**ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY**

**Kahilipara, Guwahati - 19**

# Syllabus

# 8$^{\text{th}}$ Semester, B Tech

Civil Engineering

# 8<sup>th</sup> Semester(Civil Engineering)

| Sl. No. | Sub Code | Subject | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | **Theory** | | | | | |
| **1** | CE131801 | Design of structure-IV | 3 | 0 | 0 | 3 |
| **2** | CE131802 | Construction Project Management | 3 | 0 | 0 | 3 |
| **3** | CE1318EXX | Elective-1(Departmental) | 3 | 0 | 0 | 3 |
| **4** | CE1318EXX | Elective-2(Departmental) | 3 | 0 | 0 | 3 |
| **5** | **1318EXX | Elective (Open) | 3 | 0 | 0 | 3 |
| | **Practical** | | | | | |
| **6** | CE131811 | Structural Design and Drawing Lab | 0 | 0 | 2 | 1 |
| **7** | CE131813 | Project-2 | 0 | 0 | 14 | 7 |
| **8** | CE131821 | Comprehensive Viva | 0 | 0 | 4 | 2 |
| Total | | | 15 | 0 | 20 | 25 |
| Total Working Hours = 35 | | | | | | |
| Total Credits = 25 | | | | | | |

# DESIGN OF STRUCTURES - IV
## Subject Code: CE131801

L-T-P= 3-0-0                                                                    Credit=3

Expected Weeks=12

| Module | Topics | Hours |
|:---:|:---|:---:|
| | **1st half (40%)** | |
| 1 | **Introduction to Seismic Design and Detailing of RCC buildings** Elements of seismology, Determination of Earthquake Forces (IS: 1893 (part-I)-2002; seismic coefficient method; response spectrum method); seismic design and detailing of RC buildings | 10 |
| | **2nd half(60%)** | |
| 2 | **General consideration of bridges:** Types of bridges, selection of suitable types of bridges, Characteristics of an ideal site for a major bridge, Importance of hydraulic data in bridge design, Rational method for determination of flood discharge of a river at a bridge site, Afflux and how magnitude of afflux influence bridge design. | 5 |
| 3 | **Loads and their distribution:** IRC loads, Railway loads, military loading classes, analysis of deck slab for wheel loads, load distribution among various longitudinal beams of a bridge. | 11 |
| 4 | **Design of super-structure:** R.C.C. Tee beam bridge, balanced cantilever bridge, Pratt truss steel bridge. | 11 |
| 5 | **Design of sub-structure:** Various types of bearing and design. | 5 |
| | **Total Hours** | 42 |

## Structural Design and Drawing Laboratory (CE131811)

L-T-P= 0-0-2                                                                                           Credit=1

Expected Weeks=12

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| • Design of RCC and steel structure by using software like STAAD, SAP etc. |
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**Recommended Books:**

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| • Design of R.C.C structures; Ramamurtham; DhanpatRai Publishing Co. |
| • Limit State Design of R.C.C Structures, A.K. Jain, Nemchand Brothers |
| • Design of RCC ,N.Krishnaraju , CBS Publishers |
| • Reinforced concrete design,    S.U. Pillai and DevdasMenon          Tata Mcgraw Hill |
| • Design of Steel Structures, Ramchandra, Standard book House Vol –I, II Delhi |
| • Design of Steel Structures, L.S.Negi, Tata McGraw Hill |
| • Design of steel structures, A .S Arya&Nemchand&Brothers |
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# Construction Project Management
## Subject Code: CE131802

L-T-P= 3-0-0                                                                    Credit=3

Expected Weeks=12

| Module | Topics | Hours |
|:---:|:---|:---:|
| 1 | **Project:** Project conception, Feasibility study, Cost benefit Analysis, Project appraisal. | 4 |
| 2 | **Planning:** Staff, Labour, Materials, Logistics. | 3 |
| 3 | **Management:** Network method, Resource management-materials/men/machines/money. Project cost control. | 6 |
| 4 | **Contacts:** General condition, types/bias. Special condition, Specifications, Measurement, Payment types/conditions. | 5 |
| 5 | **Tendering:** Pre-qualification criteria, Tender documents, Tender evaluation, Tender negotiation, Tender pricing strategies. Construction Finance, Financial planning, Costing, Time and cost over runs, Claims& Settlement. Insurance | 4 |
| 6 | **Personnel**: Personnel management, Staff &Labour welfare, Public relation. | 3 |
| 7 | **Quality control:** Organizing construction, Inspection and quality control. | 6 |
| 8 | **Safety:** Site safety measures, Accident prevention, First Aid. | 4 |
| 9 | **Laws:** Labour law; Arbitration | 4 |
| | **Total Hours** | **41** |

**Recommended Books:**

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| • Project Planning and Control With PERT And CPM Dr. B.C. PunmiaLaxmi Publications(P) <br> K. K. Khandelwal Ltd. New Delhi |
| • PERT and CPM Principles and Applications, L.S. Srinath Affiliated East -West Press Pvt. Ltd. New Delhi |
| • Project Management with PERT and CPM Dr. D.S. Hira S.K. Kataria& Sons New Delhi |
| • A Management Guide to PERT CPM With GERT/PDM/DCPM / Jerome D. Wiest Prentice Hall of Ferdinand K. Levy India Pvt. Ltd. |
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## Elective-1(Departmental)
## DESIGN OF SUB – STRUCTURES
## Subject Code: CE1318EXX

L-T-P= 3-0-0                                                                 Credit=3

Expected Weeks=12

| Module | Topics | Hours |
|:---:|:---|:---:|
| 1 | **Foundation in Soils :** Foundation at different levels, effect of seasonal weather changes, effect of mass movements of ground in unstable areas, Precautions for foundations on inclined strata, strata of varying thickness, spacing between existing and new foundation, loads on foundation, settlement, criteria for settlement analysis for shallow foundation, stability against overturning and sliding, with reference to IS 1904-1986 (Reaffirmed 1995), Code of practice for design and construction of foundation in soils : General requirements (Third Revision) | 02 |
| 2 | **Shallow Foundation :** Geotechnical and Structural design of Isolated footing- square, rectangular and sloped; combined footing – rectangular and trapezoidal, with special emphasis on dimensioning, checks for bending moment, one-way shear, punching shear, bearing and development length, using relevant IS codes of practice. | 10 |
| 3 | **Mat Raft Foundation :** Geotechnical and Structural design of Mat or Raft foundation, with special emphasis on dimensioning, checks for bending moment, one-way shear, punching shear, bearing and development length, using relevant IS codes of practice. | 04 |
| 4 | **Pile Foundation:** Geotechnical and Structural design of pile, pile group and pile cap- square, rectangular and triangular, using relevant IS codes of practice. | 12 |
| 5 | **Retaining Wall:** Geotechnical and Structural design of Reinforced Concrete Retaining Wall and Reinforced Earth Retaining Wall, using IS code. | 06 |
| 6 | **Well Foundation:** Forces acting on a well foundation, well sinking, tilts and shifts. | 02 |
| 7 | **Beams on Elastic Foundation:** Introduction, Classical solution of beams on elastic foundation, modulus of subgrade reaction. | 02 |
| 8 | **Finite Difference Method:**Finite Difference method for mat foundation | 02 |

|  | **Total Hours** | **40** |
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**Recommended Books:**

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| • Analysis and Design of Substructures by Swami Saran |
| • Foundation Analysis and Design by Joseph E. Bowles (McGraw Hill Education India Pvt. Ltd.) |
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# WATER RESOURCES ENGINEERING
## Subject Code: CE1318EXX

L-T-P= 3-0-0                                                                                          Credit=3

Expected Weeks=12

| Module | Topics | Hours |
|--------|--------|-------|
| 1 | **Introduction: -**<br>• Fields of water resources engineering; problems of water resources engineering,<br>• Social aspects of water resources engineering, the future of water resources engineering. Water resource in North East and its use. | 2 |
| 2 | **Engineering Economy in Water Resources Planning: -**<br>• Social importance, steps in an Engineering economy study,<br>• Discount rate, sunk cost, intangible values, economic life, physical life and period of analysis of a project,<br>• Cash flow diagram, discounting factors – single payment factors and uniform annual series factors, discounting methods, present worth method, rate of return method, annual cost method,<br>• Benefit cost ratio method. | 8 |
| 3 | **Cost Allocation: -**<br>• Definition, separable cost, joint cost, common cost, method of cost allocation–remaining benefits method and alternative justifiable expenditure method. | 5 |
| 4 | **Planning for Water Resources Development: -**<br>• Levels of planning, phases of planning objectives, data required for planning, projections for planning, project formulation, project evaluation,<br>• environmental considerations in planning multipurpose project planning, requirement of uses in multipurpose projects, drawbacks in project planning. | 8 |
| 5 | **Dams and embankments:**<br>• Elements of gravity, arch and earth dams, selection of sites, stability analysis, | 5 |

| | | embankments – materials of construction, typical sections, effectiveness and side effects. | |
| --- | --- | --- | --- |
| | | • Problems. | |
| 6 | **Reservoir: -** <br> • Purpose, physical characteristics of reservoir, storage capacity determination from the site, <br> • Reservoir site selection, life storage capacity by mass curve method, <br> Reservoir sedimentation, trap efficiency, distribution of sediment in a reservoir, useful life of reservoir, reservoir operation, reservoir sedimentation control, reservoir yield, economic height of a dam, reservoir working table. | | 8 |
| 7 | **Water Power Engineering:-** <br> • Water power utilization principles, power from flowing streams, demand for power, role of storage and pondage in water power development, firm power and secondary power. <br><br> • Types of water power developments: Run-off river, storage, pumped storage, tidal and others, characteristics and layout of low, medium and high head hydropower developments. | | 6 |
| | | **Total Hours** | **40** |

**Recommended Books:**

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| • *Water Power Engineering- M.M. Dhandekar- Vikas Publishing House Pvt Ltd.* |
| • *Elements of water resources engineering- K.N. Duggal, J.P. Soni, New Age International Publications.* |
| • *Irrigation Engineering and water power engineering- Dr. B.C Punmia& Dr. Pande B.B. Lal, Laxmi Publications* |
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**Elective-2(Departmental)**

**Earthquake Engineering**

**Subject Code: CE1318EXX**

L-T-P= 3-0-0                                                                    Credit=3

Expected Weeks=12

| Module | Topics | Hours |
|--------|--------|-------|
| 1 | **Introduction of Earthquake Engineering:**<br><br>Introduction to Earthquake Engg. Engineering Seismology (Definitions, Introduction to Seismic hazard, Earthquake Phenomenon), Causes of Earthquake, Earthquake effects on structures, Seismic Waves, Earthquake Magnitude, Earthquake Intensity Scale, Earthquake Energy Release Mechanism, Earthquake measuring instrument. Seismotectonics and Seismic Zoning of India. | 3 |
| 2 | **Dynamics Analysis of Structure:**<br><br>SDOF systems: Equations of Motion, Free vibration, damping, Forced vibrations under harmonic, impulse and general loadings, Response spectrum Generalized SDOF systems: Rigid body distributed mass and stiffness systems; MDOF Systems: Dynamic properties, | 10 |
| 3 | **Earthquake Analysis And Earthquake resistant construction**<br>Idealization of structures: equivalent force concepts, equivalent seismic lateral loads, using seismic coefficient method, response spectrum analysis; use of IS 1893:2002 for analysis and design of building structures, concept of ductility in structures, codal provisions for ductile detailing as per IS-13920-1993. | 15 |
| 4 | **Earthquake Geotechnical Engineering**<br>Geotechnical considerations in Earthquake resisitant design, introduction to soil-structure interaction, dynamic design parameters of soil,Shear strength determination by cyclic simple shear test and by cyclic triaxial test, Liquefaction of | 12 |

| | soil and its mechanism, factors affecting liquefaction, liquefaction potential determination by Seed &Idrismethod,codal provision for earthquake consideration in foundation design(IS:1893,pt.I) earthquake consideration in earth pressure on  retaining walls (as per IS 1893 pt.III) | |
|---|---|---|
| | **Total Hours** | **40** |

**Recommended Books:**

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| • R.W. Clough and J. Penzien, Dynamics of Structures, Second edition, McGraw Hill International edition, 1993. |
| • M. Paz, Structural Dynamics, CBS Publishers, 1987 |
| • A. K. Chopra, Dynamics of Structures: Theory and applications to earthquake engineering, Prentice Hall of India Ltd., 1997. |
| • K. Rao, Vibration analysis and foundation dynamics, Wheeler, 1998. |
| • S K Duggal, Eartquake resistant design of structures .Oxford Univ Press. |
| • S L Kramer, Geotechnical Earthquake Engineering, Pearson Education. |

# Elective-Open

# DISASTER MANAGEMENT

## Subject Code: **1318EXX

L-T-P= 3-0-0                                                          Credit=3

Expected Weeks=12

| Module | Topic | Number of hours |
|---|---|---|
| 1. **Introduction** | Disaster management- definition, necessity of studying DM, basic terms- hazard, emergency, disaster, risk, vulnerability and their relationship. Types of vulnerability, emergency. Types of disaster- causes and speed of onset. | **6** |
| 2. **Disaster management cycle**: - | Introduction, definition of components of DM cycle. *Phase 1*: Mitigation,- structural, non-structural, hazard identification and vulnerability analysis and various mitigation strategies. *Phase 2*: Preparedness- different measures- DRR, EOP- developing and writing the EOP. *Phase 3 and 4*: Response- terminology, aims of disaster response, disaster response activities, modern methods of disaster response. Disaster recovery- definition, the recovery plan. | **10** |
| 3. **Education and public awareness** | Necessity and stake holders roles and responsibilities- school based programs. | **3** |
| 4. **Role of technology in DM**: | Emergency management system- GIS, GPS and RS. | **4** |
| 5. **Media and DM**: | Introduction, role of media in DM. | **4** |
| 6. **Physical and socio-economic impacts of disaster** | Types of impacts- physical and social. | **3** |

| 7. | **Common disasters in North East region of India**: | Earthquake, flood, landslide: their causes, vulnerability, mitigation, preparedness. | **5** |
|---|---|---|---|
| 8. | **Building vulnerability**: | Grades of damage to RCC structure, retrofitting measures, soft storey effect, measures against soft storey failure. Special earthquake resistant devices. | **5** |
| | | Total | **40** |

**Recommended Books:**

- Dr. InduPrakash, 1994, *Disaster Management*, RashtriyaPrahariPrakashan, Sahibabad, Ghaziabad.

- V.K Sharma (Editor), 1995, *Disaster Management*, Indian Institute of Public Administration, New Delhi.

- U.R Rao, *Space Technology For Sustainable development*, Tata McGraw Hill.

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# Project-2(CE131813)

L-T-P= 0-0-14                                                Credit=7
Expected Weeks=12

Guidelines will be issued by the University from time to time.

# Comprehensive Viva(CE131821)

L-T-P= 0-0-4                                                 Credit=2
Expected Weeks=12

Guidelines will be issued by the University from time to time.