents.
8. CO- able to do structural health monitoring.

REFERENCE BOOKS:

1. Estimation and costing – S.C Rangawala
2. Estimation and costing – B.N Dutta
3. Civil engineering contracts and estimates – B.S Patil
4. Estimation, costing and valuation – N. Chakraborty
5. V. Giurgiutiu, Structural Health Monitoring with Piezoelectric Wafer Active Sensors, Academic Press.

PCC- CE704	Transportation Engineering- II	L3:T1:P0	04 Credits

Course objectives:

1. To introduce the principles and practice of Railways planning, design, construction and maintenance
2. To introduce the students about planning design principles of airport and harbour
3. To enable students to have a strong analytical and practical knowledge Geometric design of Railways
4. To introduce pavement design concepts, material properties, construction methods and to design Airways.
5. To understand the principles of Planning and Design of Harbours:

RAILWAYS:-

PLANNING AND CONSTRUCTION

Module 1: 06 hrs

Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, Selection of gauges - Track Stress, coning of wheels, creep in rails, defects in rails

Module 2: 05 hrs

Route alignment surveys, conventional and modern methods--Geometric design of railway, gradient, super elevation, widening of gauge on curves- Level Crossings.

CONSTRUCTION AND MAINTENANCE

Module 3: 06 hrs

Earthwork – Stabilization of track on poor soil - Track drainage – Calculation of Materials required for track laying.

Module 4: 05 hrs

Construction and maintenance of tracks – Railway Station and yards and passenger amenities- Signalling

AIRPORTS, DOCKS AND HARBOUR ENGINEERING

Module 5: 06 hrs

Air transport characteristics - airport classification – ICAO - airport planning: Site selection typical Airport Layouts, Case Studies, parking and Circulation Area

Runway Design: Orientation, Wind Rose Diagram, Problems on basic and Actual Length, Geometric Design – Elements of Taxiway Design – Airport Zones – Passenger Facilities and Services – Runway and Taxiway Markings.

Module 6: 06 hrs

Definition of Basic Terms: Harbour, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break

waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works – Coastal Regulation

Course Outcomes:

CO1: Students who successfully complete this course will be able to:
CO2: Understand the methods of route alignment and design elements in Railway Planning and Constructions.
CO3: Understand the Construction techniques and Maintenance of Track laying and Railway stations. CO4: Gain an insight on the planning and site selection of Airport Planning and design.
CO5: Analyze and design the elements for orientation of runways and passenger facility systems.
CO6: Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted

Tutorials:

Any 10 Tutorials Based on the syllabus.

Text/Refrence Books:

1) Subramanian K.P., Highways, Railways, Airport and Harbour Engineering, V Scitech Publications (India), Chennai, 2010
2) Saxena Subhash, C.and Satyapal Arora, A Course in Railway Engineering, Dhanapat Rai and Sons, Delhi, 1998 3. Khanna.S.K. Arora.M.G and Jain.S.S, Airport Planning and Design, Nemachand and Bros, Roorkee, 1994
3) Venkatramaiah. C., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels.,Universities Press (India) Private Limited, Hyderabad, 2015.
4) Mundrey J S, Railway Track Engineering, McGraw Hill Education (India) Private Ltd, New Delhi, 2013

HSMC 705	Interview Skill and Techniques	0L:0T:2P	1 credit

Course Objective (s):

The course is designed to address the following:

- To explore the interview skills and techniques to the Engineering aspirants.
- To understand the selection processes and procedures via group discussions, aptitude tests and psychometric tests.
- To inculcate an essential interview etiquettes, manners and a kind of professionalism amongst the aspirants.
- To train budding Engineering for Interview Processes so as to excel in their respective industrial field.

Syllabus Contents:

Module 1: Pre Interview Functions

- Know yourself
- Know the Interview Process
- Selection Criteria
- Types of interviews
- Interview Competencies
- Keys to Succeed in Interview

Module 2: Interview Process and Candidates

- Candidate Philosophy for Interview
- Reason for Selection and Rejection of Candidates
- Common Mistakes During Interview
- Do's and Don'ts of Interviews
- Physical Appearances for Interview
- FAQs in the Interview
- **Test 01:** Aptitude Test in Interview
- **Test 02:** Psychometric Test in Interview

Module 3: Group Discussion and Selection Process

- Group Discussion: Meaning and Importance
- Why Group Discussion

- Types of Group Discussion
- Essential Skills Required For Group Discussion
- Group Discussion Etiquettes
- Non-Verbal Communication in Group Discussion
- **Test 01: Perform Group Discussion in Classroom**
- **Test 02: Watch Group Discussion Videos**

Module 4: Interview Etiquettes and Manners

- Interview Etiquettes and Manners
- Humility, Honesty and Sincerity
- Practicing Good Manners
- Tips for Corporate Grooming
- Professionalism and Socializing Skills
- **Exercise 01 :** Test Your Etiquette
- **Exercise 02 :** Test Your Manners

Module 5 : Preparing Resume

- Drafting for Interview
- Drafting Job Application
- Drafting and Sending Emails
- Bio-data, CV and Resume
- Tips for CV/ Resume Writing

Module 6: Interview Exercise

- Find out different aptitude tests applied in selection processes of MNC's and prepare for the same.
- Find out and solve 03 question papers of Aptitude Tests to improve your technical competencies.
- Watch group discussion videos and learn group discussion techniques.
- Watch mock interviews of students and identify common mistakes done by them.
- Perform interviews in classroom, record students' performance and reflect upon their mistakes.

Course Outcome (s):

After learning the course the students should be able to:

- **CO1:** Learners would be familiar with different interview skills and techniques employed in the industrial and the corporate world.
- **CO2:** Students would be able to perform well in interview by developing body language, rationalizing their aptitude and attitude for the interview.
- **CO3:** They would be able to participate effectively in group discussions, accept leadership and express their ideas effectively.
- **CO4:** Students would be able to draft effective job applications and resume, CVs accurately as per the needs of the industries.
- **CO5:** Students would develop right frame of mind by learning socializing skills, corporate etiquettes, and manners.

Reference:

1. How to Win interview – Tushar Kokane – Educreation Publications New Delhi
2. Soft Skills – Know yourself and Know your world by Dr.K.Alex – S.Chand and Publications, New Delhi
3. The Ace of Soft Skills, by Gopalswamy Ramesh and Mahadevan Ramesh, Pearson. 2010.

PCC-CE 706	**Structural Analysis / Ground Water Modeling (Software)**	**0L:0T:2P**	**1 credit**

Students should learn any software related to Structural Analysis / Ground Water Modeling, the duration of the software learning should the 30 Hours.

PROJ-CE 707	**Project- 1**	**0L:0T:6P**	**3 credits**

Project part I consists of Project topic finalisation, litreture review and identification of work methodology. Assesment of Part I should be carried out and students should present their work and should submit project report, for clearing project part I.

HSMC708	**Assessment of Industrial Internship**	**0L:0T:0P**	**2 credits**

An in-plant training is a learning opportunity for students. Students should therefore receive feedback on their performance so that they can grow professionally. Overall professional development of degree in civil engineering is the need of the day for enabling them to sustain in competitive global environment. Students should under go a 4-6 weeks training in the field of civil engineering, in the duration after completion of Sixth Semester. Assessment of In-Plant training should be carried out in Seventh Semester of Civil Engineering.

PCC-CEEL801	A) Design of Hydraulic Structures	3L:1T:0P	4 credits

Objectives: Students will be able :

- To impart knowledge regarding the design of the various minor irrigation structures
- To convey the knowledge on the causes of failure, design criteria and stability analysis of different types of dams

The students will be able to
i. Perform the stability analysis of gravity dams
ii. Explain the causes of failure of different types of dams and their design criteria
iii. Design minor irrigation structures such as regulators, cross drainage works and canal falls.

Module 1: 06 Hours
Diversion head works- layout and functions of components, Weir and barrage- Causes of failure of weirs on permeable soils - Bligh's theory. Design of vertical drop weir. Khosla's theory of independent variables- Khosla's corrections-Use of Khosla's charts.

Module 2: 06 Hours
Irrigation canals, canal alignment- cross section of unlined canalsDesign of canals through alluvial soils-Kennedy's theory and Lacey's theory. Cross drainage works-Types, selection of suitable type, Type of aqueducts. Regulation Works - Canal falls-necessity, classification. Canal regulators- Regulator cum road bridge- Head regulators and cross regulators.

Module 3: 06 Hours
Dams-Types, Gravity dam – selection of site- forces acting - stability analysis and modes of failure – Principal and shear stresses- Problems - Elementary profile –limiting height of gravity dams-high and low dams- Practical profiles, Functions of various components shafts, keys, water stops, and different types of gallery, Grouting. Instrumentation in dams (Concept only).

Module 4: 06 Hours
Arch dams-types, methods for design (list only)-Thin cylinder theory. Earth dams-types, causes for failure and design criteria. Spillways-Types. Effective length of spillway- Ogee type spillwayprofile. Energy dissipation below spillways - Stilling basins- Indian standard Type I and Type II (design not necessary)

Module 5: Embankment dam engineering 06 Hours
Nature and classification of soil- engineering characteristics of soil, principles of design – Material and construction- Internal seepage – Stability and stresses, Settlement and deformation in rock fill embankments

Module 6: Drop Structures 06 Hours
Sarda fall – Glacis fall –Design principles- Cross regulator, head regulator and functions.

List of Tutorials

1 Elements of dam engineering

2 Embankment dam engineering

3 Concrete dam engineering

4 Dam outlet works

5 Drop Structures

Outcomes:

At the end of the course, students must be in a position to The students will be able to

CO1. Perform the stability analysis of gravity dams

CO2. Explain the causes of failure of different types of dams and their design criteria

CO3. Design minor irrigation structures such as regulators, cross drainage works and canal falls.

Text Books:

1. Garg S.K, Irrigation Engineering and Hydraulic Structures, Khanna Publishers, 2006.

2. Modi. P. N., Irrigation Water Resources and Water Power Engineering, Standard Book House, 2009.

3. Punmia B.C. Ashok K Jain, Arun K Jain, B. B. L Pande, Irrigation and Water Power Engineering, Laxmi Publications (P) Ltd. 2010.

Reference Books:

1. Arora, K.R., "Irrigation, Water Power and Water Resources Engineering", Standard Publishers Distributors, 2010.

2. Asawa. G.L. Irrigation and Water Resources Engineering, New Age International, 2000

3. Sahasrabudhe S.R., Irrigation Engineering & Hydraulic Structures, S.K. Kataria & Sons, 2013

4. Sathyanarayana M. C. Water Resources Engineering-Principles and Practice, New Age International Publishers. 2009

5. Varshney, R.S. Theory & Design of Irrigation Structures - Vol III, Nem Chand & Bros., Roorkee.

PEC-CEEL 801	B) Ground Improvement Techniques	L3: T1:0P	4 credits

Objectives:
The course addresses various ground improvement techniques along with principles, design issues and construction procedures. Various stabilization techniques for cohesionless and cohesive soils Miscellaneous techniques of ground improvement including geotextiles and reinforced earth.

Content

Module 1:Introduction (4 Hrs)
Need for Ground Improvement, Different types of problematic soils, Emerging trends in ground Improvement.

Module 2: Mechanical Stabilization
(8Hrs)
Shallow and deep compaction requirements, Principles and methods of soil compaction, Shallow compaction and methods. Properties of compacted soil and compaction control, Deep compaction and Vibratory methods.

Module 3: Hydraulic Modification (8Hrs)
Ground Improvement by drainage, Dewatering methods. Design of dewatering systems, Preloading, Vertical drains, vacuum consolidation, Electro-kinetic dewatering.

Module4: Modification by Admixtures (8 Hrs)
Cement stabilization and cement columns, Lime stabilization and lime columns. Stabilization using bitumen and emulsions, Stabilization using industrial wastes Construction techniques and applications.

Module 5:Grouting (4 Hrs)
Permeation grouting, compaction grouting, jet grouting, different varieties of grout materials, grouting under difficult conditions.

Module 6: In situ soil treatment method (6Hrs)
Soil nailing, rock anchoring, micro-piles, design methods, construction techniques, Micropiles, Highway Slope Stabilization TechniquesRip Rap method.

Tutorials:
Minimum 10 Tutorials, based on the syllabus should be carried as Term Work.

Outcomes:
At the end of the course, the student will have

CO1. Appreciate the need for ground improvement and different mechanical, chemical, static
and dynamic techniques

CO2. Recognize various chemical stabilization and grouting techniques
CO3. Understand different ground improvement techniques for cohesionless soils
CO4. Recognize different ground improvement techniques for cohesive soils engineering practice.
CO5. Selection of site specific method of improvement and its design
CO6. Identify miscellaneous techniques of ground improvemen

Text/Reference Books:

2. Manfired R. Hausmann, Engineering Principles of Ground Modification, McGraw-Hill Pub, Co., 1990.
3. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc. 1998.
4. Purushothama Raj P. , Ground Improvement Techniques, Laxmi Publications, 2016
5. Hausmann R., "Engineering principles of Ground Modification", McGraw Hill Publishing Co, 1990.
6. Moseley, M.P., "Ground Improvement", Blackie, Academic & professional, 1993
7. Fang-Hsai – Yang, "Foundation Engineering Hand Book", CBS Publication, New Delhi, 1990
8. B.M.Das, Principal of Foundation Engineering, Thomoson, Indian Edition.
9. R.M. Korner, Design with geosythetics, Prentice Hall, new jersy, 3rd Edition.

PCC-CE802	Construction Management	L3:1T:0P	4 credits

Course Objectives:

- To study and understand the various types of equipment's used for earthwork, tunneling, drilling, blasting, dewatering, material handling conveyors and its applications in construction projects
- To train the students with the latest and the best in the rapidly changing fields of Construction Management & construction equipment's technology
- To prepare the students to be industry leaders who implement the best engineering and management practices and technologies in the construction industry.
- To study and understand the various types of equipment's used for earthwork, material handling conveyors and its applications in construction projects.
- To study and understand the standard designations, sizes, and gradations of equipment, to construction engineering.
- Be able to apply knowledge and skills of construction equipment's practices and techniques.

Content

UNIT- I:

1. Basic concept of management: (4 Hrs.)

Management classification characteristic of Management Importance of Management Development of Management thought functional approach to Management Scientific Management, approach, Human relation approach.

2. Administration and Management: 04 Hours

Introduction Board of Directors Managing Directors Company's secretary commercial manager, Authority and Responsibility Delegations its guidelines, centralization of Authority Def. Of Management Duties and responsibilities Def. of Administration duties & Responsibilities.

UNIT- II:

3. Organization: 04 Hours

Duties and responsibilities of organizations principles of good organization Qualities of good organization, Types of Organization, Advantages and disadvantages line or Staff organization &Disadvantages Line staff and Financial Advantages and Disadvantages.

UNIT- III:

4. Site Selection and Layout: 04 Hours

Introduction, location selection of actual site, selection of site in city, selection of site in rural area, Single storey and Multi-storey Building, Factory Layout factors affecting layout.

5. Plant Layout: 06 Hours

Definition of plant layout, Main objective of scientific layout, Principles of plant layout, Symptoms of bad layout, factors influencing layout. Methods of layout, stability Advantages

and disadvantages.

UNIT- IV:

6. Elements of Costing: 03 Hours

Introduction, calculation of Material cost calculation of direct labour cost, fixed and variable Overhead, components of cost, selling price, examples of overhead.

7. Operation Research: 03 Hours

Introduction, Definition, various phase in O.R. study. Method of making decision by OR Scope, Applications of OR Method used in O.R.

UNIT-V:

Construction Equipment's:

Introduction, Planning and selection of equipment, Mechanical Operation in construction.
Earth Moving Equipment's.- Its Advantage Disadvantages working (Dragline, Clamshell, Bulldozer, Power shovel, Back Hoe, Scraper only).
Hoisting Equipment's - Derrick and Gantry cranes
Hauling Equipment's - Introduction only (Track Trailer Wagon). (4 Hrs.)

UNIT- VI:

Pile and pile driving Equipment's- operation and advantages disadvantage.
Tunnel Boring Machine - Operation - Advantages and disadvantages. Belt conveyor.
Equipment used in Highway construction and Underwater Construction.
Special Equipments (4 Hrs.)

Tutorials:

Minimum 10 Tutorials, based on the syllabus should be carried as Term Work.

Course Outcomes:

CO1: On completion of this course the students will have the knowledge of construction equipment's practices and techniques to be used in the field.
C02 : Be able to apply theoretical and practical aspects of project management techniques to achieve project goals.
CO3: Become familiar with construction equipment and their capabilities
CO4: Learn how to best utilize construction equipment on site work and heavy civil projects
CO5: Properly select heavy equipment based on applications, utilization, productivity, and other factors

Text/Reference Books:

1. Industrial organization and engineering economics by T.R. Banga, S.C. Sharma.
2. Industrial organization and Management by O.P. Khanna.
3. Construction Planning Equipment's and methods by Robert L. Purify.
4. Construction Equipment's and its Planning and Applications by Dr. Mahesh Verma.
5. Construction Management Practice by Dr. V. K. Raina Shroff Publishers & Dist. Pvt. Ltd.

6. Deodhar, S.V. Construction Equipment and Job Planning, Khanna Publishers, New Delhi,1988.
7. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., Construction Planning, Equipment andMethods, McGraw Hill, Singapore, 2006.
8. Sharma S.C. Construction Equipment and Management, Khanna Publishers, New Delhi, 1988.

PEC-CEEL803	**A) Human Resource Development And Organisational Behaviour**	**L3:1T:0P**	**4 credits**

Learning Outcome:

1. Students will be aware about the cross cultural environment in the organization
2. Students should understand the group behavior for getting work done through and with the people.
3. Students should able to trace the root cause of conflict and resolve it.
4. Students should able to develop time management strategies.
5. Able to manage and develop Human Resource of the organization.
6. Should strengthen the organizational communication.

Contents :

Unit	Topic	No of Lectures
Unit 1	1.1 Introduction to Organizational Behavior - Concept, Definitions, Evolution of OB. 1,2. Importance of Organizational Behavior – Cross-cultural Dynamics, Creating Ethical Organisational Culture and Climate. 1.3. Individual and Group Behaviour – OB Models – Autocratic, Custodial, Supportive, Collegial and SOBC in Context with Indian OB. 1.4. Human Relations and Organisational Behaviour 1.5 Intra and Inter Personal Processes	**06**
Unit 2	2,1 Managing Communication – Conflict Management Techniques. 2.2. Time Management Strategies. 2.3. Learning Organisation and Organisational Design.	**06**

	2.4. Rewards and Punishments – Termination, Layoffs, Attrition, Retrenchment, Separation and Downsizing.	
Unit 3	3.1. HRM – Meaning Objectives, Scope and Functions. 3.2. HRP – Definition, Objectives, Importance, Factors Affecting HRP, Process of HRP, Strategies of HRM and Global HR Strategies. 3.3. HRD – Concept, Meaning, Objectives and HRD Functions	**06**
Unit 4	4. 1. Performance Appraisal – Concept, Process, Methods and Problems, KRAs. 4. 2. Compensation – Concept, Components of Pay Structure, Wage and Salary Administration, Incentives and Employee Benefits. 4.3. Career Planning – Concept of Career Planning, Career Stages and Carrier Planning.	**08**
Unit 5	5.1 Group and Inter Group Processes 5.2 Group Formation and Group Processes 5.3 Organizational Communication 5.4 Team Development and Team Functioning 5.5 Conflict, Competition and Collaboration	**08**

Tutorials:
Any 10 Tutorials Based on the syllabus.

References :

1. Human Behavior at work : Kieth Devis - Mc.Graw Hill – 1989
2. Organizational Behavior : John W.Newstorm Mc.Graw Hill – 2017
3. The 11 Law of Liability – Michel Leaderman – Kindle Edition

PEC-CEEL803	B - Sustainable Engineering & Technology	L3:1T:0P	4 credits

Course Objectives:

1. To have an increased awareness among students on issues in areas of sustainability
2. To understand the role of engineering and technology within sustainable development;
3. To know thw methods, tools and incentives for sustainable product-service system development
4. To establish a clear understanding of the role and impact of variouse aspects of engineering and engineering decisions on environmental, social, and economic problems.

Contents:

MODULE 1: 04 Hours

Sustainability – Introduction, Need and Concept of sustainability, Social environment and economic sustainability concepts. Sustainable development, Nexus between Technology and sustainable development, Challenges for Sustainable Development . Multilateral environmental agreements and protocols Clean Development Mechanism (CDM) , Environmental legislations in India –Water Act,Air Act.

MODULE 2: 06 Hours

Air Pollution, Effects of air pollution: water pollution –sources ,sustainable waste water treatment , solid waste-source ,impact of solid waste, Zero waste concept. Global environmental issues-Resource degradation, Climate Change ,Global warming, Ozone layer depletion, Regional and local Environmental issues. Carbon credits and carbon trading carbon foot print

MODULE 3: 04 Hours

Environmental Management standards, ISO 14000 series ,Life cycle Analysis (LCA)-scope and Goal, Bio-mimicking, Environmental Impact Assessment (EIA) –Procedures of EIA in India

MODULE 4: 06 Hours

Basic concept of sustainable habitat, Green buildings, green materials for buildings construction, material selection for sustainable design, green building certification ,Methods for increasing energy effeciniency of buildings. Susistaiable cities ,Sustainable transport.

MODULE 5: 04 Hours

Energy sources : Basic concepts- conventional and non conventional , Solar energy, fuel cells ,wind energy , small hydro plants bio-fuels Energy derived from oceans, geothermal energy.

MODULE 6: 06 Hours

Green engineering, sustainable urbanisation , industrialisation and poverty reduction: social and technological change , Industrialprocesses: Material selection , Pollution prevention , industrial Ecology , Industrial symbiosis.

Tutorials:-

1: students may be assigned to do at least one project eg:
a) Identifying/assessment of sustainability in your neighbourhood in education, housing water resource , energy resource , food supplies, land use, environmental protection etc
b) Identify the threats for sustainability in any selected srea and explore solutions for the same

2: students may be assigned to do at least one project eg:

a) Assessing the pollution status of a small area
b) Programmes for enhancing public environmental awareness
c) Observe a pond nearby and think about different measures that can be adopted for itz conservation

3: students may be assigned to do at least one project eg:

a) Conducting LCA of products (eg . Aluminium cans, PVC bottles, cars etc)or activities (comparison of land filling and open burning)
b) Conducting an EIA study of a small project (eg. Construction of a building)

4: students may be assigned to do at least one project eg:

a) Consider the design aspects of a sustainable building for your campus
b) Explore the different methods that can be adopted for maintaining a sustainable transport system in your city

5: students may be assigned to do at least one project eg:

a) Find out the energy savings that can be achieved by the installation of a solar water heater
b) Conduct a feasibility study for installation of wind mills in kerala

6: students may be assigned to do at least one project eg:

a) Collect details for instances of climate change in your locality
b) Find out the carbon credits you can gain by using a sustainable transport system (travelling in a cycle or a car pooling from college to home)
c) Have a debate on topics like : industrial ecology is a boon or bane for industries?/are we scaring the people on climate change unnecessarily?/technology enables development sustainable or root cause of unsustainability?

Course Outcomes:

The students will be,

CO1 Able to understand the different types of environmental pollution problems and their sustainable solutions

CO2. Able to work in the area of sustainability for research and education

CO3. Having a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course

Reference books:

1) Environment impact assessment guidelines, Notification of government of India, 2006.
2) Purohit S S Green technology- An Approach for sustainable environment, Agrobios publication.
3) Allen, D. T. and Shonnard, D. R., Sutainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
4) Twidell, J. W. and Weir, A. D., Renowable Energy Resources, English Language Book Society (ELBS).
5) Ni Bin Chang, Systems Analysis for Sustainable Engineering: Theory and Applications, McGraw-Hill Professionals.

OEC804	A) Cyber Law & Ethics	L2:0T:2P	3 credits

Objectives:-

After learning the course the students should be able to:

1. Understand the core concepts of Defensive and Offensive Security.
2. Understanding of breaching the networks domains and systems.
3. Understanding the ethics of Hacking.
4. Limitations of Penetration Testing.
5. Cyber Crime Case s and IT act India and amendments.

Course Contents:-

Module 1: (06 Hrs.)

The Business Aspects of Penetration Testing, The Technical Foundations of Hacking, Foot printing and scanning Enumeration and Step - by-Step System Hacking, The Business Aspects of Penetration Testing, Automated Security Assessment Tools, Trojans and Backdoors, Sniffers Session Hijacking and Denial of Service Web Server Hacking Web application Vulnerabilities and Database Attacks

Module 2: (6 Hrs.)

Wireless Technologies, Security and Attacks IDS Honeypots and Firewalls Buffer Overflow Cryptographic Attacks and Defenses Social Engineering and Physical Security

Module 3: (8 Hrs.)

Understanding Copy Right in Information Technology, Understanding the technology of Software, software copyright vs Patent debate, Authorship Assignment issues, Commissioned work, Work for hire Idea/Expression dichotomy, Copy right in internet, Legal Issues in internet

and Software Copyright Jurisdiction Issues, Copyright Infringe Remedies of Infringement Multimedia, Copyright issues, Software Piracy, Patents understanding.

Module 4: (06 Hrs.)

Cyber Crimes, Understanding Cyber Crimes in context of Internet, Indian Penal Law & Cyber Crimes Fraud Hacking Mischief, International law, Obscenity and Pornography Internet, Potential of Obscenity Indian Law On Obscenity & Pornography Technical, Legal solutions International efforts Changes in Indian Laws, Ecommerce & Taxation, UNCITRAL model law of E,-Commerce, Indian Legal Position on E-Commerce IT Act 2000/Indian Evidence, Act/Draft law on E-Commerce.

List of Practical's:-

1. Download the tool samspade and carry out a who is on any of the domains.
2. Using Google hacks /dorks carry out any three information gathering exercises.
3. Using bing, find the shared hosting details for a domain.
4. Using net craft identify the webserver / server associated with a domain of your choice.
5. Carry out an email header analysis on an email received (preferably from a non -Gmail email and document the identified information.
6. Carry out information gathering using FOCA.
7. Using Wire shark, create a Filter to capture only FTP traffic
8. Using wire shark, identify the version of SSL protocol used (SSLv1, SSLv2, SSLv3, TLSv1, TLSv2, etc.) in any HTTPS web portal of your choice. You may need to login to get this information.
9. Carry out a port scanning on an internal lab machine using nmap.
10. Carry out a Vulnerability Scanning using Nessus and assess the report.

Reference Books

1. Gray Hat Hacking: The Ethical Hackers Handbook by Allen Harper, Shon Harris, Cyber Laws by C.K punia, Sumit Enterprises
2. Cyber Crime and Law Enforcement t by V. D. Dudeja, Commonwealth Publishers

OEC804	B) Engineering Mobile Applications	L2:0T:2P	3 credits

Student should study the use and applications of the different mobile applications available in the field of civil engineering & General Engineering.

HSMC805	Enterpreneurship Development	L0:0T:2P	1 credit

Course Objectives:

The course is designed to address the following:

1. Identifying your entrepreneurial traits.
2. Identifying business opportunities that suites student's.
3. Use the support system to zero down to students Business Idea.
4. Develop comprehensive business plans.
5. Prepare plans to manage the enterprise effectively.

Contents:

Unit 1 Entrepreneurship, Creativity & Opportunities

1.1) Concept, Classification & Characteristics and qualities of Entrepreneur

1.2) Creativity and Risk taking.

1.2.1) Concept of Creativity & Qualities of Creative person.

1.2.2) Risk Situation, Types of risk & risk takers.

1.3) Entrepreneurship as a career.

1.3.1) Process of Setting up new Business.

1.3.2) LPG Policy.

1.3.3) Impact of LPG.

1.3.4) Emerging high growth areas.

1.4) Business idea methods and techniques to generate business idea.

1.5) Technical & Financial feasibilities

1.6) SWOT analysis for arriving on product / services.

Unit 2 Information and Support Systems

2.1) Information Needed and Their Sources.

Information related to project, Information related to support system, Information Related to procedures and formalities

2.2) Support Systems: (MCED, NI-MSME, PMEGP, DI, KVIC)

1) Small Scale Business Planning, Requirements.

2) Govt. & Institutional Agencies, Formalities

3) Statutory Requirements and Agencies.

Unit 3 Market Assessment

3.1) Marketing -Concept and Importance

3.2) Market Identification, Survey Key components

3.3) Market Assessment

3.4) Market study process

3.5) Market Segmentation

3.6) Product Life Cycle

Unit 4 Financial Management & Accounting.

Business Finance

4.1) Cost of Project

1) Sources of Finance

2) Types of Capitals

3) Budgeting with (Production Budget with variance report)

4) Profitability

5) Break Even Analysis

6) Financial Ratios and Significance

Business Account (No numerical)

4.2) Accounting Principles, Methodology

1) Book Keeping

2) Financial Statements,

3) Concept of Audit,

Unit 5 : Business Plan & Preparation of Project Report

5.1) Business plan steps involved from concept to commissioning

Activity Recourses, Time, Cost.

5.2) **Project Report**

1) Meaning and Importance

2) Components of project report/profile **(Give list)**

5.3) **Project Appraisal**

1) Meaning and definition

2) Technical, Financial feasibility

3) Cost benefit Analysis

Unit 6 Enterprise Management and Modern Trends

6.1) **Enterprise Management**: -

1) Essential roles of Entrepreneur in managing enterprise

2) Quality Assurance

3) T.Q.M Total Quality Management

4) Quality Circle

Importance of Quality, Importance of testing

6.2) E-Commerce

1) 5 s and six Sigma

Concept and process

6.3) Global Entrepreneur

List of Assignments:

1. Submit a profile summary of a successful Entrepreneur
2. Generate Business idea Product / service through Brainstorming.
3. Identify business opportunities suitable to you.
4. Survey Industries of your stream; grade them according to level of Production, Investment, turnover, pollution to prepare report on.
5. Visit a bank/financial institution to enquiry about various funding schemes for small scale enterprise.
6. Compile the information from financial agencies that will help you starting up your enterprise.
7. Prepare technical feasibility report of a chosen product/service.
8. Prepare your long term, short term, & long term Goals for starting your enterprise.
9. Prepare marketing strategy for your chosen product / service.
10. Find the Breakeven point for the business idea chosen by you.

Micro Project:

- Prepare business plan for your chosen small scale Enterprise.

Course Outcomes:

1. Appreciate the importance of embarking on self-employment and has developed the confidence and personal skills for the same.
2. Identify business opportunities in chosen sector / sub-sector and plan and market and sell products / services.
3. Start a small business enterprise by liaising with different stake holders 4. Effectively manage small business enterprise.

Text Books:

1. “Entrepreneurial Development” Neerali Prakashan

Reference Books:

1. “Entrepreneurial Development” by Khanka S S
2. Entrepreneurial Development and Small Business Management” by Dr. P T Vijayashree & M Alagammai
3. Dynamics of Entrepreneurial Development and Management” by V Desai
4. Business Development for Dummies by Anna Kennedy
5. “Entrepreneurial Development” by Nuzhath Khatoon

6. “Entrepreneurial Development” by Dr C B Gupta and Dr N P Srinivasan.

PROJ-CE 806	**Project- II**	**0L:0T:8P**	**4 credits**

Project part II consists of Project work, result and conclusion with detailed project report. Assesment of Part II should be carried out and students should present their work and should submit project detailed report, for clearing project part II.