# UNIVERSITY OF MUMBAI



# Bachelor of Engineering

**Civil Engineering (Third Year – Sem. V), Revised course**

**(REV- 2012) from Academic Year 2012 -13,**

**Under**

# FACULTY OF TECHNOLOGY

(As per Semester Based Credit Grading System)

# University of Mumbai
## Scheme of Instructions and Examination
## Third Year Engineering (Civil Engineering)
## (With effect from 2014-2015)
### Semester V

| Subject Code | Subject Name | Teaching Scheme (Contact Hours) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Pract. | Tut. | Theory | Pract. | Tut. | Total |
| CE-C501 | Structural Analysis – II | 4 | 2 | -- | 4 | 1 | | 5 |
| CE-C502 | Geotechnical Engg.– I | 4 | 2 | -- | 4 | 1 | -- | 5 |
| CE-C503 | Building Design and Drawing – II | 1 | 4* | -- | 1 | 2 | -- | 3 |
| CE-C504 | Applied Hydraulics – I | 4 | 2 | -- | 4 | 1 | -- | 5 |
| CE-C505 | Transportation Engg. – I | 4 | 2 | -- | 4 | 1 | -- | 5 |
| CE-C506 | Employment and Corporate Skills | - | 4† | - | - | 2 | - | 2 |
| | **Total** | **17** | **16** | **--** | **17** | **8** | | **25** |

| Subject Code | Subject Name | Examination Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Theory | | | | | Term Work | Pract | Oral | Total |
| | | Internal Assessment | | | End Sem. Exam. | Exam. Duration (in Hrs) | | | | |
| | | Test 1 | Test 2 | Avg. | | | | | | |
| CE-C501 | Structural Analysis – II | 20 | 20 | 20 | 80 | 3 | 25 | -- | 25 | 150 |
| CE-C502 | Geotechnical Engg. – I | 20 | 20 | 20 | 80 | 3 | 25 | -- | 25 | 150 |
| CE-C503 | Building Design and Drawing – II | 20 | 20 | 20 | 80 | 4 | 25 | -- | 25# | 150 |
| CE-C504 | Applied Hydraulics – I | 20 | 20 | 20 | 80 | 3 | 25 | -- | -- | 125 |
| CE-C505 | Transportation Engg. – I | 20 | 20 | 20 | 80 | 3 | 25 | -- | -- | 125 |
| CE-C506 | Employment and Corporate Skills | -- | -- | -- | -- | - | 25 | -- | 25** | 50 |
| | **Total** | **100** | **100** | **100** | **400** | **-** | **150** | **-** | **100** | **750** |

#**Oral  Sketching**                                **\*\*Oral  Presentation**

\* For Building Design Drawing- II, although 4 (Four) clock hours are mentioned under the head of Practicals, 1 (One) clock hour out of these 4 (Four) clock hours may be utilized as the Theory at the College/ Institute level accordingly, provision may be made in the Time Table.

† For Employment and Corporate Skills although 4 clock hours are mentioned under the head of Practicals, 2 (Two) clock hours out of these 4 (Four) clock hours may be utilized as the Theory at the Institute/ College level accordingly, provision may be made in the Time Table.

| | Semester V | |
|---|---|---|

| Subject Code | Subject Name | Credits |
|---|---|---|
| CE – C501 | Structural Analysis –II | 5 |

## Teaching Scheme

| Contact Hours | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|
| Theory | Practical | Tutorial | Theory | Practical | Tutorial | Total |
| 04 | 02 | - | 4 | 1 | - | 5 |

## Evaluation Scheme

| Theory | | | | | Term work / Practical / Oral | | | Total |
|---|---|---|---|---|---|---|---|---|
| Internal Assessment | | | End Sem Exam | Duration of End Sem Exam | TW | PR | OR | |
| Test 1 | Test 2 | Average | | | | | | |
| 20 | 20 | 20 | 80 | 03 Hrs. | 25 | - | 25 | 150 |

## Rationale

There are various types of the components of any civil engineering structures which are subjected to different types of loading or combination thereof. The knowledge gained in the subjects such as Engineering Mechanics, Strength of Materials and Structural Analysis-I is extended in this subject. The scope of the subject is to evaluate the response in the form of Shear Forces, Bending Moments, Axial Forces, and Twisting Moment in various statically indeterminate structures such as beams, rigid and pin jointed frames; and two hinged arches. The subject involves the concept of the displacement and flexibility approach for analyzing the indeterminate structures. The subject also involves the analysis of the indeterminate structures using the concept of plastic analysis.

| Objectives |
|---|

- To revise the various concepts involved in the analyses of the structures studied in the subject Structural Analysis-I.

- To analyze the statically determinate structures with reference to the variation in the temperature.

- To understand the concept of static and kinematic indeterminacy (degrees of freedom) of the structures such as beams rigid pin jointed frames.

- To understand the concepts/ broad methods, sub-methods involved in the analysis of indeterminate structures.

- To apply these methods for analyzing the indeterminate structures to evaluate the response of such structures in the form of bending moment, shear force, axial force etc.

- To study the analyses of two hinged arches.

| Detail Syllabus |
|---|

| Module | Sub Modules/Contents | Periods |
|---|---|---|
| 1. | **General**<br><br>Types of structures occurring in practice, their classification. Stable and unstable structures, statically and kinematical determinacy indeterminacy of structure. Symmetric structures, symmetrical & anti-symmetrical loads, distinction between linear and non-linear behaviors of material and geometric non-linearity. | **06** |
| 2. | **Deflection of statically determinate structures**<br><br>Review of general theorems based on virtual work energy methods, introduction to the concept of complimentary energy, absolute & relative deflection caused by loads, temperature changes settlement of supports, application to beams, pin jointed frames, rigid jointed frames. | **06** |
| 3. | **Analysis of indeterminate structures by flexibility method**<br><br>Flexibility coefficients their use in formulation of compatibility equations. Fixed Beams, Application of the Clapeyron's Theorem of Three Moments. Castigliaonos theorem of least work, application of above methods to propped cantilevers, fixed beams, continuous beam, Simple pin jointed | **14** |

| | | frames including effect of lack of fit for members, Simple rigid jointed frames two hinged parabolic arches. | |
|---|---|---|---|
| **4.** | | **Analysis of indeterminate structures by stiffness method** | **14** |
| | | Stiffness coefficients for prismatic members, their use for formulation of equilibrium equations, direct stiffness method, Slope deflection method, Moment distribution method. Application of the above methods to indeterminate beams & simple rigid jointed frames, rigid jointed frames with inclined member but having only one translation degree of freedom including the effect of settlement of supports. | |
| **5.** | | **Introduction to plastic analysis of Steel structures** | **08** |
| | | Concept of plastic hinge, plastic moment carrying capacity, shape factor, determination of collapse load for single and multiple span beams. | |

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## Contribution to Outcomes

On completion of this course, the students will be able to understand the behaviour of various statically indeterminate structures including two hinged arches. They will be able to analyze these structures to find out the internal forces. Further, the students shall be able to extend the knowledge gained in this subject further in the subjects related to structural engineering mechanics in the higher years of their UG programme. The knowledge gained in this subject shall be useful for application in the structural design in later years.

**Theory Examination:**
1. Question paper will comprise of **six** questions; each carrying 20 marks.
2. The **first** question will be **compulsory** will have the short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining **five** questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. There can be an **internal** choice in various questions/ sub-questions in order to accommodate the questions on all the topics/ sub-topics.
5. The students will have to attempt any **three** questions out of remaining five questions.
6. Total **four** questions need to be attempted.

**Oral Examination:**

The oral examination shall be based upon the entire syllabus and the term work consisting of the assignments.

**Term Work:**

The term-work shall comprise of the neatly written report of the assignments. The assignments shall be given covering the entire syllabus in such a way that the students would attempt at least four problems on each modules/ sub-modules contents thereof further.

**Distribution of Term-work Marks**

The marks of term-work shall be judiciously awarded depending upon the quality of the term work including that of the report on experiments assignments. The final certification acceptance of term-work warrants the satisfactory the appropriate completion of the assignments the minimum passing marks to be obtained by the students. The following weightage of marks shall be given for different components of the term work.

- Assignments          : 20 Marks
- Attendance           : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Recommended books:**

1. Basic Structural Analysis: *C.S. Reddy*, Tata McGraw Hill Publishing House, New Delhi.
2. Mechanics of Structures (Vol-I  and II) : *S. B. Junnarkar  H.J. Shah*, Charotar Publishers.
3. Structural Analysis: *L.S. Negi and  R.S. Jangid*, Tata Mc-Graw Hills Publishing House, New Delhi
4. Analysis of Structures: Vol. I  II, *Vazirani and  Ratwani,* Khanna Publishers
5. Structural Analysis: *Bhavikatti*, Vikas Publishing House Pvt, ltd.
6. Structural Analysis: *Devdas Menon*, Narosa Publishing House.
7. Basic Structural Analysis: K.*U. Muthu, Azmi Ibrahim, M. Vijyan, Maganti Janadharn. I.K. International Publishing House Pvt. Ltd.*

8. Comprehensive Structural Analysis (Vol-I and II): *Vaidyanathan R. and Perumal R.* ; Laxmi Publications.

9. Fundamentals of Structural Analysis: *Sujit Kumar Roy and Subrota Chakrabarty*, S. Chand and Co., New Delhi

10. Structural Analysis: *T.S. Thavamoorthy*, Oxford University Press.

11. Structural Analysis: *Manmohan Das and Bharghab Mohan,* Pentice Hall International.


**Reference Books:**

12. Structural Analysis: *Hibbler*, Pentice Hall International.

13. Structural Analysis: *Chajes*, ElBS London.

14. Theory of Structures: *Timoshenko and Young*, Tata McGraw Hill New Delhi.

15. Structural Analysis: *Kassimali*, TWS Publications.

16. Element of Structural Analysis: *Norries & Wilbur*, McGraw Hill.

17. Structural Analysis: *Laursen H.I*, McGraw Hill Publishing Co.

18. Structural Theorem and Their application: *B.G. Neal*, Pergaman Press.

19. Fundamentals of Structural Analysis: *K.M. Leet*, C.M. Uang and A.M. Gilbert, Tata McGraw Hill New Delhi.

20. Elementary theory of Structures: *Hseih*, Prentice Hall.

21. Fundamentals of Structural Analysis: Harry, H.W. and Louis, F.G., Wiley India

| Semester V |
|:---:|

| Course Code | Subject Name | Credits |
|:---:|:---:|:---:|
| CE-C502 | Geotechnical Engineering -I | 5 |

## Teaching Scheme

| Contact Hours | | | Credits Assigned | | | |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| Theory | Practical | Tutorial | Theory | Practical | Tutorial | Total |
| 04 | 02 | - | 4 | 1 | - | 5 |

## Evaluation Scheme

| Theory | | | | | Term work / Practical / Oral | | | Total |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| Internal Assessment | | | End Sem Exam | Duration of End Sem Exam | TW | PR | OR | |
| Test 1 | Test 2 | Average | | | | | | |
| 20 | 20 | 20 | 80 | 03 Hrs. | 25 | - | 25 | 150 |

| Rationale |
|:---:|

All the civil engineering structures, e.g., buildings, dams, bridges, highways, etc., are supported on the ground, i.e., supported by soil rock. The geotechnical analysis depends on the basic of physical properties which are useful for determining the strength, compressibility, drainage etc. The soil mechanics is the basic tool for all branches of geotechnical engineering. Soil is used as construction materials; thus, it is necessary to study this curriculum.

| Objectives |
|:---:|

- To study the composition, types relationships involving weight, volume weight-volume of soil.
- To study the index properties of soil that is indicative of the engineering properties.
- To characterize the soil based on size, shape, index properties plasticity.
- To classify the soil based on different classification systems.
- To study the properties of soil related to flow of water
- To understand the concept of total stress, effective stress pore water pressure in soil.

- To understand the load-deformation process in soils through compaction consolidation.
- To study the shear strength of soil.
- To understand the techniques of site exploration, assessing the subsoil conditions the engineering properties of the various strata method of reporting.
- To perform different laboratory tests.

| Detail Syllabus |
|---|

| Module | Sub Modules/Contents | Periods |
|---|---|---|
| 1. | **Introduction** | 01 |
| | i. Definitions: Rock, Soil - origin & formation, Soil mechanics, Rock mechanics, Soil engineering, Geotechnical engineering. | |
| | ii. Scope of soil engineering- Importance of field exploration & characterization, design construction phases of foundations, post construction phase monitoring. | |
| | iii. Limitations of soil engineering. | |
| | iv. Cohesionless cohesive soil; Terminology of different types of soil. | |
| 2. | **Basic definitions and relationships** | 05 |
| | i. Soil as three phase and two phase system in terms of weight, volume, void ratio, porosity. | |
| | ii. Weight, volume weight–volume relationships: water content, void ratio, porosity, degree of saturation, air voids, air content, unit weights, specific gravity of solids, mass absolute specific gravity. | |
| | iii. Relationships between: different unit weights with void ratio-degree of saturation-specific gravity; different unit weights with porosity; void ratio-water content; different unit weights with water content; unit weight – air voids. | |
| | iv. Mention different methods to find water content, specific gravity, unit weight of soil (Detailed description to be covered during practical). | |
| 3. | **Particle size analysis and Plasticity characteristics of soil** | 06 |
| | i. Mechanical analysis: dry sieve analysis combined sieve sedimentation analysis; Stokes' law, theory of sedimentation; introduction to hydrometer method of analysis, relation between | |

| | | | |
|---|---|---|---|
| | | percentage finer hydrometer reading, Limitation of sedimentation analysis, Particle size distribution curve & its uses. | |
| | ii. | Relative density | |
| | iii. | Plasticity of soil, consistency limits- determination of liquid limit, plastic limit, shrinkage limit, definitions of: shrinkage parameters, plasticity, liquidity consistency indices, measurement of consistency, flow toughness indices, uses of consistency limits. | |
| | iv. | Clay mineralogy:- gravitational surface forces, primary valance bond, hydrogen bond, secondary valance bonds, basic structural units of clay minerals, difference in kaolinite, montmorillonite illite minerals, adsorbed water, soil structure. | |
| | v. | Sensitivity, thixotropy activity of soils. | |
| **4.** | **Classification of soils** | | **03** |
| | i. | Necessity of soil classification, Indian Standard particle size classification, Indian standard soil classification system, boundary classifications | |
| | ii. | General characteristics of soils of different groups. | |
| **5.** | **Permeability of soils** | | **06** |
| | i. | Introduction: ground water flow- water table, types of aquifers; capillary water – types of soil water, surface tension, capillary rise in small diameter tubes, capillary tension, capillary rise in soils. | |
| | ii. | Hydraulic head, hydraulic gradient, Darcy's law, validity of Darcy's law. | |
| | iii. | General laminar flow, Laminar flow through soil, Factors affecting permeability of soil. | |
| | iv. | Determination of coefficient of permeability of soil:- Laboratory methods: constant head variable head; Field methods: pumping out pumping in tests; Indirect methods: Consolidation test data. | |
| | v. | Permeability of stratified soil. | |
| **6.** | **Seepage analysis** | | 05 |
| | i. | Two dimensional flow- Laplace equation, analytical solution: stream potential functions, graphical representation: flow net, characteristics of flow net, uses of flow nets. | |

| | | | |
|---|---|---|---|
| | ii. | Other solution methods for Laplace equation- numerical methods. | |
| | iii. | Soil migration filtration: Seepage velocity; Effect of seepage pressure soil migration in structures such as earth dams, retaining walls, pavements, basements; soil migration prevention through graded soil filters, geotextile & geo-composite filters. | |
| | iv. | Geosynthetics: Definition, basic functions, types of geosynthetics— geotextiles, geogrids, geo cells, geomembranes, geo composites; geotextile types– woven  nonwoven, Apparent Opening Size (AOS), basic hydraulic properties- permittivity  transmissivity of geotextiles | |
| | v. | Filter design criteria for graded soil geotextile filters. | |
| **7.** | **Effective stress principle** | | **03** |
| | i. | Sources of stress in the ground- geostatic stresses induced stresses; vertical, horizontal shear stresses, effective stress principle, and nature of effective stress. | |
| | ii. | Effect of water table fluctuations, surcharge, capillary action, seepage pressure on effective stress; quick s condition | |
| **8.** | **Compaction of soils** | | **02** |
| | i. | Introduction, theory of compaction, laboratory methods of determination of optimum moisture content,  maximum dry density, | |
| | ii. | Factors affecting compaction, effect of compaction on properties of soil; Relative compaction. | |
| **9.** | **Consolidation of soils** | | **06** |
| | i. | Compressibility  settlement, comparison between compaction consolidation, concept of excess pore water pressure, initial, primary secondary consolidation, spring analogy for primary consolidation, consolidation test results, coefficient of compressibility, coefficient of volume change , compression, expansion  recompression indices, normally  over consolidated soils. | |
| | ii. | Terzhaghi's theory of consolidation- assumptions, coefficient of vertical consolidation, distribution of hydrostatic excess pore water pressure with depth  time, time factor, relationship between time factor degree  of consolidation, determination of coefficient of vertical consolidation, pre-consolidation pressure. | |

| | | | |
|---|---|---|---|
| | iii. | Final settlements of a soil deposit in the field, time settlement curve, field consolidation curve. | |
| 10. | **Shear strength** | | **06** |
| | i. | Introduction, three dimensional state of stress in soil mass, principal stresses in soil, shear failure in soils- frictional cohesive strength, general shear stress-strain curves in soil definition of failure, graphical method of determination of stresses on a plane inclined to the principal planes through Mohr's circle, important characteristics of Mohr's circle. | |
| | ii. | Mohr-Coulomb theory- shear strength parameters; Mohr-Coulomb failure criterion- relation between major minor principle stresses, total effective stress analysis. | |
| | iii. | Different types of shear tests drainage conditions; Direct shear test, Triaxial compression test (UU, CU CD), Unconfined compression test, Vane shear test; comparison between direct triaxial tests, interpretation of test results of direct shear triaxial shear tests- stress-strain curves Mohr failure envelopes | |
| | iv. | Determination of shear strength of soil with geosynthetics- pull out test: ASTM procedure for finding shear strength of soil-geosynthtic system. | |
| 11. | **Soil exploration** | | **05** |
| | i. | Introduction, methods of investigation, methods of boring, soil samples sampling, number disposition of trial pits borings, penetrometers tests- SPT,CPT; borehole logs, | |

**Contribution to outcomes**

With the completion of this course, the students will be able to:

- To classify soils with a view towards assessing the suitability of a given soil for use in a designed, constructed facility e.g. foundation, embankment, or highway.
- To evaluate compaction characteristics interpret field compaction result with respect to compaction specification.

- To evaluate consolidation properties of soils apply those properties to settlement problems frequently encountered in civil engineering.
- To apply engineering science principles, using shear strength compressibility parameters, to analyze the response of soil under external loading.
- To obtain soil properties required for many design applications
- To design conduct laboratory experiments to collect, analyze, interpret, present data.
- To understand soil boring data for foundation design.

**Theory Examination:-**

1. Question paper will comprise of **six** questions; each carrying 20 marks.
2. The **first** question will be **compulsory** will have the short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining **five** questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. There can be an **internal** choice in various sub-questions/ questions in order to accommodate the questions on all the topics/ sub-topics.
5. The students will have to attempt any **three** questions out of remaining five questions.
6. Total **four** questions need to be attempted.

**Oral Examination:**

The oral examination shall be based upon the entire syllabus the term work consisting of the report of experiments performed in the laboratory assignments.

**List of Experiments/ Practical:** *(At least ten to be performed)*

1. Determination of natural moisture content using oven drying method.

   Following other methods to find moisture content shall be explained briefly.

   a) Pycnometer method,
   b) S bath method,
   c) Alcohol method,
   d) Torsional balance method,
   e) Radio activity method,
   f) Moisture meter.

2. Specific gravity of soil grains by density bottle method or pycnometer method.

3. Field density using core cutter method.

4. Field density using s replacement method.

5. Field identification of fine grained soils.

6. Grain size distribution by sieve analysis

7. Grain size distribution by hydrometer analysis

8. Consistency limits: Liquid limit, plastic limit

9. Consistency limit: Shrinkage limit

10. Permeability test using constant head method

11. Permeability test using falling head method

12. Compaction test: stard proctor / IS light compaction

13. Compaction test: modified proctor / IS heavy compaction

14. Relative density


**Term Work:**

The term-work shall comprise of the neatly written report based on the experiments performed in the laboratory as well as assignments. The assignments shall be given covering the entire syllabus in such a way that the students would attempt at least two problems on each modules/ sub-modules contents thereof further.


**Distribution of Term-work Marks**

The marks of term-work shall be judiciously awarded depending upon the quality of the term work including that of the report on experiments assignments. The final certification acceptance of term-work warrants the satisfactory the appropriate completion of the assignments the minimum passing marks to be obtained by the students. The following weightage of marks shall be given for different components of the term work.

- Report of the Experiments: 10 Marks

- Assignments          : 10 Marks

- Attendance          : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall          be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Recommended Books:**

1. Soil Engineering in Theory Practice: *Alam Singh*, CBS Publishers Distributors, New Delhi.
2. Soil Mechanics & Foundation Engineering: *V. N. S. Murthy*, Saitech Publications
3. Soil Mechanics & Foundation Engineering: *K. R. Arora*, Stard Publishers Distributors, New Delhi.
4. Soil Mechanics & Foundation Engineering: *B.C. Punimia*, Laxmi Publications
5. Geotechnical Engineering: *C. Venkatramaiah*, New Age International.
6. Fundamentals of Soil Engineering: *D. W.Taylor,* John Wiley & sons.
7. An Introduction to Geotechnical Engineering: *R. D. Holtz*, Printice Hall, New Jersey.
8. Soil Mechanics: *R. F. Craig*, Chapman & Hall.
9. Soil Mechanics: *T. W. Lambe R. V. Whitman*, John Wiley & Sons.
10. Theoretical Soil Mechanics: *K. Terzaghi*, John Wiley & Sons.
11. Designing with geosynthetics: *R. M. Koerner*, Prentice Hall, New Jersey.
12. An introduction to soil reinforcement geosynthetics: *G. L. SivakumarBabu*, Universities Press.
13. Geosynthetics- an introduction: *G. Venkatappa Rao*, SAGES.
14. Relevant Indian Standard Specifications  Codes, BIS Publications, New Delhi
15. ASTM D6706: Standard Test Method for measuring Geo-synthetic Pull-out Resistance in soil.
16. ASTM D5321: Standard Test Method for determining Shear Strength of Soil  Geo-synthetic or Geo-synthetic  Geo-synthetic Friction by Direct Shear Method

| Course Code | Subject Name | Credits |
|---|---|---|
| CE- 503 | Building Design & Drawing – II | 3 |

**Teaching Scheme**

| Contact Hours | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|
| Theory | Practical | Tutorial | Theory | Practical | Tutorial | Total |
| 1 | 4# | -- | 1 | 2 | -- | 3 |

**Evaluation Scheme**

| Theory | | | | | Term Work/Practical/Oral | | | |
|---|---|---|---|---|---|---|---|---|
| Internal Assessment | | | End Sem. Exam | Duration of End Sem. Exam | Term Work | Practical | Oral | Total |
| Test-I | Test-II | Average | | | | | | |
| 20 | 20 | 20 | 80 | 04 Hrs. | 25 | -- | 25# | 150 |

**Rationale**

The complete knowledge of Planning, Designing & drawing of Public Buildings, which includes Offices like Bank, Post-Office, Commercial Complexes, Hostels, Hotel, Rest Houses; buildings for education like Schools, Colleges including Library; buildings for health like Primary Health Center to Hospitals etc. is essential for Civil Engineering students. The structures include Load Bearing Framed type with respect to Plan, Elevation, Section, Foundation Plan, Roof Plan, Site plan for the same. The subject also involves drawings of One-Point & Two-Point Perspectives for public buildings which will represent the real impression of building when we see them from a long distance, may be seeing by sitting on ground level from top like bird's eye-view. This subject imparts the theoretical knowledge to students like concept of Green buildings, Town Planning concepts with reference to development of a Town or large urban area, slum clearance redevelopment of old dilapidated buildings in a broader way. This subject also outlines the drawings of different Plans, Elevations sections at various levels using latest software techniques like Auto CAD, with reference to drafting of various types of public buildings. Over all, by the end of semester, the civil engineering

students will have the complete knowledge with reference to Planning, Designing, drawing concepts of all types of public buildings.

| Objectives |
|---|

1.  To understand the Planning concepts, rules, regulations, various bye-laws of local administration/authorities with reference to all types of public buildings.
2.  To understand the application of bye-laws in Planning, Designing Drawing of all types of public buildings.
3.  To understand all the concepts involved in drawing the different Perspective drawings for public buildings, workshops.
4.  To prepare various types of drawings for the public building structures planned designed, satisfying the functional market requirements.
5.  To study & apply the provisions made in the relevant Indian Specifications pertaining to the practice for public buildings, the society needs for over all development.

| Detail Syllabus |
|---|

| Module | Sub-Module/Contents | Periods |
|---|---|---|
| 1. | Planning & Design of Public Buildings such as:<br>i) Buildings for education: Schools, Colleges, Institutions, Libraries<br>ii) Buildings for health: Hospitals, Primary Health Centers<br>iii) Industrial Buildings, Workshops, Warehouses<br>iv) Buildings for entertainment: Theaters, Cinema Halls, Club houses, sports club<br>v) Offices: Banks, Post Offices, Commercial Complex<br>vi) Hostels, Hotels, Boarding houses, Rest houses<br>vii) Bus Depots | 10 |
| 2. | Perspective Drawing : One Point Perspective & Two Point Perspective | 04 |
| 3. | Town Planning: Objectives  Principles, Master Plan, Road Systems, Zoning, Green Belt, Slums | 02 |
| 4. | Redevelopment of Buildings, Introduction to Residential Township | 02 |
| 5. | Architectural Planning, massing  composition, concept of built environment | 02 |

| | its application in planning | |
|---|---|---|
| **6.** | Principles of modular planning, planning as recommended by National Building Organization | **01** |
| **7.** | Use of Computers in Building Planning & Designing | **03** |
| **8.** | Introduction to Green Buildings, understanding certification methods (TERI,LEEDS) | **02** |

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**Contribution to Outcomes**

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On successful completion of the course work, the students shall be able to understand the principles of planning, designing of public buildings. They will demonstrate the ability to plan the public buildings according to the requirements, design the various components involved therein by keeping all the principles of planning following the extant bye-laws of the local authorities. The students will also understand the different control rules of the local authorities, besides provisions made in the relevant Indian specifications meant for practice for architectural drawings. They will further demonstrate the ability of preparing different types of drawings showing complete details therein with respect to public buildings as a whole.

**Theory Examination:**

1. The question paper will comprise of **six** questions, each carrying 20 marks.
2. Question No.1 will be **compulsory,** based on the planning of any one public building mentioned in the syllabus.
3. The remaining **five** questions will be based on all the modules sub-modules, consisting of Plan, Elevation, Section, Foundation Plan theoretical concepts mentioned in the entire syllabus.
4. These five questions shall be based on Plan, Elevation, Section, Elevation, Foundation Plan; Roof/Terrance Plan on the public buildings (may be on framed or load bearing structure). Some questions could be asked on the theoretical portion mentioned in the module/sub-modules also.
5. The students will have to attempt **any three** questions from the **remaining five** questions.
6. **Total four** questions need to be attempted.

**Oral Examination:**

There shall be an Oral Examination in conjunction with the Sketching examination. The Oral examination shall be based on the entire syllabus term work.

**Contents of the Practicals /Site Visit:**

1. Planning drawings of different public buildings.
2. Writing of the Report related to the buildings that are planned & drawn by the students.
3. One-day site visit could be arranged for students to visit any one public building near the college like commercial complex, library, Bank etc. They need to study in detail of that building take the measurements of that building should submit as a site report with detailed drawing according to some suitable scale. This will become a part of Term Work.

**Term Work:**

The Term Work shall consist of all the following:

1. A-1 size drawing sheets drawn for one public building as Framed Structure as (G+1) with Ground Floor Plan, First Floor Plan, Front Elevation, Sectional Elevation, Foundation Plan, Roof/Terrace Plan, Site Plan, Schedule of Openings, Construction Notes  Area Statement for the building.
2. A-1 size drawing sheets drawn for one public building as Load Bearing  Structure for Single storied structure with Ground Floor Plan, Front Elevation, Sectional Elevation, Foundation Plan,  Schedule of Openings and Construction Notes.
3. Perspective drawings for One-Point & Two-Point.
4. One public building one workshop can be considered for the perspective drawings.
5. Report on the problem taken for the drawing sheets with respect to public buildings.
6. Site visit report with drawings.

**Distribution of Term Work Marks:**

The marks of the Term Work shall be judiciously awarded for the various components depending upon the quality of the term work. The final certification acceptance of term work warrants the satisfactory performance of drawing work by the student, appropriate completion of the report on the said drawing sheets, minimum passing marks to be obtained by the student. The following weightage of marks shall be given for different components of the term work.

- Drawing Sheets          : 10 Marks
- Report of the Drawing    : 05 Marks
- Report on the Site Visit : 05 Marks
- Attendance              : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall       be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Recommended Books:**

1. Building Drawing : *M.G.Shah, C.M.Kale and Patki*; Tata McGraw Hill Publishers, Delhi
2. Civil Engineering Drawing: *Chakraborty M*; Monojit Chakraborty Publication,Kolkata
3. Building Drawing Detailing : *B.T.S. Prabhu, K.V. Paul and C. Vijayan*; SPADES Publications, Calicut,Kerala
4. Planning Designing Buildings : *Y.S. Sane*; Modern Publication House, Pune
5. Civil Engineering Drawing: *Sushilkumar,* Stardard Publishers
6. IS: 962-Code of Practice for Architectural Drawings: BIS, New Delhi
7. Town Planning : *Rangwala*, Charotar Publishers

**Reference Books:**

1. Time Saver Standards for Building Types: Joseph De Chiara John Callender

| Course Code | Subject Name | Credits |
|---|---|---|
| CE-C504 | Applied Hydraulics – I | 5 |

## Teaching Scheme

| Contact Hours | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|
| Theory | Practical | Tutorial | Theory | Practical | Tutorials | Total |
| 04 | 02 | -- | 04 | 01 | -- | 05 |

## Evaluation Scheme

| Theory | | | | | Term Work/ Practical/Oral | | | Total |
|---|---|---|---|---|---|---|---|---|
| Internal Assessment | | | End Sem Exam | Duration of End sem exam | TW | PR | OR | |
| Test 1 | Test 2 | Average | | | | | | |
| 20 | 20 | 20 | 80 | 03 HRS | 25 | -- | -- | 125 |

## Rationale

The knowledge of this subject is essential to understand facts, concepts and design parameters of dynamics of fluid flow, application of momentum equation in lawn sprinklers and pipe bends, dimensional analysis and impact of jets. Further it helps to understand the design aspects, components, function, and uses of centrifugal pump, reciprocating pumps and turbines.

## Course Objectives

- To study hydraulic machines like centrifugal pumps, reciprocating pumps and turbines.
- To study devices based on the principals of fluid statics fluid kinematics.
- To study the mathematical technique used in research work for design for conducting model tests.
- To impart the dynamic behavior of the fluid flow analyzed by the Newton's second law of motion.

**Detail Syllabus**

| Module | Sub Modules/Contents | Periods |
|:---:|:---|:---:|
| 1 | **Dynamics of Fluid Flow:**<br>Momentum principle (applications: pipe bends) moment of momentum equation (applications: sprinkler). | 06 |
| 2 | **Dimensional Analysis:**<br>Dimensional homogeneity, Buckingham's $\pi$ theorem, Reyleigh's method, dimensionless numbers their significance, Model (or similarity) laws, Types of models, application of model laws: Reynold's model law Froude's model law, scale effect in models. | 07 |
| 3 | **Impact of Jets:**<br>Introduction, Force exerted bon stationary flat plate: held normal to jet, held inclined to jet, curved plate: symmetrical unsymmetrical (jet striking at centre tangentially), jet propulsion of ships. | 09 |
| 4 | **Hydraulic Turbines:**<br>General layout of hydro-electric plant, heads efficiencies of turbine, classification, Pelton Wheel Turbine, Reaction Turbine, Francis Turbine, Kaplane Turbine, draft tube theory, specific speed, unit quantities, Characteristic curves, Governing of turbines, Cavitations. | 13 |
| 5 | **Centrifugal pumps:**<br>Work done, heads, efficiencies, Minimum speed: series parallel operation, Multistage pumps, specific speed, model testing, priming, characteristic curves, cavitations, Brief introduction to reciprocating pump. | 09 |
| 6 | **Miscellaneous Hydraulic Machines:**<br>Introduction: Hydraulic ram, Hydraulic press, Hydraulic accumulator, Hydraulic intensifier, Hydraulic crane, Hydraulic lift. | 04 |

**Contribution to Outcomes**

On completion of this course the student will be able to understand the design of turbines pumps. They will be able, further, to understand the forces acting on pipe bends sprinklers. They will be able

to study the dimensional analysis model laws, apply the principle of momentum to fluid flow problems.

**Theory Examination:-**

1. Question paper will comprise of **six** questions; each carrying 20 marks.
2. The **first** question will be **compulsory** will have to short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining five questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. The students will have to attempt **any three** questions out of remaining five questions.
5. Total **four** questions need to be attempted.

**Oral Examination:**

The oral examinations shall be based on the entire syllabus the report of the experiments conducted by the students including assignments.

**List of Experiments:** *(At least six to be performed)*

1. Impact of jet on flat plate
2. Impact of jet on flat inclined plate
3. Impact of jet on curved plate
4. Performance of Pelton wheel- full gate opening
5. Performance of Pelton wheel- half gate opening
6. Performance of Centrifugal pumps
7. Performance of Kaplan turbine
8. Performance of Francis turbine
9. Hydraulic ram
10. Pumps in series
11. Pumps in parallel

**Term Work:**

The term-work shall comprise of the neatly written report based on the afore-mentioned experiments and the assignments. The assignments shall comprise of minimum 15 problems covering the entire syllabus divided properly module wise.

**Distribution of Term Work Marks:**

The marks of the term work shall be judiciously awarded for the various components depending upon the quality of the term work. The final certification acceptance of term work warrants the satisfactory performance of drawing work by the student, appropriate completion of the report on the said drawing sheets minimum passing marks to be obtained by the student. The following weightage of marks shall be given for different components of the term work.

- Report of the Experiments: 10 Marks
- Assignments : 10 Marks
- Attendance : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Recommended Books:**

1. Fluid Mechanics  Hydraulics: *Dr. S. K. Ukarande*, Ane's Books Pvt. Ltd. (Revised Edition 2012), ISBN 97893 81162538.
2. Hydraulic Fluid Mechanics: *Dr. P. M. Modi & Dr. S. M. Seth*, Stard Book House, Delhi.
3. Theory Application of Fluid Mechanics: *K. Subramanya*, Tata Mc-Graw Hill publishing Company, New Delhi.
4. Fluid Mechanics Fluid Pressure Engineering: *Dr. D. S. Kumar*, S. K. Kataria  Sons.
5. Fluid Mechanics: *Dr. A. K. Jain*, Khanna Publishers.
6. Fluid Mechanics: *Dr. R. K. Bansal*, Laxmi Publications Ltd., New Delhi

**Reference Books:**

7. Fluid Mechanics Fundamentals Applications, *Yunus A. Cengel & John M. Cimbala*, Tata Mc-Graw Hill Education Private Limited, New Delhi.
8. Fluid Dynamics: *Daiy  Harleman*; Addition Wesley, New York, 1973.
9. Fluid Mechanics: *R.A. Granger*; Dover Publications, New York, 1995.

| Course Code | Subject Name | Credits |
|---|---|---|
| CE-C505 | Transportation Engineering – I | 5 |

**Teaching Scheme**

| Contact Hours | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|
| Theory | Practical | Tutorials | Theory | Practical | Tutorials | Total |
| 4 | - | 2 | 4 | - | 1 | 5 |

**Evaluation Scheme**

| Theory | | | | | Term Work/Practical/Oral | | | Total |
|---|---|---|---|---|---|---|---|---|
| Internal Assessment | | | End | Duration of | TW | PR | OR | |
| Test I | Test II | Average | Sem Exam | End Sem Exam | | | | |
| 20 | 20 | 20 | 80 | 03Hrs | 25 | - | - | 125 |

**Rationale**

Transportation contributes to the economical, industrial, social & cultural development of any country. The adequacy of transportation system of a country indicates its economic social development. Three basic modes of transportation include land, water and air. The land mode further includes highways & railways. This course is developed so as to impart the basic principles behind railway engineering, airport engineering & water transportation engineering in respect of their various types of materials used, function of component parts, methods of construction, planning principles, aspects of supervision & maintenance. The bridges are essential structures of highway railway engineering. In addition to the railways, airport water transportation, this subject imparts the fundamental aspects of bridge engineering to the students.

**Objectives**

- To enable the students to study the various elements pertaining to air transportation, water transportation, railway transportation and bridge engineering.

- To study the various components of railway track, materials used, functions of component parts.
- To study the various imaginary surfaces of an airport, geometric standards, runway taxiway lighting.
- To study the various parking system, holding apron, hangers, drainage system.
- To study the various modes of water transportation, types of breakwater, harbours and port facilities equipment.
- To study the various aspects of jetties, wharves, piers, dolphins, fenders, buoyancy etc.
- To study the fundamental concepts of bridge engineering including selection of site for bridge, different types of bridges, bridge hydrology and various components of bridge structures.

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**Detail Syllabus**

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| Module | Sub Modules/Contents | Periods |
|:------:|:---------------------|:-------:|
| 01 | **Introduction:**<br>Role of transportation in Society, objectives of transportation system, different types of modes, planning, coordination of different modes for Indian conditions. | 02 |
| 02 | **Railway Engineering**<br>i  Role of Indian Railways in national development, Railways for urban transportation, Engineering surveys for track alignment, Obligatory points, Conventional & modern methods(Remote sensing,  GIS)<br>ii  Permanent way-track components their functions, sleeper – functions, types, sleeper density, ballast functions different ballast materials.<br>iii  Rails: coning of wheels, tilting of rails, rail cross sections, wear, creep of rails, rail fastenings.<br>iv  Geometrics: gradients, transition curves, widening of gauge on curves, cant deficiency.<br>v  Points & crossing: design of turnouts, description of track junctions, different types of track junctions.<br>vi  Yards: details of different types of railway yards & their functions. | 16 |

| | | | |
|---|---|---|---|
| | vii | Signalling & interlocking: classification of signals, interlocking of signals points, control of train movement. | |
| | viii | Construction maintenance of railway track, methods of construction, material requirements, maintenance of tracks, traffic operations. | |
| | ix | Modernization of track railway station for high speed trains, special measures for high speed track. | |
| **03** | **Airport Engineering** | | **20** |
| | i | Aircraft component parts & its function, aircraft characteristics, their influence on airport planning. | |
| | ii | Airport planning: topographical & geographical features, existing airport in vicinity, air traffic characteristics, development of new airports, factors affecting airport site selection. | |
| | iii | Airport obstruction: zoning laws, classification of obstructions, imaginary surfaces, approach zones, turning zones. | |
| | iv | Airport layout: runway orientation, wind rose diagrams, basic runway length, corrections for runway length, airport classification, geometric design, airport capacity, runway configuration, taxiway design, geometric standards, exit taxiways, holding aprons, location of terminal buildings, aircraft hangers, parking. | |
| | v | Airport marking, lighting, marking & lighting of runways, taxiway, approach, other areas. | |
| | vi | Terminal area & airport layout: terminal area, planning of terminal buildings, apron: size of gate position, number of gate position, aircraft parking system, hanger, general planning considerations, blast considerations. | |
| | vii | Air traffic control: Air traffic control aids, en-route aids, ling aids. | |
| | viii | Airport drainage: requirement of airport drainage, design data, surface drainage design. | |
| | ix | Airport airside capacity delay: runway capacity delays, practical hourly capacity, practical annual capacity, computation of runway system, runway gate capacity, taxiway capacity. | |
| | x | Air traffic forecasting in aviation: forecasting methods, forecasting requirement & applications. | |

| 04. | **Water Transportation** | 04 |
| --- | --- | --- |
| | Introduction of water transportation systems, harbors docks, port facilities. | |
| 05. | **Bridge Engineering** | 06 |
| | i. Bridge engineering: importance, investigations, site selection, collection of data, determination of flood discharge, waterway, afflux, economic span, scour depth, Bearing | |
| | ii. Design criteria for Bridge Foundations, IRC Code of practice for bridges | |

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**Contribution to Outcomes**

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On successful completion of this course, the students shall be able to:

1. Understand the knowledge of various systems of railway, airport, water transportation.
2. Understand the design concept of railway track, runway, taxiways, etc.
3. Apply the concept of geometric design of railway track, runway, taxiway, etc.
4. Apply the knowledge of various signalling system for railway engineering, air traffic control, navigational aids.
5. Understand the concepts of bridge engineering including site selection for the bridges, different types of bridges in the classified manner, bridge hydrology, and various components of the bridge structures.

**Theory Examination:**

1. Question paper will comprise of **six** questions; each carrying 20 marks.
2. The **first** question will be **compulsory** will have the short questions having weightage of 4-5 marks covering the entire syllabus.
3. The remaining **five** questions will be based on all the modules of entire syllabus. For this, the module shall be divided proportionately further, the weightage of the marks shall be judiciously awarded in proportion to the importance of the sub-module contents thereof.
4. There can be an **internal** choice in various questions/ sub-questions in order to accommodate the questions on all the topics/ sub-topics.
5. The students will have to attempt any **three** questions out of remaining five questions.
6. Total **four** questions need to be attempted.

**Oral Examination:**

The oral examination shall be based upon the entire syllabus and the term work consisting of the assignments.

**Term Work:**

The term-work shall comprise of the neatly written report of the assignments. The assignments shall be given covering the entire syllabus in such a way that the students would attempt at least four problems on each modules/ sub-modules contents thereof further. There shall be theory questions as well.

**Distribution of Term-work Marks**

The marks of term-work shall be judiciously awarded depending upon the quality of the term work including that of the report on experiments assignments. The final certification acceptance of term-work warrants the satisfactory the appropriate completion of the assignments the minimum passing marks to be obtained by the students. The following weightage of marks shall be given for different components of the term work.

- Assignments : 20 Marks
- Attendance : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Text Books:**

1. A Course of Railway Engineering: *Saxena, S. C. and  Arora, S. P.*; Dhanpat Rai  Sons, New Delhi.

2. *Airport Planning Design: Khanna, S.K., Arora, M.G.  and Jain, J.J.;  Nemchand Bros., Roorkee.*

3. Docks and Harbour Engineering: *Bindra, S. P.*; Dhanpat Rai and  Sons, New Delhi.

4. Principles and Practice of Bridge Engineering: *Bindra, S.P. ;* Dhanpat Rai  and Sons, New Delhi.

5. Harbour, Dock and Tunnel Engineering: *Shrinivas, R.;* Chrotar Publishing House, Anand

6. A Text Book on Highway Engineering Airports: Sehgal, S. E. and Bhanot, K. L., S. Chand and Co. Ltd., New Delhi

7. Airport Engineering: *Rao, G. V.,* Tata Mc-Graw Hill India Publishing House, New Delhi

8.   Bridge Engineering: Victor, D.J.

**Reference Books:**

1.   Indian Railway Track: *Agarwal, M. M.,* Suchdeva Press New Delhi.

2.   Planning Design of Airport: *Horonjeff Mckelrey*, Tata Mc-Graw Hill India Publishing House, New Delhi.

3.   Design and Construction of Ports and Marine Structures: Quinn, A. D., Tata Mc-Graw Hill India Publishing House

| Course Code | Subject Name | Credits |
|---|---|---|
| CE-C506 | Employment and Corporate Skills (ECS) | 2 |

**Teaching Scheme**

| Contact Hours | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|
| Theory | Practical | Tutorials | Theory | Practical | Tutorials | Total |
| - | - | 4 | - | - | 2 | 2 |

**Evaluation Scheme**

| Theory | | | | | Term Work/Practical/Oral | | | Total |
|---|---|---|---|---|---|---|---|---|
| Internal Assessment | | | End Sem Exam | Duration of End Sem Exam | TW | PR | OR | |
| Test I | Test II | Average | | | | | | |
| - | - | - | - | - | 25 | - | 25 | 50 |

**Rationale**

With the advancement in technology and diverse need of the corporate world, proficiency in English and communication is considered essential for the student's personal and professional growth. Also it is necessary to equip with desired qualities required in an employee and provide tips for achieving success in interviews. The exposure to various interpersonal skills helps to make a conscious attempt of how to communicate and improve one's personality.

**Course Pre-requisite:**

- FEC206 Communication Skills

**Objectives**

- To inculcate in students professional ethical attitude, effective communication skills, teamwork, skills, multidisciplinary approach an ability to understand engineer's social responsibilities.

- To provide students with an academic environment where they will be aware of the excellence, leadership lifelong learning needed for a successful professional career.
- To inculcate professional ethics codes of professional practice
- To prepare students for successful careers that meets the global Industrial Corporate requirement' provide an environment for students to work on Multidisciplinary projects as part of different teams to enhance their team building capabilities like leadership, motivation, teamwork etc.

|  | Detail Syllabus |  |
|---|---|---|

| Module | Sub Modules/Contents | | Periods |
|---|---|---|---|
| **1.** | **Report Writing** | | **08** |
| | 1.1 | Objectives of report writing | |
| | 1.2 | Language Style in a report | |
| | 1.3 | Types of reports | |
| | 1.4 | Formats of reports: Memo, letter, project survey based | |
| **2.** | **Technical Proposals** | | **02** |
| | 2.1 | Objective of technical proposals | |
| | 2.2 | Parts of proposal | |
| **3.** | **Introduction to Interpersonal Skills** | | **08** |
| | 3.1 | Emotional Intelligence | |
| | 3.2 | Leadership | |
| | 3.3 | Team Building | |
| | 3.4 | Assertiveness | |
| | 3.5 | Conflict Resolution | |
| | 3.6 | Negotiation Skills | |
| | 3.7 | Motivation | |
| | 3.8 | Time Management | |

| 4. | | **Meetings  Documentation** | 02 |
|---|---|---|---|
| | 4.1 | Strategies for conducting effective meetings | |
| | 4.2 | Notice | |
| | 4.3 | Agenda | |
| | 4.4 | Minutes of the meeting | |
| 5. | | **Introduction to Corporate Ethics  etiquettes** | 02 |
| | 5.1 | Business Meeting etiquettes, Interview etiquettes, Professional  work etiquettes, Social skills | |
| | 5.2 | Greetings  Art of Conversation | |
| | 5.3 | Dressing  Grooming | |
| | 5.4 | Dinning etiquette | |
| | 5.5 | Ethical codes of conduct in business  corporate activities (Personal ethics, conflicting values, choosing a moral response, the process of making ethical decisions) | |
| 6. | | **Employment Skills** | 06 |
| | 6.1 | Cover letter | |
| | 6.2 | Resume | |
| | 6.3 | Group Discussion | |
| | 6.4 | Presentation Skills | |
| | 6.5 | Interview Skills | |

| **Contribution to Outcomes** |
|---|

On successful completion of the students, the students will be able to

1. Communicate effectively in both verbal  written form  demonstrate knowledge of professional ethical responsibilities

2. Participate succeed in Campus placements competitive examinations like GATE, CET.

3. Possess entrepreneurial approach ability for life-long learning.

4. Able to have education necessary for understanding the impact of engineering solutions on Society demonstrate awareness of contemporary issues

**Reference Books:**

1. Organizational Behaviour: *Fred, Luthans*; Mc-Graw Hill
2. Report Writing for Business: *Lesiker, Petit*; Mc-Graw Hill
3. Technical Writing Professional Communication: *Huckin, Olsen*; Mc-Graw Hill
4. Personal Development for Life Work: *Wallace Masters*, Thomson Learning, 12$^{th}$ Ed.
5. Effective Business Communication: *Heta, Murphy*, Mc-Graw Hill
6. Business Correspondence Report Writing: *Sharma, R. C. and Krishna Mohan*
7. Managing Soft Skills for Personality Development: *Ghosh, B. N*. Tata Mc-Graw Hill
8. BCOM: *Sinha*, Cengage Learning (2$^{nd}$ Ed.)
9. Management Communication: *Bell, Smith*; Wiley India Edition (3$^{rd}$ Ed.)
10. Soft Skills: *Dr. Alex, K*.; S. Chand Co. Ltd.

**Oral Examination:**

The oral examination shall be based upon the entire syllabus and the report of the assignments prepared by the students.

**Term Work:**

The term work shall be comprised of the neatly written report comprising below-mentioned assignments.

*List of Assignments for Term Work:*

Assignment 1- Report Writing (Synopsis or the first draft of the Report)

Assignment 2- Technical Proposal (Group activity, document of the proposal)

Assignment 3- Interpersonal Skills (Group activity Role play)

Assignment 4- Interpersonal Skills (Documentation in the form of soft copy or hard copy)

Assignment 5- Meetings Documentation (Notice, Agenda, Minutes of Mock Meetings)

Assignment 6- Corporate ethics etiquettes (Case study, Role play)

Assignment 7- Cover Letter Resume

Assignment 8- Printout of the PowerPoint presentation

**Distribution of Term-work Marks**

The marks of term-work shall be judiciously awarded depending upon the quality of the term work including that of the report on experiments assignments. The final certification acceptance of term-work warrants the satisfactory the appropriate completion of the assignments the minimum passing marks to be obtained by the students. The following weightage of marks shall be given for different components of the term work.

- Assignments          : 20 Marks
- Attendance           : 05 Marks

Further, while giving weightage of marks on the attendance, following guidelines shall be resorted to.

- 75%- 80% : 03 Marks; 81%- 90%: 04 Marks  91% onwards: 05 Marks

**Distribution of Marks on Oral Examination:**

The marks meant for oral examination will be distributed as below:

- Presentation of the Project Report: 15 Marks
- Group discussion: 10 Marks