

SYLLABUS III YEAR B.TECH. (CIVIL ENGINEERING)

AUTONOMOUS REGULATIONS 2015

(Effective for the batches admitted in 2015-16 onwards)

OPEN ELECTIVES

(Offered by Department of Civil Engineering)

III B.TECH. I SEMESTER	IV B.TECH. I SEMESTER
1. Basic Civil Engineering	1. Elements of Environmental Engineering
2. Building Planning and Construction	2. Water Resources Conservation
3. Basics of Foundation Engineering	3. Elements of Transportation Engineering



DEPARTMENT OF CIVIL ENGINEERING

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (A)

(Affiliated to AU, Approved by AICTE & Accredited by NBA)

SANGIVALASA, Bheemunipatnam Mandal, Visakhapatnam District-531162

OPEN ELECTIVES

(For III B.Tech. I Sem All except Civil Engineering students)

BASIC CIVIL ENGINEERING

CIV 311(A)

Instruction : 3 Lectures & 1 Tutorial / week

End Exam : 3 Hours

Credits : 3

Sessional Marks : 40

End Exam Marks : 60

Prerequisite:

Nil

Course objectives:

The objective of this course is to

1. Know the various materials and components in building construction
2. Have knowledge on survey and highways engineering, irrigation and water supply engineering and soil mechanics.

Course outcomes:

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

1. Student will able to identify various materials, components in building construction.
2. Student will be familiar in various disciplines in civil engineering.

Mapping of course outcomes with program outcomes:

CO		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
		1	3	1	-	-	-	1	1	-	1	1	-	-	1	-
2	3	1	-	-	-	2	2	-	1	1	-	-	1	-	2	

SYLLABUS

UNIT – I

12 Periods

Construction materials

Stones -Characteristics of good building stones-common building stones and their uses-Bricks-Characteristics of good bricks-classification of bricks and their uses-Timber-Classification of Timber and their uses-Cement-Types of cement and their uses

UNIT – II

12 Periods

Components of building

Components of sub structure and their functions-Components of super structure and their functions -Types of forces – compression, tension, shear – Stress – Strain-Concrete-Ingredients of concrete and its importance in construction -Steel- Types of steel and its importance in construction

UNIT – III

12 Periods

Survey and Highway Engineering

Definition and classification of surveying – linear and angular measurements - levelling
Modes of transportation – Classification of highways - Classification of pavements - Super elevation.

UNIT – IV

12 Periods

Irrigation and Water supply

Definition and classification of irrigation – Irrigation structures – dams, weirs, cross drainage works, canal drops-Quality of water-Treatment methods

UNIT – V

12 Periods

Geotechnical Engineering

Origin of soil – types of soil – bearing capacity of soil – Types of foundation – shallow and deep

REFERENCES

1. B C Punmia, Ashok K Jain, Arun K Jain, (1st Edition, 2003), “Basic Civil Engineering”, Laxmi Publications (P) Ltd.
2. G K Hiraskar, (1st Edition, 2004), “Basic Civil Engineering”, Dhanpat Rai Publication.

Note: As the subject is an Open elective taken by non-civil engineering students, the student is expected to gain only elementary knowledge of the subject.

BUILDING PLANNING AND CONSTRUCTION

(For III B.Tech. I Sem All except Civil Engineering students)

CIV 311(B)

Instruction : 3 Lectures & 1 Tutorial / week

End Exam : 3 Hours

Credits : 3

Sessional Marks : 40

End Exam Marks : 60

Prerequisite:

Nil

Course Objective:

1. Learn about building byelaws laid by planning authorities.
2. Learn about the principles and methods to be followed in constructing various components of a building.
3. Understand about masonry types in brick and stone construction

Course Outcomes:

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

1. Know the various building Bye-Laws laid by town planning authorities and local regulatory bodies for planning various buildings
2. Learn about masonry types in brick and stone construction
3. Understand about various building components.
4. Know about damp prevention and fire protection methods.
5. Understand about various types of roofs.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO	1	3	2	1	-	-	3	3	2	1	1	-	2	3	2	3
	2	3	2	2	-	-	-	2	1	-	1	2	2	2	1	2
	3	3	3	1	2	-	2	2	1	2	2	2	2	3	2	2
	4	3	-	2	1	2	2	2	-	2	1	2	3	3	2	3
	5	3	1	2	1	-	1	1	-	1	1	2	2	3	2	2

SYLLABUS

UNIT – I

12 Periods

Residential Buildings : Different types of Residential Buildings Selection of Site for Residential Building, Components of building, bye-laws and regulations, Orientation of Buildings

UNIT – II

12 Periods

Masonry: Definitions of terms used in masonry, Materials used, Stone masonry, Brick masonry, Different bonds used for brick masonry, Composite masonry.

UNIT – III

12 Periods

Floors and Roofs: Components of a floor, materials used for floor construction, Different types of flooring, Ground floor and upper floors, Types of roofs, Basic roofing elements and Roof coverings.

UNIT – IV

12 Periods

Doors and Windows: Location of roofs and windows, Definition of technical terms, Size of doors and windows, Door frames, Types of doors and windows, Ventilators, Fixtures and fastenings.

UNIT – V

12 Periods

Damp proofing: Causes and effect of dampness on buildings, Materials and methods used for damp proofing, Fire hazards, Fire resisting properties of common building materials.

REFERENCES

1. N. KumaraSwamy & A. Kameswara Rao, (1998),” Building planning and Drawing, Charotar Publishers, (6th Edition).
2. S.K. Duggal, (2010), “Building Materials” New Age International Publishers, (4th Edition).
3. Dr. B.C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, (2008), “Building Construction”, Laxmi Publications, (10th Edition)
4. D.N. Ghose , (1989), “Materials of construction”, Tata-McGraw-Hill Publishing Company Limited.
5. Sushil Kumar Sushil Kumar, (2003), “Engineering Materials”, Metropolitan Book Co., Private Ltd., New Delhi.

Note: As the subject is an Open elective taken by non-civil engineering students, the student is expected to gain only elementary knowledge of the subject.

BASICS OF FOUNDATION ENGINEERING

(For III B.Tech. I Sem All except Civil Engineering students)

CIV 311(C)

Instruction : 3 Lectures & 1 Tutorial / week

End Exam : 3 Hours

Credits : 3

Sessional Marks : 40

End Exam Marks : 60

Prerequisites:

Nil

Course Objective:

The course content enables students to

1. Learn Soil and its formation.
2. Learn the various methods of Sub-soil exploration.
3. Impart knowledge on types of shallow foundations, theories required for the determination of their bearing capacity and imbibe the concepts of pile foundations.

Course Outcomes:

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

1. Explain Soil and its formation.
2. Identify the method of Soil Exploration.
3. Classify the types of shallow foundations and theories required for the determination of their bearing capacity.
4. Explain the necessity of pile Foundation.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO	1	2	1	1	1	1	-	1	-	3	2	1	1	2	1	1
	2	2	1	1	1	3	1	1	-	2	2	3	1	2	3	1
	3	2	2	2	2	3	2	2	-	3	2	2	1	2	3	2
	4	2	2	2	2	3	2	2	-	3	2	2	1	2	3	2

SYLLABUS

UNIT – I

8 Periods

Introduction: Definition of soil - Definition of soil Engineering and Geotechnical Engineering
- Origin of Soils-Formation of Soils-Transportation of Soils-Major soil deposits of India.

UNIT – II

8 Periods

Subsoil Investigation for Foundations: Borings for Exploration-Auger boring, Wash Boring, Rotary Drilling, Percussion Drilling-Split Spoon Samplers-Standard Penetration Test- Cone Penetration Test- In-situ Vane Shear Test.

UNIT – III

8 Periods

Bearing capacity: Bearing capacity theories of shallow foundation- Terzaghi Bearing capacity theory, IS Code Method - Settlement of Foundation-Loads for Settlement Analysis-Allowable Settlement.

UNIT – IV

8 Periods

Shallow Foundation: Types of Foundations: Strip, Isolated, Strap, Combined Footings, Raft foundation - Loads on foundations – Proportioning of footings.

UNIT – V

8 Periods

Deep Foundations: Necessity of pile foundation – classification of piles – Factors governing choice of type of pile – Load transfer mechanism – piling equipments and methods.

REFERENCES

1. Arora K.R. (2014), Soil Mechanics and Foundation Engineering, Standard Publishers; 7th Edition.
2. Punmia B.C., Ashok Kumar Jain, Arun Kumar Jain (2005), Building Construction, Laxmi Publications, 5th Edition.
3. Gopal Rajan & Rao A.S.R. (2006), Basic and Applied Soil Mechanics, New Age; 2nd Edition.
4. Murthy V.N.S. (2009), Soil Mechanics & Foundation Engineering, CBS; 1st Edition

Note: As the subject is an Open elective taken by non-civil engineering students, the student is expected to gain only elementary knowledge of the subject.

ELEMENTS OF ENVIRONMENTAL ENGINEERING

(For IV B.Tech. I Sem All except Civil Engineering students)

CIV411 (A)

Instruction: 3 Lecture & 1 Tutorial / week

End Exam: 3 hours

Credits: 3

Sessional marks: 40

End Exam Marks: 60

Prerequisites:

Environmental science

Course Objectives:

The objective of this course is to:

1. Impart knowledge of environment and different types of pollution
2. Impart knowledge about causes and preventive measures against water, air, solid waste and noise pollution
3. Impart knowledge about environmental impact assessment

Course Outcomes:

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

1. Understand importance of environment and different types of pollution.
2. Explain causes and preventive measures against water, air, solid waste and noise pollution
3. Formulate various mitigation measures to reduce the pollution.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO	1	3	3	3	3	3	3	3	3	1	3	2	1	3	2	3
	2	3	2	2	2	3	-	-	-	-	-	-	-	3	2	3
	3	-	2	2	3	2	3	3		1	2	3	1	3	2	3

UNIT I

Water Sources- Origin of waste water – Types of water pollutants and their effects, Sources of water pollution and their effects

UNIT- II

AIR POLLUTION - Causes of air pollution – Types & sources of air pollutants- Climatic & Meteorological effect on air pollution concentration- Formation of smog and fumigation, Different air pollution episodes in India and Abroad.

UNIT- III

SOURCES AND TYPES OF MUNICIPAL SOLID WASTES - Sources and types of solid wastes – factors affecting generation of solid wastes; characteristics - effects of improper disposal of solid wastes – public health effects- principle of solid waste management – social & economic aspects- public awareness- role of NGOs- legislation

UNIT –IV

NOISE POLLUTION & CONTROL - Noise Pollution: Intensity, Duration – Types of Industrial Noise – ill affects of Noise – Noise Measuring & Control – Permissible Noise Limits

UNIT –V

Environmental Impact Assessment- Assessment of Impact on land, water and air, noise, social, cultural flora and fauna - Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) – EIA capability and limitations –Legal provisions on EIA.

REFERENCES

1. Garg, S.K, (2015) “Environmental Engineering (Vol.II): Sewage disposal and Air Pollution Engineering” Khanna Publishers (33th Edition, 2008)
2. Peavy, H.S., Rowe, D.R., and Tchobanoglous, G, (1985), “Environmental Engineering” McGraw-Hill international edition (7th Edition)
3. Dr. B.S.N. Raju, (1995), “Water supply and Waste Water Engineering” McGraw-Hill Education
4. Dr. P.N. Modi,(2010), “Sewage treatment disposal and waste water engineering” Standard Book House-Delhi (4th Edition)
5. Urban and Jain (1993) “Environmental Impact Assessment”, McGraw-Hill Education
6. Relevant I.S. Codes

WATER RESOURCES CONSERVATION

(For IV B.Tech. I Sem All except Civil Engineering students)

CIV411 (B)

Instruction: 3 Lecture & 1 Tutorial / week

End Exam: 3 hours

Credits: 3

Sessional marks: 40

End Exam Marks: 60

Prerequisites:

NIL

Course Objective

The course content enables students to learn Water Hydrology, importance of water conservation and methods to conserve Water Resources.

Course Outcomes

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

1. Explain water hydrology and environmental influence.
2. Outline the concepts of Artificial Ground Water Recharge.
3. Learn the Concept of Water Harvesting.
4. Explain Reuse & Recycle of Waste Water and Watershed Management.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO	1	2	1	-	2	1	3	3	2	1	-	1	3	2	2	2
	2	3	1	2	2	2	3	3	2	2	2	2	3	3	3	3
	3	3	2	3	2	2	3	3	2	3	2	2	3	3	3	3
	4	3	2	3	2	3	3	3	3	3	2	2	3	3	3	2

UNIT-I

Ground and Surface Water Utilization- Historical background, Hydrologic Cycle, Water Budget, Ground Water level fluctuations and Environmental influence.

UNIT-II

Artificial Ground Water Recharge: Concept & methods of artificial ground water recharge, recharge mounds & induced recharge, wastewater recharge for reuse, Water Spreading, Farm Ponds and Percolation Tanks.

UNIT-III

Water Harvesting: Rainwater harvesting, Catchment Harvesting, Harvesting Structures, Soil Moisture Conservation, Check Dams.

UNIT-IV

Reuse & Recycle of Waste Water: Types of reuse, Application of treated waste water, Purity of reclaimed water, Guidelines and Regulations, New technologies used in recycling of Waste Water.

UNIT-V

Watershed management- Introduction, Concept of watershed Management, Watershed Management policies and decision making.

REFERENCES

1. Ramakrishnan S.(1996),"Ground water", Scitech Publications, 2nd Edition.
2. Todd D.K. & Mays L. F.(2006),"Groundwater Hydrology", John Wiley and sons, 2nd Edition.
3. Murthy J.V.S.(1998), "Watershed Management", New Age International Publishers, 2nd Edition.
4. Murthy V.V.N.(2013), " Land and Water Management", Kalyani Publications, 6th Edition.
5. US Environment Protection Agency, 1992. "Guidelines for Water Reuse".

ELEMENTS OF TRANSPORTATION ENGINEERING

(For IV B.Tech. I Sem All except Civil Engineering students)

CIV 411(C)

Instruction : 3 Lectures & 1 Tutorial / week

End Exam : 3 Hours

Credits : 3

Sessional Marks : 40

End Exam Marks : 60

Prerequisite:

Nil

Course Objective:

4. To study the various modes of transportation.
5. To know the different traffic control devices.

Course Outcomes:

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

6. Know the various components in pavements and their functions.
7. Understand the traffic regulations and control devices.
8. Study the components of permanent way and their functions.
9. Know the harbour and port layout components.
10. Study about shapes of tunnels and methods.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO	1	3	2	-	-	-	2	1	1	1	1	-	2	3	2	3
	2	3	2	-	-	-	-	2	1	-	1	1	2	3	2	3
	3	3	2	1	-	-	1	1	1	2	2	2	2	3	2	2
	4	3	2	1	-	2	1	1	-	2	1	1	3	3	3	3
	5	3	1	1	-	-	1	1	-	1	1	2	2	3	2	3

SYLLABUS

UNIT – I

12 Periods

Highway Engineering : Modes of transportation, Classification of roads, Types of Pavements & Components– Flexible and Rigid Pavements and Super elevation, Traffic Control Devices.

UNIT – II

12 Periods

Railway Engineering: Importance of Railways in National Development, Railway Track (Permanent Way) – Components and Functions, Points and Crossings.

UNIT – III

12 Periods

Airport engineering: Airport Classification, Definitions of terms and standards, Airport site selection, Orientation of runway – Wind rose.

UNIT – IV

12 Periods

Harbour Engineering: Definition of terms – Harbour, port, dock, tides, waves – Classification of Harbours, Different ports in India, Harbour and port layout – Components and functions.

UNIT – V

12 Periods

Tunnel Engineering: Definition, Shapes of tunnels, Selection of route for tunnels, Shafts, Methods of tunneling, Ventilation and lighting.

REFERENCES

1. K.P.Subramanian (2003), “ Highway, Railway, Airport and Harbour Engineering” Scitech Publications (India) Pvt. Ltd
2. S. K. Khanna & C. E. G. Justo,(1973), “Highway Engineering” Nemchand & Brothers, Roorkee, (3rd Edition).
3. Partha Chakroborty & Animesh Das, (2003), “Principles of Transportation Engineering” Prentice Hall of India, New Delhi, (6th Edition)
4. Rattan Chand Sharma & Surendra Kumar Sharma, (2007), “Highway Engineering” Asia Publication.
5. B.C.Punmia (2006) “ Tunnel Engineering” Laxmi Publications.

Note: As the subject is an Open elective taken by non-civil engineering students, the student is expected to gain only elementary knowledge of the subject.