TRAINING OBJECTIVES

1. To familiarize the students with the knowledge and measurement of civil engineering works.
2. To develop the skill of preparing bills of quantities, bills of cost estimates for tendering (preparation of tender documents) contract laws and arbitration.
3. To develop the skill to prepare budgetary cost of civil engineering projects.

Emphasis will be given on character building of students during their training by delivering motivational lectures on patriotism, discipline and work ethics. So trainee may deal market people and curriculum as a good citizen.

Curriculum Salients

Entry level                          Metric with Science
Duration of course                  3-years
Total training hours               3840 Hours
                                        40 hours / week
                                        08 hours / day
Training methodology               Practical 80%
                                        Theory 20%
Instructional media                Urdu / English
**Skill Competency Details:**

On successful completion of this course, trainee should be able to:

1. Work according to contract law, FIDIC, PEC particular conditions and PPRA rules.
2. Use of Surveying tools to carry out the bench work and measuring.
3. Use of common and latest tools for Surveying.
5. Understand the construction of various geometry figures and applicable in Engineering.
6. Apply the techniques of free hand sketching for preparation of finished sketches of given objective.
7. Select and work on different types of Survey of Land, Road and Mountain.
9. Be able to understand project management.
10. Will acquire fair idea of contract management.
11. Will be thorough on Auto CAD and Eagle Point Software.
12. Will be a useful quantity surveyor.
13. Will know interlinking of survey tools with computer.
14. Use Auto Cad & Eagle Point Software.
15. Prepare material statement and perform rate analysis.
16. Prepare detailed estimates (civil, electrical and mechanical works) and bill of quantities of following:
   a. Residential, Commercial and Industrial buildings.
   b. Water supply & Sewerage
   c. Roads
   d. Irrigation works
   e. Use of construction machinery for above projects i.e. productivity, depreciation, cost etc
17. Prepare tender and contract documents, assess and recommend payment to contractors.
18. Use software in estimating quantities & cost and planning of project
Knowledge Proficiency Details:

On successful completion of this course, the trainee should be able to:-

1. Define the developing/pattern drawing.
2. State the necessary of development of surfaces.
3. State ruled, single curved, plane and double curved surface.
4. Identify and the geometrical objects
5. State the uses of development, drawing.
6. Explain the method of development i.e. right angle triangle and revolution.
7. Define the house planning.
8. State the necessity of house planning.
9. State the importance of free board.
10. Interlink survey tools with computer.
11. Understand function and use latest surveying equipment.
12. Workout quantities of various items of work in the field of quantity survey.
13. Property evaluation and rent calculation.
15. Difference of work by civil diploma engineer and quantity surveyor.
SCHEME OF STUDIES FOR QUANTITY SURVEY DIPLOMA

### 1st Year

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DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
ISLAMIAT / PAK STUDIES

اسلامیات / مطالعہ پاکستان

GEN III

سال اول

1

1 0

کل وقت 20 گھنٹے

1- کتاب وقتن (الف)

قرآن کریم

1- آیات ترکان بیان 2- نزول آئی 3- کیفیت معلوم کرنگیاں 4- ذیلی قسم

5- لن تناول الارب حنی نتفقو اما تجربون

1.1 واعتصمو ببحل الله جمیعا ولا تفرقوا

1.2 ولا يجر منكم شنان قوم على ان لا تعذلو

1.3 ان الله يا مكرم ان نودا الامنت الى اهلها

1.4 ان الله يامر بالعدل والاحسان

1.5 ان الصلاوة نتهي عن الفتحاء والمنك

1.6 لقد كان لكم في رسول الله اسوة حسنة

1.7 ان اكرمكم عند الله اتقاكم

1.8 وما انا كم الرسول فخذوه وما نكم عنه فانهوا

1.9 ووابووا بالهد

1.10 وعاشوهم بالمعروف

1.11 بصحب الله الروى وبربى الصدقات

1.12 واصبر على ما اصابك

1.13 وقولوا قولا مسبدا

1.14 ان الدين عند الله الإسلام
(ب) علی

علی بن ابی طالب رضی اللہ عنہ

1. اعمال عبادت بنیامین

2. اعمال مکرمہ الاحسان

3. لا ہو کسی کھدا کسی ہی بھی لا کسی کے لئے

4. اسلام کے مسلمانوں کو یاد ہی کیا جائیں اور ایک اور ایک

5. قل امت با اللہ تم انتقم

6. خیر کم خیر کم لا همہ

7. سبیس اسلام افسوس ہے کہ تم کی تفریق

8. المؤمن اوہا المومین

9. کل اسلام کے مسلمین خراب مہمہ و ملازمت

10. ایہ المنافقین اہل احترم کہ بہا اور اعدام اخیال و انسان خان

2- 2.1 عناصر

1. قربعت

2. زکاة

3. عطیہ

4. مالیات

5. 2- اریاان تغلب

2.2 عواجات

1. قرار 2- یخور 3- 4- یخور
DAE Technology

خیرالدولہ

جمعہ سلیم

تمہارے مباہین

1. قرآن کیری

تمہارے مباہین علم علم کے غالب کہتے ہیں چونکہ وہ قرآن کے مطابق ہیں۔

تمہارے مباہین علم علم کے غالب کہتے ہیں چونکہ وہ قرآن کے مطابق ہیں۔

قرآن کیری کی تعلیم کے ساتھ کی گئی تعلیم

قرآن کیری کی تعلیم کے ساتھ کی گئی تعلیم

قرآن کیری کی تعلیم کے ساتھ کی گئی تعلیم

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2. سلیم

تمہارے مباہین علم علم کے غالب کہتے ہیں چونکہ وہ قرآن کے مطابق ہیں۔

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8

آیا اسلام

تقصی خاصیت: آیا اسلام کے فیلی معاشرتی عورات کے بارے میں پانچ اطلاعات ہیں؟

تصدیق خاصیت: اسلام کے عورات کے نقصانی معاشرتی آیات کھنڈ کے

الجواب: اسلام کے معاشرتی نقصانی آیات کھنڈ کے آیات کے نقصانی معاشرتی آیات کھنڈ کے

اسلام کے معاشرتی معاشرتی آیات کے آیات کے نقصانی معاشرتی آیات کھنڈ کے

مکار کے ذائقہ اسلام کے آیات کے نقصانی معاشرتی آیات کھنڈ کے

ختمیے کے معاشرتی کارون کے معاشرتی معاشرتی آیات کھنڈ کے

عورات (کامیابی، ودوانگی، برقراری) کے ذائقہ اسلام کے آیات کھنڈ کے

اسلام کے معاشرتی معاشرتی آیات کے ذائقہ اسلام کے آیات کھنڈ کے

آینے سے پانچ اطلاعات کے ذائقہ اسلام کے آیات کال کے ذائقہ اسلام کے ذائقہ
(نیچے مسلم طلباء کے لئے)

GEN III

نصاب اخلاقیات سال اول

حصر و مثال اکثریت

موضوعات

اخلاقیت کی تعریف اور ارتباط

اخلاقیت کا معیار (قاویون، عشقی، انتہائی کتاب)

مندرجہ ذیل اخلاقی وضاحت

واہنته دار

وفادار

انظم وضاحت

رہاگوئی

صبراً انتقال

نوع لایندی

وقتی کی پیشکرد

صقل

اعتتر

باقی احترام

مندرجہ
نصب اخلاقیات سال اول

مقدمہ

عمومی منابع:
للی اخلاقیات کو دیکھ سکتے ہیں اما تم نبی قرآن کریم کے

خصوصی منابع: طالب علم اور علم سے اس کا فائدہ بھی کرسکے

موذوین کا منصب بیان کر سکے

عمل زندگی کو مثال ورکے کے

ایک شخصیت اور معاشرتی موضوعات کے متعلق بیان کر سکے کے کثرت بیان کر

کر سکے

دیانوی داری کی اصطلاح بیان کر سکے

وفاداری کی اصطلاح بیان کر سکے

نظم وضیفی افادات بیان کر سکے

صدق بیان کی ضرورت بیان کر سکے

توصل آمدی سے فوائد بیان کر سکے

وفات کی پاہنی سے فوائد بیان کر سکے

مقام اور بانی اختیار سے سیاسی کارکردگی بیان کر سکے

مخلوط فوائد بیان کر سکے
نصاب سال اول
مطالعہ پاکستان
فوٹو: محمد علی محمد

موضوّعات

تریخی فقرہ: مسلمان قوم مسنّہ زادی ہونے کی تاریخ، مسلمان تین سال سیاسی اور اجتماعی اور
ضرورت، قومی حدیث مسلمان کے انتظامات

آخرین پاکستان

قائم پاکستان کی اساس(ویت اسلام) قائم پاکستان کی نفی، معاشرتی اور دعویٰ پاکستان کی
دعا حقیقی پاکستان عالم اقوال اور واقعیت کے اثرات کی روشنی میں
آخرین پاکستان کا ناکشی جلد

مғتوں کا آمادگی محرکہ ویت اسلام کی اور وابستگی کی عالم، بہت اور وابستگی کا ترقی کا کہاں ہے
ناکشی جلد

کا کہا جلد اسلام(ویت اسلام)،

لاہور(ویت اسلام)، ویت اسلام کا کہا جلد اسلام(ویت اسلام)،

لاہور(ویت اسلام)
مطالعہ پاکستان (حیدرآباد)

نقد و سیاسی مباحث

تحیرت فکر

عموی متفقہ

طلب علم لوہم سے کہ اسلام شیعہ و سلسلیت کا کامیاب سیاستکار ہے۔

خصوصی مباحث

تحیرت فکر کا سب سے خاص تنہائی کا سیکھ ہے

آزادی گریکی کا سب سے خاص تنہائی کا سیکھ ہے

خصوصاً سیاسی سلسلہ آزادی افکار کا سب سے خاص تنہائی کا سیکھ ہے

دنیا کی ستائی کے میں میں انتصارات کے تنہائی کا سیکھ ہے

جمہوری ہائی کا سب سے خاص تنہائی کا سیکھ ہے

نظریہ پاکستان

عموی متفقہ

نظریہ پاکستان (رائي اسلام) سے پوری طرح وافقہ ہے

خصوصی مباحث

نظریہ تحقیف ہیں کہ اوراس کی وضاحت دست کرے

نظریہ پاکستان کی تحقیف کے اوراس کا دستی اہمیت دین گا

نظریہ پاکستان کی تحقیف کے اوراس کا دستی اہمیت دین گا

علاقے پر بھی اوراس کے میں میں اہمیت دین گا

نظریہ پاکستان کی تحقیف کے اوراس کا دستی اہمیت دین گا
نظریہ پاکستان کا تاریخی چیتاو

عموی مقدمہ

نظریہ پاکستان کے تاریخی چیتاو دو اہم جہاں پر کیے گئے

کشمیری متنازع

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے

عموی مقدمہ

کشمیری تاریخی چیتاو دو اہم جہاں پر کیے گئے
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
ENGLISH

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**AIM:** On completion, the student will have the technical understanding of the English language in the context of a working environment. The student will also be able to express their understanding of communication skills in the form of speaking, listening, reading and writing and use it to supplement their technical skills.

**Curriculum Contents**

1. **Prose/Text**
   - 18 Hours
   - 1.1 First six essays of Intermediate English Book-II.

2. **Grammar**
   - 18 Hours
   - 2.1 Sentence structure
   - 2.2 Tenses (correct use of verb/tense)
   - 2.3 Parts of speech
   - 2.4 Active and Passive (change of voice)
   - 2.5 Words often confused.
     - Phrases and Clauses (Nouns, Adjective and adverb clauses),
     - Transformation of sentences and Synthesis of sentences,

3. **Composition**
   - 12 Hours
   - 3.1 Business letters
   - 3.2 Applications for job, character certificate and grant of scholarship
   - 3.3 Different types of writing
   - 3.4 Writing simple and complex sentences and Paragraphs

4. **Translation**
   - 16 Hours
   - 4.1 Translation from Urdu into English for foreign students: A paragraph or a dialogue.
**Recommended / Reference Books:**

1. Intermediate English Book II :
2. Gul Technical English : **Rehan Gul**
5. The Elements of International English Style: **E. H. Wiess** [2009], PHI Learning, New Delhi.
6. High School English Grammar & Composition: **Wren & Martin** [2009], S. Chand & Company Ltd.

**Instructional Objectives**

1. **Describe and Demonstrate Better Reading, Comprehension and Vocabulary.**
   1.1 Describe and narrate in simple English.
   1.2 Identify the author and the essay.
   1.3 Write summaries of the textual essays.
   1.4 Carry out essay writing using topics from the following:
      1.4.1. Knowledge is power
      1.4.2. Well begun is half done
      1.4.3. Cleanliness
      1.4.4. Libraries
      1.4.5. Honesty
      1.4.6. Moral Education
      1.4.7. Knowledge of English
      1.4.8. Choice of Books’
      1.4.9. Newspaper Reading
      1.4.10. Right use of Time
      1.4.11. Discipline
      1.4.12. Aims in Life
      1.4.13. Manual Training
      1.4.14. The power of words
      1.4.15. The Sporting Spirit
      1.4.16. Good Manners
      1.4.17. Method of Working
1.4.18. Sanitation
1.4.19. The duties of a Citizen
1.4.20. What would I like to be
1.4.21. My hostel life
1.4.22. Importance of Technical Education
1.4.23. Role of Skills Development
1.4.24. If I were the Principal of a School
1.4.25. If I were the Minister of Education
1.4.26. An ideal student
1.4.27. An ideal teacher
1.4.28. Are scientific inventions making us happier
1.4.29. Atoms for Peace
1.4.30. Education
1.4.31. Education for Modernization
1.4.32. Energy Crisis
1.4.33. Environmental Pollution
1.4.34. Information System today
1.4.35. Scientific Education
1.4.36. Social Evils- Causes and Eradication
1.4.37. Status of women in Islam
1.4.38. Technology creates more problems than it can solve
1.4.39. Television- Its advantages and Disadvantages
1.4.40. Wonders of Electricity

1.5 Identify facts and ideas.

2. **Listen and Speak English Clearly (Sessional Evaluation).**
   
   2.1 Converse fluently.

   2.2 Express ideas clearly.

3. **Apply Grammatical Rules to Writing and Speaking.**
   
   3.1 Describe sentence structure.
   
   3.1.1 Identify kinds of sentences.

   3.2 Use correct verb/tense in sentences.
   
   3.2.1 Identify the tense of a sentence.

   3.3 Narrate direct speech in indirect form.

   3.4 Distinguish between confusing words.
4. **Apply Concepts of Composition Writing to Practical Situations.**

4.1 Write letters to communicate messages in the business world (inquiry, placing orders, complaints etc.).
   4.1.1 Identify parts of a business letter.
   4.1.2 Describe the qualities of a good business letter.

4.2 Write applications for job opportunities, grant of character certificate and grant of scholarship.
   4.2.1 Describe the structure of application.
   4.2.2 Design and compose Curriculum Vitae (C.V.), Bio-data or Resume separately.

4.3 Write essays pertaining to Technical Education, Science and our life, Computer, Environmental Pollution, and Duties of a student and Life of a Technician.
   4.3.1 Identify major kinds of essay

5. **Apply Rules of Translation.**

5.1 Convert sentences from Urdu to English.
5.2 Translate a passage of Urdu into English making appropriate substitution of words.
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
APPLIED MATHEMATICS-I

Total Hours 96
Theory 96
Practical

T P C

96 3 0 3

AIM: On completion, the student will be able to solve problems of Algebra, Trigonometry, Vectors, Mensuration, etc, thereby developing skills, mathematical attitudes and logical perception in aid of civil engineering work.

Curriculum Contents

1. **Sets and Numbers.**
   1.1 Sets and subsets.
   1.2 Product of sets.
   1.3 Intervals.
   1.4 Real and complex numbers.
   1.5 Problems

2. **Quadratic Equations.**
   2.1 Standard form.
   2.2 Methods of solving quadratic equations.
   2.3 Nature of roots of quadratic equations.
   2.4 Relation between roots and coefficients.
   2.5 Formation of quadratic equations.
   2.6 Problems.

3. **Matrices and Determinants.**
   3.1 Definition of matrix.
   3.2 Some important matrices.
   3.3 Algebra of matrices.
   3.4 Determinants and their properties.
   3.5 Singular and non-singular matrices.
   3.6 Adjoint and inverse of a matrix.
   3.7 Solution of linear equations.
   3.8 Problems.
4. **Sequences and Series.**

4.1 Arithmetic sequence.
4.2 Arithmetic means.
4.3 Arithmetic series and its sums.
4.4 Geometric sequence.
4.5 Geometric means.
4.6 Geometric series and its sums.
4.7 Infinite Geometric series and its sums.
4.8 Problems.

5. **Binomial Theorem.**

5.1 Factorials.
5.2 Statement of Binomial Theorem.
5.3 General term.
5.4 Binomial series.
5.5 Problems.

6. **Trigonometric Functions.**

6.1 Angles.
6.2 Measurements of angles in different quadrants.
6.3 Degree and radian measurements.
6.4 Trigonometric functions.
6.5 Signs of trigonometric functions.
6.6 Graphical representation of trigonometric functions (Sine, Cos, Tan)
6.7 Fundamental identities.
6.8 Problems.

7. **Trigonometric Identities.**

7.1 Fundamental law and deductions.
7.2 Sum and difference formulae.
7.3 Double angle identities.
7.4 Half angle identities.
7.5 Conversion of sum or difference to products.
7.6 Problems.

8. **Solution of Triangles.**

8.1 Solution of oblique triangles.
8.2 The law of sines.
8.3 The law of cosines.
8.4 Solution of right triangles.
8.5 Measurement of heights and distances.
8.6 Problems.

9. **Vectors.** 6 Hours

9.1 Scalars & vectors.
9.2 Addition and subtraction.
9.3 The unit vectors i, j, k.
9.4 Direction cosines.
9.5 Scalar product of two vectors.
9.6 Vector product of two vectors.
9.7 Problems

10. **Mensuration of Prisms and Cylinders.** 12 Hours

10.1 Introduction and review of formulae of plane figures.
10.2 Definitions.
10.3 Types of prisms and cylinders.
10.4 Formulae for surfaces and volumes.
10.5 Problems.

11. **Mensuration of Pyramids and Cones and their Frusta.** 12 Hours

11.1 Definitions.
11.2 Types of pyramids, cones and frusta.
11.3 Formulae for surfaces and volumes.
11.4 Problems.

12. **Mensuration of Spheres.** 6 Hours

12.1 Definitions.
12.2 Surface area of sphere.
12.3 Volume of a sphere.
12.4 Problems

**Recommended / Reference Books:**

5. Technical Mathematics: Ghulam Yasin
6. Technical Mathematics: Ilyas Bhatti
7. Technical Mathematics: Zafar Iqbal

Instructional Objectives

1. Understand about Sets and Numbers.
   1.1 Define sets and subsets.
   1.2 Explain product of sets.
   1.3 Define intervals.
   1.4 Understand real and complex numbers.
   1.5 Solve problems

2. Define Quadratic Equations.
   2.1 Understand standard form.
   2.2 Understand methods of solving quadratic equations.
   2.3 Understand nature of roots of a quadratic equation.
   2.4 Define relation between roots and coefficients.
   2.5 Understand formation of quadratic equations.
   2.6 Solve problems.

3. Understand Matrices and Determinants.
   3.1 Understand definition of matrix.
   3.2 Explain some important matrices.
   3.3 Define algebra of matrices.
   3.4 Explain determinants and their properties.
   3.5 Explain singular and non-singular matrices.
   3.6 Explain adjoin and inverse of a matrix.
   3.7 Explain solution of linear equations.
   3.8 Solve problems.

4. Understand Sequences and Series.
   4.1 Define and explain arithmetic sequence.
   4.2 Define and explain arithmetic means.
   4.3 Define and explain arithmetic series and its sums.
   4.4 Define and explain geometric sequence.
4.5 Define and explain geometric means.
4.6 Define and explain geometric series and its sums.
4.7 Define and explain infinite geometric series and its sums.
4.8 Solve problems.

5. **Understand Binomial Theorem.**
   5.1 Define and explain factorials.
   5.2 Define and explain Statement of binomial theorem.
   5.3 Explain general term.
   5.4 Explain binomial series.
   5.5 Solve problems.

6. **Understand Trigonometric Functions.**
   6.1 Explain measurements of angles in different quadrants.
   6.2 Explain degree and radian measurements.
   6.3 Define trigonometric functions.
   6.4 Explain signs of trigonometric functions.
   6.5 Explain graphical representation of trigonometric functions (Sine, Cos, Tan)
   6.6 Explain fundamental identities
   6.7 Solve problems.

7. **Understand Trigonometric Identities**
   7.1 Define fundamental law and deductions.
   7.2 Explain sum and difference formulae.
   7.3 Define double angle identities.
   7.4 Define half angle identities.
   7.5 Explain conversion of sum or difference to products.
   7.6 Solve problems.

8. **Explain Solution of Triangles.**
   8.1 Define solution of oblique triangles.
   8.2 Define the law of sines.
   8.3 Define the law of cosines.
   8.4 Define and explain solution of right triangles.
   8.5 Explain measurement of heights and distances.
   8.6 Solve problems.

9. **Define and explain Vectors.**
   9.1 Define scalars & vectors.
9.2 Explain addition and subtraction.
9.3 Define The unit vectors i, j, k
9.4 Define direction cosines
9.5 Define scalar product of two vectors.
9.6 Define vector product of two vectors.

10. Understand Mensuration of Prisms and Cylinders.
10.1 Explain introduction and review of formulae of plane figures.
10.2 Understand definitions.
10.3 Define and explain types of prisms and cylinders.
10.4 Define and explain formulae for surfaces and volumes.
10.5 Solve problems.

11. Understand Mensuration of Pyramids and Cones and their Frusta.
11.1 Understand definitions.
11.2 Explain types of pyramids, cones and frusta.
11.3 Understand formulae for surfaces and volumes.
11.4 Solve problems.

12. Explain Mensuration of Spheres.
12.1 Understand definitions.
12.2 Explain surface area of sphere.
12.3 Explain volume of a sphere.
12.4 Solve problems
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
APPLIED CHEMISTRY

Total Hours 128 T P C
Theory 32 1 3 2
Practical 96

Aim: After studying this subject a student will be able to:
1. Understand the significance and role of chemistry in the development of modern technology.
2. Become acquainted with the principles of chemistry as applied in the fields of civil technology.
4. Gain skills for the efficient conduct of practicals in the chemistry lab and its useful real time applications.
5. Be prepared for vertical academic development.

Curse Contents
1. Basic Concepts 2 Hours
   1.1 Introduction
   1.2 Atom
   1.3 Relative Mass
   1.4 Isotopes
   1.5 Analysis of a compound – empirical & molecular formulas
   1.6 Concept of mole
   1.7 Stoichiometry
   1.8 Limiting reactant
   1.9 Yield
2. Atomic Structure 2 Hours
   2.1 Sub atomic particles of atom
   2.2 Rutherford’s model of atom
   2.3 Plank’s quantum theory
   2.4 Bohr’s model of atom.
   2.5 Spectrum
2.6 X-Rays and atomic number
2.7 Wave-particle nature of matter
2.8 Heisenberg's uncertainty principle
2.9 Electronic distribution

3. **Chemical Bonding**  
   3.1 Introduction.
   3.2 Atomic sizes
   3.3 Ionization energy, electron affinity & electro negativity
   3.4 Types of bonds
      Ionic Bonding and Covalent Bonding,
   3.5 Valence Bond Theory
   3.6 Molecular Orbital Theory
   3.7 Born-Haber cycle
   3.8 Hydrogen Bonding
   3.9 Theories of bonding in Metal (Band Theory)
   3.10 Bond energy, bond length and dipole moment
   3.11 The effect of bonding on the properties of compound

4. **Gases**  
   4.1 States of matter
   4.2 Gas laws
   4.3 General gas equation.
   4.4 Avogadro's law
   4.5 Dalton's law of partial pressures
   4.6 Diffusion and effusion
   4.7 Kinetic molecular theory of gases
   4.8 Kinetic interpretation of temperature
   4.9 Liquefaction of gases
   4.10 Ideal behavior of gases
   4.11 Plasma state

5. ** Liquids and Solids**  
   5.1 Intermolecular Forces
   5.2 Evaporation
   5.3 Liquid crystals
   5.4 Introduction to solids
5.5 Crystal Lattice
5.6 Crystal and their classification
5.7 Classification of Solids
5.8 Introduction to Solid State
5.9 Radius Ratio Rule
5.10 Space Lattice
5.11 Types of Unit Cell
5.12 Bragg’s Equation and Calculation of density of unit cell
5.13 One and Two dimensional solids and Graphite as two dimensional solid and its conducting properties
5.14 Fullerene and its applications

6. **Water.** 3 Hours

6.1 Chemical nature and properties.
6.2 Sources of water
6.3 Impurities.
6.4 Hardness of water (types, causes & removal)
6.5 Softening of water by L-S process and Reverse Osmosis, Treatment of boiler feed water by calgon process, Zeolite process, Water softening by synthetic Ion Exchange process.
6.6 Scales of measuring hardness (degree Clark, French, PPM, Mg per liter).
6.7 Boiler feed water, scales and treatment.
6.8 Sea-water desalination

7. **Experimental Techniques in Chemistry** 2 Hours

7.1 Filtration
7.2 Sublimation
7.3 Chromatography
7.4 Solvent extraction
7.5 Crystallization

**Chemical Kinetics**
7.6 Rate of Reaction, Rate Law and Order of reaction,
7.7 Molecularity,
7.8 Pseudo-Order reactions, Zero Order Reaction, First Order Reaction, Second Order Reaction, Third Order Reaction, Side Reaction, Reversible Reaction and Consecutive Reaction,
7.9 Energy of activation and catalysis

8. **Chemical Equilibrium**  3 Hours

8.1 Reversible and irreversible reactions
8.2 Applications of chemical equilibrium in industry
8.3 Ionic product of water
8.4 Ionization constant of acids
8.5 Ionization constant of bases
8.6 Common ion effect
8.7 Buffer solutions
8.8 Equilibrium of slightly soluble ionic compounds

9. **Solutions**  3 Hours

9.1 Concept of a solution
9.2 Concentration units of solutions
9.3 Types of Solutions
9.4 Ideal and non-ideal solutions
9.5 Vapor pressures of liquid-liquid solution
9.6 Solubility and solubility curves
9.7 Colligative properties of solutions
9.8 Energetics of a solution
9.9 Hydration and hydrolysis
9.10 pH-value of a solution and pH scale.

10. **Electrochemistry**  2 Hours

10.1 Electrolytic conduction
10.2 Electrode and equilibrium potential
10.3 Electrochemical Cell, Galvanic Cell, Concentration Cell
10.4 Corrosion and method of its control

10.4.1 **Introduction**
    10.4.1.1 Electrochemical
    10.4.1.2 Theory of corrosion and Atmospheric Corrosion,
    10.4.1.3 Types of corrosion

10.4.2 **Factors affecting rate of corrosion**

10.4.3 **Corrosion control**
    10.4.3.1 Protection of Corrosion,
    10.4.3.2 Cathodic and Anodic Protection, and
10.4.3.3 Galvanic Protection
10.4.3.4 Passivity.

10.5 **Metal Finishing**
- 10.5.1 Introduction
- 10.5.2 Factors involved in metal finishing
- 10.5.3 Types of electroplating
- 10.5.4 Electro less plating

10.6 **Liquid Crystals**
- 10.6.1 Introduction
- 10.6.2 Types of liquid crystals
- 10.6.3 Liquid crystal behavior
- 10.6.4 Effects of magnetic and electric field on liquid crystals
- 10.6.5 Electro-optic effect
- 10.6.6 Applications of liquid crystals

10.7 **Polymers**
- 10.7.1 Introduction
- 10.7.2 Classification of polymers
- 10.7.3 Polymerization methods
- 10.7.4 Polymerization techniques
- 10.7.5 Properties of polymers
- 10.7.6 Copolymers
- 10.7.7 Plastics and resins
- 10.7.8 Addition polymers
- 10.7.9 Condensation polymers
- 10.7.10 Elastomers and synthetic rubbers
- 10.7.11 Fibers
- 10.7.12 Adhesives
- 10.7.13 Polymer composites
- 10.7.14 Molecular weight of polymers
- 10.7.15 Light emitting diodes
- 10.7.16 Photoconductive polymers
- 10.7.17 Liquid crystal polymer

11. **Environmental Chemistry**
- 11.1 Introduction
11.2 Ecology and eco-systems
   11.2.1 Introduction
   11.2.2 Geo-biochemical cycles
   11.2.3 Bio-geochemical cycles
   11.2.4 Solar energy and atmosphere
   11.2.5 Population dynamics
   11.2.6 Life-toxic substances and sustenance of life
   11.2.7 Pest control
   11.2.8 Agriculture and energy
   11.2.9 Control of toxic substances in environment

11.3 Types of pollution (air, water and land)
   11.3.1 Introduction
   11.3.2 Sources and effects of air pollution
   11.3.3 Pollution of air, water and land
   11.3.4 Air pollution effects (including acid rain, smog, green house effect and
depletion of ozone layer in the stratosphere)
   11.3.5 Measurement techniques
   11.3.6 Air and water pollution control

11.4 Factors affecting the quality of water
   11.4.1 Dissolved oxygen (DO)
   11.4.2 Biochemical oxygen demand (BOD)
   11.4.3 Chemical oxygen demand (COD)
   11.4.4 Purification of water

Recommended / Reference Books:

1. Text Book of Intermediate Chemistry (I & II)
3. Polytechnic Chemistry : J.N. Reedy (New Delhi)
4. Chemistry for Engineers : P.C. Jain (New Delhi)
5. Engineering Chemistry: Shradha Sinha Sudha Jain S. S. Dara, S. Chand &
   Company Ltd 2005
7. A textbook on Experiments and Calculations in Engineering Chemistry, S. S. Dara,
   [2008], S. Chand & Co New Delhi.
Instructional Objectives

1. **Understand the Scope, Significance and Fundamental Role of the Subject.**
   1.1 Define chemistry and its important terms.
   1.2 State the units of measurements in the study of chemistry.
   1.3 Write chemical formula of common compounds.
   1.4 Describe types of chemical reactions with examples.

2. **Understand the Structure of Atoms and Arrangement of Sub Atomic Particles in the Architecture of Atoms.**
   2.1 Define atom.
   2.2 State the periodic law of elements.
   2.3 Describe the fundamental sub atomic particles.
   2.4 Distinguish between atomic no. and mass no; isotopes and isobars.
   2.5 Explain the arrangements of electrons in different shells and sub energy level.
   2.6 Explain the grouping and placing of elements in the periodic table:

3. **Understand the Nature of Chemical Bond.**
   3.1 Define chemical bond.
   3.2 Describe the nature of chemical bond.
   3.3 Differentiate between electrovalent and covalent bonding.
   3.4 Explain the formation of polar and non polar, sigma and pi-bond with examples.
   3.5 Describe the nature of coordinate bond with examples.

4. **Understand the Nature of Gases**
   4.1 Define states of matter
   4.2 Explain the gas laws
   4.3 Explain general gas equation
   4.4 Define Avogadro’s law
   4.5 Define Dalton’s law of partial pressures
   4.6 Explain Diffusion and effusion
   4.7 Describe Kinetic molecular theory of gases
   4.8 Express Kinetic interpretation of temperature
   4.9 Describe Liquefaction of gases
4.10 Explain Ideal behavior of gases
4.11 Define Plasma state

5. **Comprehend Liquids and Solids**
   5.1 Explain intermolecular forces
   5.2 Define evaporation
   5.3 Describe liquid crystals
   5.4 Explain introduction to solids
   5.5 Define crystal lattice
   5.6 Explain crystals and their classification
   5.7 Describe classification of solids

6. **Understand the Chemical Nature of Water**.
   6.1 Describe the chemical nature of water with its formula.
   6.2 Describe the general impurities present in water.
   6.3 Explain the causes and methods of removing hardness of water.
   6.4 Express hardness in different units like mg/liter., p.p.m degrees Clark and degrees French.
   6.5 Describe the formation and nature of scales in boiler feed water.
   6.6 Explain the method for the treatment of scales.
   6.7 Explain the sewage treatment and desalination of sea water.

7. **Comprehend the Experimental Techniques in Chemistry**
   7.1 Explain Filtration
   7.2 Describe Sublimation
   7.3 Describe Chromatography
   7.4 Explain Solvent extraction
   7.5 Explain Crystallization

8. **Understand about Chemical Equilibrium**
   8.1 Explain reversible and irreversible reactions
   8.2 Describe the applications of chemical equilibrium in industry
   8.3 Express the ionic product of water.
   8.4 Ionization constant of acids
   8.5 Ionization constant of bases
   8.6 Common ion effect
   8.7 Buffer solutions
   8.8 Equilibrium of slightly soluble ionic compounds
9. **Understand about Solutions**
   9.1 Concept of a solution
   9.2 Concentration units of solutions
   9.3 Types of Solutions
   9.4 Ideal and non-ideal solutions
   9.5 Vapor pressures of liquid-liquid solution
   9.6 Solubility and solubility curves
   9.7 Colligative properties of solutions
   9.8 Energetics of a solution
   9.9 Hydration and hydrolysis
   9.10 pH-value of a solution and pH scale.

10. **Understand about Electrochemistry**
   10.1 Electrolytic conduction
   10.2 Electrode potential
   10.3 Corrosion and method of its control
       10.3.1 Introduction
       10.3.2 Types of corrosion
       10.3.3 Factors affecting rate of corrosion
       10.3.4 Corrosion control
   10.4 Metal Finishing
       10.4.1 Introduction
       10.4.2 Factors involved in metal finishing
       10.4.3 Types of electroplating
       10.4.4 Electro less plating
   10.5 Liquid Crystals
       10.5.1 Introduction
       10.5.2 Types of liquid crystals
       10.5.3 Liquid crystal behavior
       10.5.4 Effects of magnetic and electric field on liquid crystals
       10.5.5 Electro-optic effect
       10.5.6 Applications of liquid crystal
   10.6 Polymers
       10.6.1 Introduction
       10.6.2 Classification of polymers
10.6.3 Polymerization methods
10.6.4 Polymerization techniques
10.6.5 Properties of polymers
10.6.6 Copolymers
10.6.7 Plastics and resins
10.6.8 Addition polymers
10.6.9 Condensation polymers
10.6.10 Elastomers and synthetic rubbers
10.6.11 Fibers
10.6.12 Adhesives
10.6.13 Polymer composites
10.6.14 Molecular weight of polymers
10.6.15 Light emitting diodes
10.6.16 Photoconductive polymers
10.6.17 Liquid crystal polymer

11. **Understand about Environmental Chemistry**

11.1 Introduction

11.2 Ecology and eco-systems
    11.2.1 Introduction
    11.2.2 Geo-biochemical cycles
    11.2.3 Bio-geochemical cycles
    11.2.4 Solar energy and atmosphere
    11.2.5 Population dynamics
    11.2.6 Life-toxic substances and sustenance of life
    11.2.7 Pest control
    11.2.8 Agriculture and energy
    11.2.9 Control of toxic substances in environment

11.3 Types of pollution (air, water and land)
    11.3.1 Introduction
    11.3.2 Sources and effects of air pollution
    11.3.3 Pollution of air, water and land
    11.3.4 Air pollution effects (including acid rain, smog, green house effect and depletion of ozone layer in the stratosphere)
    11.3.5 Measurement techniques
11.3.6 Air and water pollution control

11.4 Factors affecting the quality of water

11.4.1 Dissolved oxygen (DO)

11.4.2 Biochemical oxygen demand (BOD)

11.4.3 Chemical oxygen demand (COD)

11.4.4 Purification of water

**List of Practicals**

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<td>General instructions about conduct of practicals and safety precautions in the lab and introduction to common apparatus, glassware and chemical reagents used in the chemistry lab.</td>
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<td>2.</td>
<td>To purify a chemical substance by crystallization.</td>
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<td>3.</td>
<td>To purify commercial NaCl by passing HCl gas</td>
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<td>4.</td>
<td>Determination of NaOH and Na2CO3 in the given alkali mixture solution</td>
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<td>5.</td>
<td>Determination of NaHCO3 and Na2CO3 in the given alkali mixture solution</td>
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<td>6.</td>
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<td>Estimation of chloride in a water sample by Mohr's method</td>
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<td>8.</td>
<td>Determination of dissolved oxygen (DO) in a water sample</td>
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<td>Determination of free chlorine in a water sample</td>
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<td>10.</td>
<td>Determination of chemical oxygen demand (COD) in a waste water sample</td>
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<td>Determination of biochemical oxygen demand (BOD) in a waste water sample</td>
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<td>Determination of fluoride in water</td>
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<td>Calculations on water softening by lime-soda process and zeolite process</td>
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<td>Determination of molecular weight of a polymer</td>
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<td>Determination of acid value of a plastic material</td>
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<td>17.</td>
<td>To separate a mixture of sand and salt.</td>
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<td>18.</td>
<td>To find the melting point of a substance.</td>
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<td>To find the pH value of a solution with pH paper.</td>
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<td>20.</td>
<td>To separate a mixture of inks by chromatography.</td>
<td>3</td>
</tr>
<tr>
<td>21.</td>
<td>To find the surface tension of a liquid with a stalgometer.</td>
<td>3</td>
</tr>
<tr>
<td>22.</td>
<td>To perform electrolysis of water to produce Hydrogen and Oxygen.</td>
<td>3</td>
</tr>
<tr>
<td>23.</td>
<td>To get introduced with the scheme of analysis of salts for basic radicals.</td>
<td>3</td>
</tr>
<tr>
<td>24.</td>
<td>To detect dilute acid group.</td>
<td>3</td>
</tr>
</tbody>
</table>
25. To get introduced with the methods/ apparatus of conducting volumetric estimations.  
26. To prepare standard solution of a substance.  
27. To find the strength of a given alkali solution.  
28. To find out the %age composition of mixture solution of KN03 and KOH volumetrically.  
29. To find the amount of chloride ions (Cl) in water volumetrically.  
30. Determination of iron concentration in sample of water by colorimetric method.  
31. The method involves the use of KCNS as color developing agent and the measurements are carried out at $\lambda_{\text{max}}$ 480nm.
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
APPLIED PHYSICS

<table>
<thead>
<tr>
<th>Total Hours</th>
<th>228</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>32</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Practical</td>
<td>196</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**AIM:** On completion, the student will be able to understand the fundamental principles and concepts of physics related to civil technology and use this knowledge to understand and solve problems in practical situations. The student will also be prepared for vertical academic development.

**Curse Contents**

1. **Measurements.**
   - 1.1 Fundamental units and derived units.
   - 1.2 Systems of measurement and S.I. units.
   - 1.3 Concept of dimensions, dimensional formula.
   - 1.4 Conversion from one system to another
   - 1.5 Significant figures.

2. **Vectors and Equilibrium:**
   - 2.1 Basic Concepts of Vectors
   - 2.2 Vector Addition by Rectangular Components
   - 2.3 Product of Two Vectors
   - 2.4 Torque
   - 2.5 Equilibrium of Forces
   - 2.6 Equilibrium of Torques

3. **Motion and Force:**
   - 3.1 Displacement
   - 3.2 Velocity
   - 3.3 Acceleration
   - 3.4 Velocity-Time Graph
   - 3.5 Review of Equation of Uniformity Accelerated Motions
   - 3.6 Newton’s Laws of Motion
   - 3.7 Momentum
   - 3.8 Elastic and Inelastic Collisions
3.9 Force Due to Water Flow
3.10 Momentum and Explosive Forces
3.11 Rocket Propulsion
3.12 Projectile Motion

4. **Work and Energy:**
4.1 Work Done by a Constant Force
4.2 Work Done by a Variable Force
4.3 Work Done by a Gravitational Field.
4.4 Power
4.5 Energy
4.6 Interconversion of Potential Energy and Kinetic Energy
4.7 Conservation of Energy
4.8 Non-Conventional Energy Sources

5. **Circular Motion:**
5.1 Angular Displacement
5.2 Angular Velocity
5.3 Angular Acceleration
5.4 Relation between Angular and Linear Velocities
5.5 Centripetal Force.
5.6 Moment of Inertia
5.7 Angular Momentum
5.8 Law of Conservation of Angular Momentum
5.9 Rotational Kinetic Energy
5.10 Artificial Satellites
5.11 Real and Apparent Weight
5.12 Weightlessness in Satellites and Gravity Free System
5.13 Orbital Velocity
5.14 Artificial Gravity
5.15 Geostationary Orbits
5.16 Communication Satellites
5.17 Newton’s and Einstein’s Views of Gravitation

6. **Fluid Dynamics:**
6.1 Viscous Drag and Stokes Law.
6.2 Terminal Velocity
6.3 Fluid Flow
6.4 Equation of Continuity
6.5 Bernoulli’s Equation
6.6 Applications of Bernoulli’s Equation

7. **Electrostatics:** 4 Hours
   7.1 Coulomb’s Law
   7.2 Field of Force
   7.3 Electric Field Lines
   7.4 Applications of Electrostatics
   7.5 Electric Flux
   7.6 Electric Flux through a Surface Enclosing a Charge
   7.7 Gauss’s Law
   7.8 Applications of Gauss’s Law
   7.9 Electric Potential
   7.10 Electric Volt
   7.11 Electric And Gravitational Forces (A Comparison)
   7.12 Charge on an Electron by Millikan’s Method
   7.13 Capacitor
   7.14 Capacitance of a Parallel Plate Capacitor
   7.15 Electric Polarization of Dielectrics
   7.16 Energy Stored in a Capacitor
   7.17 Charging and Discharging Capacitor

8. **Current Electricity:** 3 Hours
   8.1 Electric Current
   8.2 Source of Current
   8.3 Effects of Current
   8.4 OHM’s Law
   8.5 Resistivity and its Dependence upon Temperature
   8.6 Color Code for Carbon Resistances
   8.7 Electrical Power and Power Dissipation in Resistors
   8.8 Electromotive Forces (EMF) and Potential Difference
   8.9 Kirchhoff’s Rules
   8.10 Wheatstone Bridge
   8.11 Potentiometer
9. **Alternating Current:**

9.1 Alternating current
9.2 A.C. Circuits
9.3 A.C. through a Resister
9.4 A.C. through a Capacitor
9.5 A. C. through Inductor
9.6 Impedance
9.7 R-C and R-L Series Circuits
9.8 Power in A.C. Circuits
9.9 Series Resonance Circuits
9.10 Parallel Resonance Circuits
9.11 Three Phase A.C. Supply
9.12 Principles of Metal Detectors
9.13 Choke
9.14 Electromagnetic Waves
9.15 Principles of Generation Transmission and Reception of Electromagnetic Waves
9.16 Modulation

10. **Properties of Solids:**

10.1 Classifications of solids
10.2 Mechanical Properties of Solid
10.3 Electrical Properties of Solids
10.4 Superconductors
10.5 Magnetic Properties of Solids
10.6 Magnetism and Magnetic Materials
10.7 Differences between Diamagnetic
10.8 Paramagnetic and Ferromagnetic Materials
10.9 Curie Temperature and Curie-Weiss Law
10.10 Hysteresis and Definition of Some Magnetic Parameters
10.1 Relation between Magnetic Intensity, Magnetic Induction and Intensity of Magnetization
11. **Dielectric Properties of Materials**
   11.1 Electric Potential, Electric Field Strength, Relation between Electric Potential and Electric Field Strength
   11.2 Para electricity, Ferro electricity, Piezoelectricity, Ferro electricity vs. Piezoelectricity
   11.3 Frequency Dependence of Dielectric Constant, Dielectric Loss Applications of Dielectrics

12. **Fiber Optics**
   12.1 Introduction: Structure of the Optical Fiber and Principle of Optical Fibers
       Step Index Fiber, Graded Index Fiber, Fiber packing
   12.2 Losses in Optical Fibers and Applications of Optical Fibers

13. **Nanotechnology**
   13.1 Introduction to Nano-materials, Nano-science and nanotechnology
       Fundamental Concepts of Nan science and Nanotechnology
   13.2 Bucky balls, Carbon Nano-tubes, Structure of Carbon Nano-tubes:
       Singlewalled and Multi-walled Nano-tubes
   13.3 Growth Mechanism of Nano tube and Synthesis of Nano-tubes
   13.4 Properties of Nano tubes and Applications of Nanotechnology

**Recommended / Reference Books:**

1. Fundamentals of Physics Vol- I and II: Tahir Hussain
2. Fundamentals of Physics Vol - I and II: Farid Khawaja
3. Schaum’s Series Physics: Wells and Slusher
4. Advanced Level Practical Physics: Nelkon and Oybron
5. Practical Physics: Mehboob Ilahi Malik and Inam-ul-Haq
6. Experimental Physics Note Book: M. Aslam Khan and M. Akram Sandhu
Instructional Objectives

1. Use Concepts of Measurement to Practical Situations and Technological Problems.
   1.1 Write dimensional formulae for physical quantities.
   1.2 Derive units using dimensional equations.
   1.3 Convert a measurement from one system to another.
   1.4 Use concepts of measurement and Significant figures in problem solving

2. Use Concepts of Scalars and Vectors in Solving Problems Involving These Concepts.
   2.1 Explain laws of parallelogram, triangle and polygon of forces.
   2.2 Describe method of resolution of a vector into components.
   2.3 Describe method of addition of vectors by rectangular components.
   2.4 Differentiate between dot product and cross product of vectors.
   2.5 Use the concepts in solving problems involving addition resolution and multiplication of vectors.

3. Understanding Motion and Force:
   3.1 Explain Displacement, Velocity and Acceleration
   3.2 Describe the Velocity-Time Graph
   3.3 Describe the Equation of Uniformity Accelerated Motions
   3.4 Explain Newton’s Laws of Motion
   3.5 Describe Momentum
   3.6 Explain Elastic and Inelastic Collisions
   3.7 Derive Force Due to Water Flow
   3.8 Describe Momentum and Explosive Forces
   3.9 Describe Rocket Propulsion and Projectile Motion

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9.15 Principles of Generation Transmission and Reception of Electromagnetic Waves
9.16 Modulation

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10.1 Mechanical Properties of Solid
10.2 Electrical Properties of Solids
10.3 Superconductors
10.4 Magnetic Properties of Solids

**List of Practicals**

<table>
<thead>
<tr>
<th>Practical</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General instructions about conduct of practicals and safety precautions in the lab</td>
<td>6</td>
</tr>
<tr>
<td>2. Draw graphs representing the function:</td>
<td>6</td>
</tr>
<tr>
<td>a) $y = mx$ for $m = 0, 0.5, 1, 2$</td>
<td></td>
</tr>
<tr>
<td>and $y = x^2$ or $y = 1/x$</td>
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</tr>
<tr>
<td>3. Find the volume of a given solid cylinder using vernier calipers.</td>
<td>6</td>
</tr>
<tr>
<td>4. Find the area of cross-section of the given wire using micrometer screw gauge and prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers, trolley.</td>
<td>6</td>
</tr>
<tr>
<td>5. Verify law of parallelogram of forces using Grave-sands apparatus.</td>
<td>6</td>
</tr>
<tr>
<td>6. Verify law of triangle of forces and Lami's theorem</td>
<td>6</td>
</tr>
<tr>
<td>7. Determine the weight of a given body using</td>
<td></td>
</tr>
<tr>
<td>a. Law of parallelogram of forces</td>
<td></td>
</tr>
<tr>
<td>b. Law of triangle of forces</td>
<td></td>
</tr>
<tr>
<td>c. Lami’s theorem</td>
<td></td>
</tr>
<tr>
<td>8. Verify law of polygon of forces using Grave-sands apparatus.</td>
<td>6</td>
</tr>
<tr>
<td>9. Locate the position and magnitude of resultant of like parallel forces.</td>
<td>6</td>
</tr>
<tr>
<td>10. Determine the resultant of two unlike parallel forces.</td>
<td>6</td>
</tr>
<tr>
<td>11. Find the weight of a given body using principle of moments.</td>
<td>6</td>
</tr>
<tr>
<td>12. Locate the centre of gravity of regular and irregular shaped bodies.</td>
<td>6</td>
</tr>
<tr>
<td>13. Verify Hooke’s Law using helical spring and find Young’s Modulus of Elasticity of a metallic wire.</td>
<td>9</td>
</tr>
<tr>
<td>14. To find the unknown weight of a body by the method of vector addition of forces</td>
<td>6</td>
</tr>
</tbody>
</table>
15. To determine the value of ‘g’ by free fall method using an electric timer
16. To verify the following relations of the simple pendulum
   a. Time period is independent of the amplitude
   b. Time period is independent of its mass or density of the bob
   c. Time period is directly proportional to the square root of its length
17. To find the acceleration due to gravity by oscillating mass spring system
18. To study the laws of conservation of momentum by colliding trolleys and ticker timer for elastic and inelastic collision
19. To verify the second conditions of equilibrium using a suspended meter rod
20. To study the fall of a body through viscous medium and hence deduce the coefficient of viscosity of medium (liquid)
21. To find the moment of inertia of a fly wheel
22. To find the co-efficient of linear expansion of the material of a rod by Pullinger’s apparatus
23. To measure the mechanical equivalent of heat by electrical method
24. To find the resistance of
   a. a wire by slide wire bridge
   b. a galvanometer by half deflection method
   c. a voltmeter by drawing graph between R and I/V
25. Variation of resistance of thermister with temperature
26. Conversion of
   a. galvanometer into ammeter
   b. galvanometer into voltmeter
27. To find the internal resistance of a cell using a potentiometer
28. To determine the e.m.f. of a cell using potentiometer
29. Relation between current passing through tungsten filament lamp and the potential applied across it
30. Variation of magnetic field along the axis of a circular coil
31. Charging and discharging of a capacitor and to measure time constant
32. Relation between current and capacitance when different capacitors are used in A.C. circuit.
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
COMPUTER APPLICATIONS
(GENERAL, MS OFFICE, BASIC AUTO CAD)

Total Hours 96
Theory 0
Practical 96

List of Practicals Hours
1. **Introduction to Computer** 6 Hours
   1.1 Demonstrate & practice identification/application of Input/ Output devices
   1.2 Demonstrate & practice identification/application of Hardwares/ Softwares & their types
   1.3 Demonstrate & practice identification/application of Computer Resources

2. **Windows Operating System & Internet** 12 Hours
   2.1 Practice start, restart, shut down, log on/off
   2.2 Demonstration & Practice Windows interface
   2.3 Demonstration & Practice Windows Help
   2.4 Practice File / folder Manipulation
   2.5 Demonstration & Practice window search
   2.6 Practice Windows Advance setting options.
   2.7 Demonstration & Practice Partitioning & installation of windows
   2.8 Demonstration Introduction to internet
   2.9 Demonstration & Practice setting up internet connection using internet browser
   2.10 Practice Make/Maintain E-Mail address
   2.11 Practice send/Receive E-Mail
   2.12 Practice Downloading data
   2.13 Practice search teaching & learning Resources (TLRs)

3. **Word Processing** 24 Hours
   3.1 Demonstration & Practice installation of MS-office package
   3.2 Demonstration Introduction to word processor
   3.3 Introduction to MS-Word
   3.4 Demonstration Main Interface window
   3.5 Practice open/Close MS-Word
3.6 Practice Create/save/Rename/Close files
3.7 Practice Editing data in MS-Word
3.8 Demonstration and Practice use of clip board
3.9 Practice Insert Symbols
3.10 Demonstration & Practice find/replace data
3.11 Practice Formatting character
3.12 Practice Formatting Paragraph
3.13 Practice paragraph indentation
3.14 Practice Bullets & Numbering
3.15 Demonstration & Practice Inserting columns
3.16 Practice page setup
3.17 Practice spelling & grammar
3.18 Practice Synonyms & Thesaurus
3.19 Demonstration & Practice Drawing toll bar
3.20 Practice word Art
3.21 Practice Manipulating Tables
3.22 Demonstration & Practice Printing Documents
3.23 Demonstration & Practice Mail Merge
3.24 Practice using formulas in MS-Word

4. **MS-Excel**

4.1 Introduction to spread sheet program
4.2 Introduction to MS-Excel
4.3 Practice open/close MS-Excel
4.4 Introduction to data types, work sheets/work books
4.5 Introduction Row, Column, Cell
4.6 Practice Editing Data
4.7 Practice data manipulation
4.8 Practice Formatting cells
4.9 Practice printing documents
4.10 Practice using Formula
4.11 Practice insert function/wizard
4.12 Formula application for surveying data calculation
4.13 Formula application for geometry calculation
4.14 Formula application for trigonometry calculation
4.15 Practice prepare charts
4.16 Practice protection of files
4.17 Practice data sorting
4.18 Practice filtering data
4.19 Practice table Manipulation
4.20 Practice creating macro
4.21 Practice find/replace data
4.22 Practice merge/split cells

5. **Auto CAD**  
   5.1 Installation of Auto CAD Software
   5.2 Introduction to AutoCAD and demonstration of its use
   5.3 Demonstration & Practice of AutoCAD Menus
   5.4 Demonstration & Practice of AutoCAD Graphic window
   5.5 Demonstration & Practice of coordinate system (Types of coordinates).
   5.6 Practice setting of model and its layout.
   5.7 Practice of Draw commands
   5.8 Practice of File commands
   5.9 Practice of Edit commands
   5.10 Practice of dimensions.
   5.11 Practice of display command.
   5.12 Modify Commands
   5.13 Insert object
   5.14 Formatting Commands
   5.15 Practice to use existing templates and also create relevant templates.
   5.16 Practice of drawing of plane and solid geometrical figures
   5.17 Practice for incorporation of data from WORD and Excel.
   5.18 Practice of drawing of two roomed house (detailed plan, elevation and sections) and setting layouts for plotting.
   5.19 Plotting of two roomed house.
   5.20 Practice of drawing of over head & under ground Water Tanks (detailed) plan, elevation, steel reinforcement and sections) and setting layouts for plotting.
   5.21 Practice of Plotting of drawing of over head & under ground Water Tanks (detailed plan, elevation, steel reinforcement and sections)
5.22 Practice of drawing of framed structure building (detailed plan, elevation, steel reinforcement and sections) and setting layouts for plotting.
5.23 Practice plotting of drawing framed structure building.
5.24 Drawings of road structures and their plotting.
5.25 Practice Integration of Total Station with AutoCAD & MS Excel.

**Recommended / Reference Books:**

2. Word Processor Latest Release
3. MS Excel for Learners
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
WORK ETHICS

Total Hours: 32
Theory: 32
Practical: T  P  C

Course Contents
1. Communication  2 Hour
2. Integrity  2 Hour
3. Accountability  2 Hour
4. Interaction  2 Hour
5. Patience  2 Hour
6. Attitude / Behaviour  2 Hour
7. Truthfulness  2 Hour
8. Trust  2 Hour
9. Uprightness  2 Hour
10. Tolerance  2 Hour
11. Confidence  2 Hour
12. Aptitude  2 Hour
13. Self Respect  2 Hour
14. Faith  2 Hour
15. Reliability  2 Hour
16. Sincerity  2 Hour
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
BASIC ENGINEERING DRAWING

Total Hours 384  T  P  C
Theory 96  3  9  6
Practical 288

AIMS-
- Understand proper use of drawing instruments for preparation of geometric and multi-views pictorial drawing.
- Understand the construction of various geometric figures as applicable in Engineering.
- Apply the techniques of free hand sketching for preparation of finished sketches of given objects.

Course Contents
1. Basics of drafting 4 Hour
   1.1 Introduction
   1.2 Meanings of drafting and its scope in civil engineering
   1.3 Free hand sketching

2. Engineering Drawing instruments 4 Hours
   2.1 Classification-basic tools, and their uses.
   2.2 Scales.
   2.3 Lines-type, selection of line thickness.
   2.4 Selection of pencil.
   2.5 Drawing sheet sizes title strip/block-types, sizes.
   2.6 Drawing board sizes

3. Lines 6 Hours
   3.1 Different types of lines and their use
   3.2 Boundary wall, Title block

4. Lettering 4 Hours
   4.1 Importance and types
   4.2 Size and style
   4.3 Lettering stencils

5. Dimensioning 4 Hours
   5.1 Definition
   5.2 Elements in dimensioning
   5.3 System of dimensioning
6. **Geometrical construction**  
6.1 All kinds of angles  
6.2 Triangles, quadrilaterals and polygons  
6.3 Circle and terms used for it  
6.4 Ellipse, parabola, hyperbola and their applications in civil engineering.

7. **Orthographic projection**  
7.1 Planes-principal planes  
7.2 Projections and projection lines  
7.3 Dihedral and trihedral angles  
7.4 Principles and Types of orthographic projections  
7.5 Principal views in 1st & 3rd angle

8. **Sectioning**  
8.1 Definition, purpose and types  
8.2 Location of cutting plane-purpose of cutting plane line  
8.3 Position of cutting plane lines in case of full & half section

9. **Pictorial projection**  
9.1 Definition and uses  
9.2 Isometric projection and its types  
9.3 Oblique projection and its types  
9.4 Perspective drawings, its purpose, principles & types

10. **Auxiliary views**  
10.1 Necessity, auxiliary plane  
10.2 Cases of auxiliary views

11. **Development of surfaces**  
11.1 Definition and need for development of surfaces  
11.2 Ruled and single cured surfaces  
11.3 Geometric solids-pyramids, cylinder, cones  
11.4 True length diagrams by right angled triangle and revolution method  
11.5 Intersection of solids-prism and cylinders

12. **Site selection for a Civil Engineering Structure**  
12.1 Significance  
12.2 Factors governing site-selection  
12.3 Factors affecting selection or planning for a site  
12.4 Orientation
12.5 Selection of material, ventilation & position of openings.

13. **Building drawing** 12 Hours

13.1 Convention and terms used for buildings
13.2 Symbols used for Public health & electrical installations
13.3 Plan, site plan, line plan, detailed plan, layout plan
13.4 All detail of Architectural drawing
13.5 Schedule of Area, Schedule of opening

14. **Detail of drawing** 4 Hours

14.1 Sewerage drawing
14.2 Electrical drawing
14.3 Plumbing drawing

**Instructional Objectives**

1. **Understand the Need of Drafting, Civil Drafting and Use of Free Hand Sketching.**
   1.1 State the importance of civil drafting as an engineering communication medium.
   1.2 Draw free hand sketches of different plane and solid figures.
   1.3 State the difference between plane and solid figures.
   1.4 Understand necessity of civil drafting in different engineering fields.
   1.5 Indicate the link between drafting and other subjects of study in diploma course.

2. **Understand Different Engineering Drawing Instruments and Accessories.**
   2.1 Use different engineering drawing instruments.
   2.2 State the type of scales and meaning of R.F.
   2.3 Explain the plane and diagonal scales.
   2.4 State the uses of hard and soft grades of pencils.
   2.5 State the sizes of drawing sheets.
   2.6 State sizes of drawing boards.

3. **Know about all the Types of Lines and their Use**
   3.1 Drawing of vertical lining, horizontal lining and oblique lining
   3.2 Proper use of object line, construction line, hidden line, centre line, cutting plane line
   3.3 Use of section line, break line, leader line, dimension & extension line.

4. **Know the Need and Types of Lettering & Printing.**
   4.1 State importance of lettering.
   4.2 State different types of lettering.
4.3 Write letters and numbers in different sizes and styles.
4.4 Select and use lettering stencils for a given applications.
4.5 State the systems of lettering.

5. **Understand Techniques of Dimensioning.**
5.1 State the need of dimensioning drawings according to accepted standards.
5.2 Define dimensioning.
5.3 State the dimension and extension line.
5.4 State the length of arrowhead.
5.5 Identify the system of placement of dimensions given dimensioned drawing.
5.6 Dimension a given drawing using standard notations and desired system of dimensioning.

6. **Understand Types and Construction of Geometrical Figures.**
6.1 State names of angles.
6.2 State different triangles quadrilaterals and polygons.
6.3 State difference between inscribed and circumscribed figures.
6.4 State the terms used in a circle.
6.5 Sketch and label different lines and arcs in a circle.
6.6 State cone, conical sections, (circle, parabola, ellipse and hyperbola).
6.7 Relate the conical sections in civil engineering drawings.
6.8 Define ellipse and parabola

7. **Under Types & Techniques of Orthographic Projections.**
7.1 Define plane, principal plane.
7.2 Explain the principle of orthographic projection with simple sketches.
7.3 State the definition of projector and projection lines and their use.
7.4 State and differentiate between dihedral and trihedral angles.
7.5 State the types of orthographic projection.
7.6 Sketch the orthographic views of a simple engineering part of given pictorial drawing.
7.7 Identify the object from a number of orthographic views of the object.
7.8 Select the minimum number of views needed to represent a given object fully.

8. **Understand the Basics of Sectioning.**
8.1 State the definition of section and sectioning.
8.2 Explain purpose of sectional views.
8.3 State cutting plane and cutting plane line.
8.4 State the purpose of cutting plane line.
8.5 State conventional representation of engineering materials.
8.6 Know rule of putting arrowhead on cutting plane line.
8.7 State types of sectional views.
8.8 Select the position of cutting plane line to give maximum details of object.
8.9 Explain the principles of hatching.

9. **Understand the Techniques of Pictorial Drawings.**
9.1 Define the pictorial drawing.
9.2 State the types of pictorial drawings and their general uses.
9.3 Sketch isometric axis, angles, scales, arcs and circles.
9.4 Differentiate between the isometric and non-isometric lines.
9.5 Sketch isometric drawing and isometric projection.
9.6 Sketch the isometric projection from the given orthographic drawings.
9.7 Explain the angle of receding axis.
9.8 State the oblique drawing and its uses.
9.9 Sketch and letter the oblique cavalier and cabinet views.
9.10 Define perspective drawing.
9.11 Explain the purpose of perspective drawing.
9.12 State the vanishing point.
9.13 State the principles of making perspective views.
9.14 State the parallel and angular perspective.

10. **Know the Types and Uses of Auxiliary Views.**
10.1 State auxiliary views and auxiliary planes.
10.2 State necessity of auxiliary views.
10.3 State types of auxiliary views i.e. primary and secondary auxiliary views.
10.4 State the types of auxiliary views due to their location with reference line i.e. symmetrical, unilateral and bilateral auxiliary views.
10.5 State the classes of primary views i.e. front top and profile auxiliary planes and oblique surfaces.
10.6 State the cases of secondary auxiliary views.

11. **Understand the Techniques of Development of Surfaces.**
11.1 Define of development/pattern drawing.
11.2 State the necessity of development of surfaces.
11.3 State ruled, single curved, plane and double curved surfaces.
11.4 State the uses of development, drawings.
11.5 Explain the method of development i.e. right-angled triangle and revolution method.
11.6 State the rules for calculation of true length.
11.7 Sketch the development of surfaces of prism, pyramid, cylinder and cone.
11.8 Explain the intersection and line of intersection.
11.9 Explain the procedures for finding line of intersection.

12. **Know the Importance and Factors of House Planning/ Site Selection.**
   12.1 Define house planning.
   12.2 State the necessity of house planning.
   12.3 State the factors, which govern the selection of site for building.
   12.4 Define orientation.
   12.5 State the factors effecting the planning of house.
   12.6 State the minimum area of the openings for ventilation of specific rooms.
   12.7 State principles of providing building services.
   12.8 State the inter-relationship of different rooms.
   12.9 Select the materials for building structures.
   12.10 State the position of different openings in building at their appropriate places.

13. **Understand the Types and Procedures of Building Drawing.**
   13.1 Sketch the conventional symbols for different engineering materials, building components, public health and electric installation.
   13.2 Sketch the x-section of wall with flooring and roofing
   13.3 Labels the parts of given plan.
   13.4 State the sizes of rooms for different classes of houses.
   13.5 Follow measurements from a given plan.
   15.6 Define site plan, detailed plan, layout plan, index plan, elevations & sections.
   13.7 Sketch plans elevations and sections of buildings from given line diagrams.
   13.8 Explain the procedure for preparing plans, elevations and sections for single story and double story buildings.
   13.9 State the different fixtures required for bath kitchen, dining and courtyards.
   13.10 Sketch the different fixtures in kitchen and bathrooms at their proper places.
14. **Understand Detail Drawings**
   14.1 Completely explain Sewerage Drawing.
   14.2 Elaborate and explain Electrical Drawings.
   14.3 Preparation of a detailed Plumbing Drawing.

**List of Practicals**

1. Printing/Lettering
   i. Block printing in ratio 5:4 & 7:4
   ii. Single stroke printing in ratio 5:4 & 7:4
   iii. Italic printing - free hand gothic letters and figures in capital and lower case letters.
2. Space distribution of drawing sheet and drawing of title strips and drawing different types of lines.
3. Freehand proportionate sketching & sketching to scale of lines, triangle, quadrilaterals, Polygon, circle.
4. Construction of scale useful for civil engineering.
5. Drawing triangles with inscribed and circumscribed circles, hexagons inside and outside circle, cones, conic, section (ellipse, parabola, hyperbola).
6. Sketching three views of V-Block and different wooden blocks.
7. Completion of missing views when two views are given.
8. Drawing of full sectional front view and outside top view of the Hallow concrete block.
9. Drawing of full sectional front view, side view and top view of the Prisms, pyramids of different types.
10. Drawing Isometric views of a cube having circular hole in its focus and R.C.C. stairs (First three steps).
11. Oblique drawing of different prisms, and pyramid from its given principal views.
12. Perspective drawing of slotted block and different wooden blocks from there given principal views.
13. Drawing partial symmetrical auxiliary view when top and front views are given, front and side views are given.
14. Drawing development of a right and oblique truncated hexagonal prism, cylinder and pyramid.
15. Pattern drawing of a funnel from given data.
16. Determine the line of section of a cone and cylinder and show it in the development of cone.

17. Building Drawings.
   a. Symbols used in building work including public health and electrical installation.
   b. X-section of wall with foundation, floor and roof details.
   b. Line plan of a single room, two roomed quarter and C-Type (2500 sft) residence.
   d. Detailed plan, elevation and section of
      (1) Single room with verandah.
      (2) C-class residence
      (3) Double story building.
   e. Foundation/Layout plan of
      (1) C-type residence.
      (2) A-class residence.(3500 sft)
   f. Detailed plan of
      (1) A & C class bathroom showing internal arrangement.
      (2) Kitchen with internal fittings.
   g. Drawing plan of C type residence showing public health and water supply connections.

Reference Books
1. Engineering Drawing by Parkinson.
2. Engineering Drawing by N.D. Bhat.
4. First Year Drawing by Gupta
5. Civil Engineering Practice (Urdu) by Niaz Ahmed Mirza
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 1
BASIC CIVIL SURVEY

Total Hours 288
  Theory 96
  Practical 192

Curse Contents
1. Introduction 4 Hours
   1.1 Definition of surveying
   1.2 Main divisions of surveying
   1.3 Fundamental principles of surveying
   1.4 Minor instruments-linear distance and angular measurement.
   1.5 Verniers

2. Chain Surveying 12 Hours
   2.1 Instruments used with description
   2.2 Principles of Chain Surveying.
   2.3 Types of Ranging - Chaining on level and sloping grounds.
   2.4 Offsetting - types and methods
   2.5 Setting out right angles in the field by different methods with various instruments
   2.6 Obstacles in chaining, method to overcome
   2.7 Sources and types of errors in chaining
   2.8 Numerical problems on calculating correct distances measured with incorrect chain.
   2.9 Testing and adjustment of chain
   2.10 Field work in chain surveying, reconnaissance, key plan, selection of base line, marking station and making triangles, various chain lines, reference sketch, running survey lines, booking field notes.
   2.11 Plotting chain survey-method of determining true north in the field.
   2.12 Degree of accuracy in chain surveying.

3. Compass Surveying 10 Hours
   3.1 Introduction, justification for compass survey.
   3.2 Description, working and uses of compass.
   3.3 Traverse-types
3.4 Concept of meridian - its types.
3.5 Bearing of line-types, system of measuring bearings, Numerical problems
3.6 Dip, declination, Local attraction, detection and correction.
3.7 Calculations of included angles from bearings and vice versa
3.8 Compass Survey in the field, recording field notes.
3.9 Plotting compass traverse, closing error and its adjustment
3.10 Errors in compass surveying.

4. **Plane Table Surveying**  
   4.1 Introduction to equipment used.
   4.2 Setting of plane table - Centering, levelling & orientation
   4.3 Methods of Plane tabling - Radiation, intersection, Traversing and Resection.
   4.4 Merits and demerits of Plane table Survey

5. **Levelling**  
   5.1 Introduction.
   5.2 Definitions of terms-level line, level surface, Datum line, Reduced level, line of collimation, Horizontal plane, vertical plane, station point, axis of telescope, axis of bubble tube etc.
   5.3 Bench mark and types.
   5.4 Types of leveling Instruments, component parts
   5.5 Types of leveling staves and description
   5.6 Temporary adjustment of level
   5.7 Finding reduced levels.
   5.8 Booking - height of Instrument and rise & fall method, finding missing reading in a level Book page.
   5.9 Classification of leveling and detailed description.
   5.10 Errors in leveling
   5.11 Permanent adjustment of levels, Numerical problems.
   5.12 Leveling by laser transmitter and level staff.

6. **Contouring**  
   6.1 Definition, purpose, types and characteristics.
   6.2 Marking of alignment & grade of road, railway and canal. Computing of earthwork, capacity of reservoir using trapezoidal and prismoidal rules.
7. **Techeometry** 8 Hours
   7.1 Definition, types and principles.
   7.2 Finding horizontal distances & elevations.

8. **hydrographic Survey** 6 Hours
   8.1 Introduction and purpose.
   8.2 Soundings - sounding boat, sounding rod, still water recess, current meter, fathometer, velocity rod.
   8.3 Long section & cross section of a small distributary, determination of velocity and area

9. **Computation of Areas** 12 Hours
   9.1 Introduction
   9.2 Computation of area from field notes
   9.3 Computation of areas from plotted plan
   9.4 The mid-ordinate Rule
   9.5 The average-ordinate Rule
   9.6 The trapezoidal rule
   9.7 Simpson’s rule
   9.8 Coordinate method
   9.9 Instrumental method

10. **Interpretation OF Maps** 16 Hours
    10.1 Introduction
    10.2 Map symbols and conventional signs
    10.3 Principles of map scale
    10.4 Relationship between map scales and contour intervals
    10.5 Interpretation of maps, layouts and sketches
    10.6 Measure distances from maps and plans

**Instructional Objectives**

1. **Know Basic Facts about Surveying**
   1.1 Define Surveying.
   1.2 State the purpose of surveying
   1.3 State the classification of surveys
   1.4 State the fundamental principles of surveying
   1.5 State the instruments used for taking linear and angular measurements
2. **Understand the Principles of Chain Surveying**
   2.1 Identify instruments used in chain surveying
   2.2 Explain the functions of different instruments used in chain surveying
   2.3 Explain the methods of ranging out survey line
   2.4 List the operations involved in chaining on flat and sloping ground high.
   2.5 Describe the methods of setting out right angle with or without cross staff
   2.6 Explain the source and type of errors in chaining
   2.7 Correction of distances measured with incorrect length of chain
   2.8 Explain the testing and adjustment of chain
   2.9 Explain the principles used in chain triangulation
   2.10 Explain steps involved in performing field work
   2.11 Explain the methods of overcoming the different obstacles in chain surveying
   2.12 State the limits for permissible errors.
   2.13 Explain the method of booking field notes
   2.14 Explain the method of plotting chain-surveying details

3. **Understand the Principles of Compass Surveying**
   3.1 State the purpose and principles of compass surveying
   3.2 Identify the parts of compasses and state their functions
   3.3 Define the Traverse
   3.4 State the types of traverse
   3.5 Define terms, bearing, true bearing, magnetic bearing, W.C.B, quadrantal bearing, meridian, true meridian, magnetic meridian, declination, local attraction
   3.6 Explain systems of measuring bearing, W.C.B and quadrantal bearing
   3.7 Converts whole circle bearing into quadrantal and vice versa
   3.8 Explain local attraction and its effects
   3.9 Calculate correct bearings affected by local attraction
   3.10 Compute/determine the included angles and true bearing of a line in a compass traverse from given data
   3.11 Explain the operations involved in fieldwork of compass surveying
   3.12 State the errors in compass surveying
   3.13 Explain the procedure for plotting compass survey and correction for closing error
4. **Understand the Principle of Plane Table Surveying and Perform Field Work**

4.1 State the purpose and principles of plane table surveying

4.2 Identify the functions of accessories used in plane table surveying

4.3 Explain the operations involved in setting-up plane table.

4.4 Explain the methods of Orientation

  (a) By back sighting and

  (b) Trough compass

4.5 Explain the methods of plane tabling.

4.6 List steps involved in carrying out plane table surveying

4.7 Describe three point problem

4.8 Explain solution of three point problem by

  (a) By mechanical method

  (b) By graphical method

4.9 State the merits and demerits of plane table surveying

4.10 List the errors in plane table surveying and precautions

5. **Understand the Principles of Levelling for Different Engineering Purposes**

5.1 Define levelling

5.2 Describe the purpose of levelling

5.3 Define technical terms, level line, level surface, datum, datum line, horizontal plane, vertical plane, Horizontal line, vertical line, level line, line of collimation, Axis of telescope, bubble tube axes, back sight, foresight, Intermediate sight, change point, station point

5.4 Describe bench mark and its types

5.5 Identify the parts and function of various types of levels i.e dumpy level, Y-level, cushing level, cook's reversible level, tilting level, and Auto set level

5.6 Explain with sketches levelling staves and their uses

5.7 List the steps involved in performing temporary adjustment of a level

5.8 Compute the reduced levels by rise & fall method and height of instrument method and recording the same on level book

5.9 Determine the missing reading of a level book page

5.10 Define fly levelling, L-sectioning, cross-sectioning, reciprocal leveling, precise levelling, Barometric levelling

5.11 State precautions in levelling operation
5.12 Describe the procedures for taking, L-section x-section, and for reciprocal levelling precise levelling etc
5.13 Plot x-section and l-section
5.14 Solve numerical problem on reciprocal levelling
5.15 Describe errors in levelling
5.16 Compute correction due to curvature and refraction
5.17 Compare fundamental lines of dumpy level with tilling levels
5.18 List the steps involved in performing permanent adjustment of level
5.19 Solve numerical problems related to permanent adjustment
5.20 Describe laser transmitter
5.21 Explain the procedure of leveling by laser transmitter

6. **Understand Methods of Contouring and Computation of Volumes**
   6.1 Define the terms relating to contouring
   6.2 Explain characteristics and the purpose of contouring
   6.3 Explain the uses of contouring
   6.4 Explain the methods of performing contour survey
   6.5 Interpolate contours on a plan
   6.6 Explain the procedure to lay down alignment of road, railway and channel on contour map
   6.7 Describe procedure for measuring gradient
   6.8 Compute the capacity of reservoirs and volume of earth from the contour map

7. **Understand the Principles of Techeometry to Find the Elevations and Distances of Stations**
   7.1 Explain the principles of techeometry
   7.2 Enlist the method of techeometry
   7.3 Describe the instruments used in stadia survey
   7.4 State techeometric constants
   7.5 Lists the steps involved in taking stadia observations in field to find elevations and distances of stations
   7.6 Compute the elevation and horizontal distances.
   7.7 Solve examples of finding horizontal distances by techeometry

8. **Understand the Principles of Hydrographic Survey**
   8.1 Define Hydrographic survey
   8.2 State the purposes of Hydrographic survey
8.3 Describe sounding, sounding rod/pole, sounding boat, still water recess, fathometer, velocity rod, current meter
8.4 Explain the methods of taking soundings
8.5 Explain procedure of determining velocity with velocity rod and current meter for determination of discharge of channel

9. **Learn the Techniques to Compute Areas**
   9.1 Purpose of area calculation
   9.2 Explain area computations from field notes
   9.3 Explain area computations from plotted plan
   9.4 Describe the mid-ordinate rule
   9.5 Describe the average ordinate rule
   9.6 Describe the trapezoidal rule
   9.7 Describe the simpson’s rule
   9.8 Explain coordinate method
   9.9 Explain instrumental method

10. **Intrepretation of Maps**
    10.1 Define the terms relating to maps
    10.2 Describe map symbols and conventional signs
    10.3 Describe the principles of map scale
    10.4 Explain the relationship between map scales and contour intervals
    10.5 Explain the interpretation of maps, layouts and sketches
    10.6 Explain the measurement of distances from maps and plan

**List of Practicals**

1. **Chain Surveying**
   1.1 Various operations in chain surveying.
      1.1.1 Folding & Unfolding of chain.
      1.1.2 Testing and adjusting the chain.
      1.1.3 Ranging and chaining of lines.
      1.1.4 Off-setting.
      1.1.5 Drawing/setting out right angles by instruments.
      1.1.6 Chaining a line involving obstacles.
   1.2 Chain survey of an area and plotting work.
   1.3 Finding the width of river by Rhombus Method and finding height of tower.
2. **Surveying:**
   2.1 Setting up the compass and observation of bearings.
   2.2 Compass survey of an area and its plotting.

3. **Plane Table Survey:**
   3.1 Plane table survey of an area.
   3.2 Three point problem by Graphical method.

4. **Levelling:**
   4.1 Reading different types of staves.
   4.2 Temporary adjustment of level and taking readings.
   4.3 Taking reduced levels of various points and recording in the field book.
   4.4 Fly levelling and finding R.Ls by height of collimation and rise fall method.
   4.5 Route levelling (by auto set level).
   4.6 Reciprocal levelling and its booking.
   4.7 Finding and setting gradient using a level and staff.
   4.8 Taking longitudinal section and cross section of a 1/2 mile long route and their plotting, marking alignment and gradient calculation of earth work.
   4.9 Permanent adjustment of level.
   4.10 Leveling by laser transmitter.

5. **Contouring:**
   5.1 Contouring small area by radial and square method and prepare a contour map

6. **Tacheometry:**
   6.1 Determination of horizontal distance and elevation by stadia techeometry.

7. **Hydrographic Survey**
   7.1 Hydrographic survey of small channel and its plotting.

8. **COMPUTATION OF AREAS**
   8.1 Computation of areas from cross staff survey
   8.2 Computation of area on ground by all studied methods
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
ISLAMIAT / PAK STUDY

1. صنف 211
2. موعد
3. اسلامیات/مطالعہ پاکستان
4. سنة
5. 0
6. 1
7. کل: 20 کمیشن

معلومات

مرخص

1. ہمارا دو سے چار یک ہوتے ہیں، ہمارا دو ہیں
2. من اعتراف کہ تیسرے ہیں

خوب کمی من تعلیم القرآن و علمہ
لا انسان لسن لا امانہ له ولا دین لسن عبید
یا کمی وکلمین نظر کل بحث
من اس حیثیت فی امر نما ما لس مضمون مہور
من حمل علمہ السلاح فلیس مما
انا و کافل انسانی فی المرض مکا
لا ضرور ولا ضرار فی السلام
کلکم راغ و کلکم مستثنی عن رعیة

ب) طبیعیات الوجیب

1. کی زندگی (وزارت، شاہراہ)
2. سے زندگی (سوانات، بیانیات، مہیا (اسباب وعلائم)
3. خاصیت
4. مطابق

ب) سرمایہ خاندان (مطالعہ سرمایہ خاندان کی اساتذہ)

5. اسلامی تحفہ

ہماری کئی قسم کے موضوع حبل وواسفہ اور ہم اہم ہیں
ہماری کئی سپاہی کہ (سیاست واتباعات)

6. اسلامی بیانات کئی افراط، اسلامی بیانات کئی دستورات، اسلامی بیانات کئی فلسفہ، اسلامی طریکہ کوہم.
اسلامیت

ناوچہ مشاہدہ:

علم بہیچی پناہ کو کہ کی ہوئی تحریک کی روشنی میں ہوئے انسان کی وساحہ کا ایک تحقیق کے لئے تحقیق کتربات

خوشنواز مشاہدہ:

تقریب آیات کی بہترین بہترین کے
تقریب آیات کی بہترین بہترین کے
تقریب آیات کی رفتار میں برقراری ہوائی انسان کے
تقریب آیات کی بہترین بہترین کے
تقریب آیات کی بہترین بہترین کے

ایکہی بلیبی

نمونے مشاہدہ: احادیث الہی بیان مسلمان ثلألملام انسان اقیمتی اقدار کی دیویت کر کے

خوشنواز مشاہدہ:

اہلہ بیت کا اس بہترین کے
اہلہ بیت کی بہترین کے

اہلہ بیت کی روشنی میں اسلامی اقیمتی اقدار کی دیویت کر کے

ایکہی بلیبی

تربیت بہور

عوامی مشاہدہ: ضروری مشاہدہ کی بہترین بہترین کے انسان کے

خوشنواز مشاہدہ:

ضروری مشاہدہ کی بہترین بہترین کے انسان کے
ضروری مشاہدہ کی بہترین بہترین کے انسان کے
ضروری مشاہدہ کی بہترین بہترین کے انسان کے
ہم باکی کی کشفیات کا اندازہ لے کر میں بیان کر گئے ہوں کہ ضرورت الیک تحقیقات کی نظر میں بیان کر گئے ہیں

اسلامی معاشرت

عوامی متحدہ: اسلامی معاشرت کی تحقیقات سے آگاہ ہیں معاشرت کے

خوشی معاشرتی:

اسلامی معاشرت کا متعاسی وعید بیان کر گئے

اسلامی معاشرتی انتظامی تحقیقات بیان کر گئے

اسلامی معاشرتی انتظامی سلسے میں وہ بیان کر گئے

تیل کے کاروائیوں میں بیان کر گئے

تیل کی ہوثر نہ ہور بیان کر گئے

بچھاو کے انقش ہی بیان کر گئے

بچھاو کے انقش ہی بیان کر گئے

بچھاو کے انقش ہی بیان کر گئے

بچھاو کے انقش ہی بیان کر گئے

لئےاہم بیان کر گئے

وجہ بچھاو کے انقش ہی بیان کر گئے

اسلامی ریاست

خوشی مقصد: اسلامی ریاست کی تحقیقات بیان کر گئے

خوشی مقصد:

ریاستوں کا انقش بیان کر گئے

اسلامی ریاست سے انسانوں کو لے کر اسلام کا نقش بہانات کر گئے

اسلامی ریاست کی تحقیقات بیان کر گئے

اسلامی ریاست کے اقتصادی ہماقاعدہ بیان کر گئے

اسلامی ریاست کے اقتصادی ہماقاعدہ بیان کر گئے
نصاب مطالعہ پاکستان

Obsolete مطالعہ پاکستان

مباحثات

روہتی نظریہ

تحریک پاکستان

اعظم کا قومی سلسلہ

مسلمہ

قيد رقصت

بتاوق کے روز

تحریک خانہ

سندھ روڈ برائی

شیوا پورت

قائد عظم کے فریدہ کات

خطال آباد

انتخابات 1938 اور انتقال افکار اور قرار ودوا پاکستان
مطالعہ پاکستان

تفریک پاکستان

عوامی متعلقہ: قیام پاکستان کے اس پارلیمنٹ کے دوپہر کے

خصوصی متعلقہ:

قیام کے مضبوط کیوں کر کے

دوجا ایرانی کی فریب دو پہچان کر کے

دوجا ایرانی کی اپنی بیان کر کے

بنیوں سالی سلمان کو خوشی کر کے

قیام کے تحقیق کو زبردار کر کے لئے سلمان کی مسکنی بیان کر کے

آزادی ایرانی بھی پاکستان میں اس کے قبلا اور اکثریہ مسکانی بیان کر کے

قیام پاکستان کے کئی اسلامی مسائل کے لئے سلمان کا حکم

کر کے

مسلمان کی قیام پاکستان کے لئے جنگ پیدا کر کے
(نیز مسلم طالبہ کے لئے)

نسب الخلاصات

سال دوم

موضوعات

مئی

خواتین کے اداروں میں مسالیہ کم پتی ہیں۔ اس کے لئے اداروں کی اہمیت ویہ تھی۔

تقویت ورقائی

تقویت برداشت

تقویت اداری

لیبل وجدہ

ورنج انثری

پھری

انسلو وتقی

خواستہ شور

پاس آزادی

کل آگاسی

تغییرات کی دو کریز

خودشکا ن
انساب اخلاقیات

سلام دیم

نام برکت متقاعد

عوامل مختلف: اخلاقیات کی اهمیت و ضرورت سے آگہاہو کہ اوہ بانک کا گی

خصوصی متاتعید: طالب علم اس قابل بوده

موضوعات کا مطلب بانک کر کے

عمل زندگی کی سبھن کی تصدیقی کر کے

یقین شخصت اور مشاعر کی موضوعات کی مطلوبہ شدت اثرات میں کر کے

طریقہ بانک کر کے

اطلاع اخلاقی اقدار کے

قوت برداشت کی قوت اقرار کی بنی بنی کے بنی بنی کے

شروع، پاپ آزادی کی کل آگہاہو، اوہ برخورشیدی کی ایکینت بانک کر کے

اخلاقیات کے مختص ذکر کی خدمت کی جگہ تحریک پاکی اخلاقی کے
AIM: On completion, the student will be able to solve problems of calculus and analytical geometry and apply it in relevant fields of civil engineering work.

Curriculum Contents

1. **Functions & Limits.** 6 Hours
   - 1.1 Constants and variables
   - 1.2 Functions & their types
   - 1.3 The concept of limit
   - 1.4 Limit of a function
   - 1.5 Fundamental theorems on limit
   - 1.6 Some important limits
   - 1.7 Continuous function
   - 1.8 Problems

2. **Differentiation.** 10 Hours
   - 2.1 Derivative of a function.
   - 2.2 Geometrical interpretation of differentiation.
   - 2.3 Differentiation by first principle.
   - 2.4 Rules for differentiation.
   - 2.5 Differentiation of algebraic functions.
   - 2.6 Differentiation of trigonometric and inverse trigonometric functions.
   - 2.7 Differentiation of logarithmic and exponential functions.
   - 2.8 Problems.

3. **Higher Derivatives and Application of Differential Calculus.** 9 Hours
   - 3.1 Second derivative of a function.
   - 3.2 3rd derivative of a function.
   - 3.3 Increasing and decreasing function.
   - 3.4 Maximum and minimum values.
   - 3.5 Criteria for maximum and minimum values.
3.6 Methods of finding maxima and minima.
3.7 Problems.

4. Integration. 8 Hours
4.1 Basic concepts of integration.
4.2 Fundamental formulae & important rules.
4.3 Integration by substitution.
4.4 Integration by trigonometric substitution.
4.5 Integration by parts.
4.6 Definite integrals and its applications.
4.7 Problems

5. Integration by Using Partial Fractions. 10 Hours
5.1 Introduction to partial fractions.
5.2 Linear distinct factors case-I
5.3 Linear repeated factors case-II
5.4 Quadratic distinct factors case-III
5.5 Quadratic repeated factors case-IV
5.6 Integration of rational fractions.
5.7 Problems.

6. Differential Equations. 6 Hours
6.1 Introduction
6.2 Differential equation of order-1
6.3 Differential equation of order-2
6.4 Solution of 1st and 2nd order differential equations
6.5 Problems

7. Fundamentals of Plane Analytic Geometry and Straight Line. 9 Hours
7.1 Rectangular coordinate system.
7.2 Distance formula.
7.3 Ratio formula.
7.4 Slope of a line.
7.5 Slope formula and angle formula.
7.6 Parallel and perpendicular lines.
7.7 Equation of lines parallel to X-axis and Y-axis.
7.8 Important forms of equation of the straight line.
7.9 Intersection of two lines.
7.10 Distance between a line and a point.
7.11 Problems

8. **Conic Sections.**

8.1 Circle
8.2 Standard equation of a circle
8.3 General equation of a circle
8.4 Radius and coordinates of centre
8.5 Parabola
8.6 Standard equation of parabola
8.7 Four forms of standard equation
8.8 General equation of parabola
8.9 Ellipse
8.10 Standard equation and related definitions
8.11 Hyperbola
8.12 Standard equation and related definitions
8.13 Problems.

9. **Statistics.**

9.1 Concept of mean, media and mode
9.2 Standard deviation
9.3 Laws of probability
9.4 Problems.

**Recommended / Reference Books:**

1. Technical Mathematics: Ghulam Yasin
2. Technical Mathematics: Zafar Iqbal
3. Technical Mathematics: Ilyas Bhatti
Instructional Objectives

1. **Understand Functions & Limits.**
   1.1 Define Constants and variables
   1.2 Define Functions & their types
   1.3 Define The concept of limit
   1.4 Define Limit of a function
   1.5 Define Fundamental theorems on limit
   1.6 Define Some important limits
   1.7 Define Continuous function
   1.8 Solve Problems

2. **Differentiation.**
   2.1 Explain Derivative of a function.
   2.2 Explain Geometrical interpretation of differentiation.
   2.3 Explain Differentiation by first principle.
   2.4 Explain Rules for differentiation.
   2.5 Explain Differentiation of algebraic functions.
   2.6 Explain Differentiation of trigonometric and inverse trigonometric functions.
   2.7 Explain Differentiation of logarithmic and exponential functions.
   2.8 Solve Problems.

3. **Explain Higher Derivatives and Application of Differential Calculus.**
   3.1 Explain Second derivative of a function.
   3.2 Explain 3rd derivative of a function.
   3.3 Explain Increasing and decreasing function.
   3.4 Explain Maximum and minimum values.
   3.5 Explain Criteria for maximum and minimum values.
   3.6 Explain Methods of finding maxima and minima.
   3.7 Solve Problems.

4. **Understand Integration.**
   4.1 Explain Basic concepts of integration.
   4.2 Explain Fundamental formulae & important rules.
   4.3 Explain Integration by substitution.
   4.4 Explain Integration by trigonometric substitution.
   4.5 Explain Integration by parts.
4.6 Explain Definite integrals and its applications.
4.7 Solve Problems

5. Understand Integration by Using Partial Fractions.
5.1 Understand Introduction to partial fractions.
5.2 Explain Linear distinct factors case-I
5.3 Explain Linear repeated factors case-II
5.4 Explain Quadratic distinct factors case-III
5.5 Explain Quadratic repeated factors case-IV
5.6 Explain Integration of rational fractions.
5.7 Solve problems.

6.1 Explain introduction
6.2 Explain Differential equation of order-1
6.3 Explain Differential equation of order-2
6.4 Explain Solution of 1st and 2nd order differential equations
6.5 Solve problems

7.1 Explain rectangular coordinate system.
7.2 Explain distance formula.
7.3 Define ratio formula.
7.4 Define slope of a line.
7.5 Define slope formula and angle formula.
7.6 Define parallel and perpendicular lines.
7.7 Define equation of lines parallel to X-axis and Y-axis.
7.8 Explain important forms of equation of the straight line.
7.9 Explain intersection of two lines.
7.10 Explain distance between a line and a point.
7.11 Solve problems

8. Explain Conic Sections.
8.1 Define and explain Circle
8.2 Explain standard equation of a circle
8.3 Explain general equation of a circle
8.4 Explain radius and coordinates of centre
8.5 Explain parabola
8.6 Explain Standard equation of parabola
8.7 Explain Four forms of standard equation
8.8 Explain General equation of parabola
8.9 Define Ellipse
8.10 Explain Standard equation and related definitions
8.11 Define Hyperbola
8.12 Explain Standard equation and related definitions
8.13 Solve Problems.

9. **Explain Statistics.**

9.1 Define Concept of mean, media and mode
9.2 Define Standard deviation
9.3 Define Laws of probability
9.4 Solve Problems.
### DAE IN ADVANCE QUANTITY SURVEY FIELDS

#### YEAR 2

#### ADVANCE CIVIL ENGINEERING DRAWING – ADVANCE AUTO CAD

<table>
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<tr>
<th>Total Hours</th>
<th>256</th>
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<tr>
<td>Practical</td>
<td>192</td>
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**AIM:** Understand the techniques of drawing buildings, roads, irrigation structures and methods of inking and Ferro printing.

**Curse Contents**

1. **Drawing of Building Components.**
   - **10 hours**
     - **1.1** Instruction for detailed Drawing of Foundations, Lintels arches, stairs, floors. Roofs and its types, doors, windows, Calculations of spread footing.
     - **1.2** Instructions for detailed drawing of truss and its different components.
     - **1.3** Instructions on drawing plan and X-section of R.C.C. column.
     - **1.4** Instructions on drawing plan and X-section of R.C.C. slab roof with main and secondary beams.

2. **Frame Structure Buildings.**
   - **10 hours**
     - **2.1** Definition of frame structure.
     - **2.2** Instruction on drawing of Raft foundation with steel reinforcement.
     - **2.3** Instruction for detailed drawing of frame structure showing all components.

3. **Drawing of Road Structures.**
   - **10 hours**
     - **3.1** Instructions for drawing of x-section of Roads.
     - **3.2** Instructions for drawings of R.C.C. Road culvert 5 ft span
     - **3.3** Instructions for detailed drawing of high level two span R.C.C. Deck Bridge with 25’ span-each.

4. **Drawing of Irrigation Structures.**
   - **8 hours**
     - **4.1** Instructions for drawing typical section of Irrigation Channel in cutting and filling.
     - **4.2** Instruction for drawings of A.P.M. out-let, masonry flume.

5. **Inking and Ferro Printing.**
   - **4 hours**
     - **5.1** Introduction to inking and Ferro printing.
     - **5.2** Introduction for ink tracing including materials and apparatus used.
     - **5.3** Sensitizing paper, taking out prints.
6. **Advance Auto CAD**

6.1 3D drawing commands
   6.1.1 Introduction to 3D drawing
   6.1.2 Basic commands
   6.1.3 Toolbars

6.2 Project drawings
   6.2.1 Road Project
      6.2.1.1 L-Section
      6.2.1.2 Cross section at required intervals
      6.2.1.3 Calculation of Quantities
      6.2.1.4 Area Command
   6.2.2 Building Project
      6.2.2.1 Sketching 5 Marla house
      6.2.2.1 Sketching 7 Marla house
      6.2.2.1 Sketching 1 kanal house

6.3 Detailed drawing
   6.3.1 Schedule of Area
   6.3.2 Schedule of Opening
   6.3.3 Sewerage Drawings
   6.3.4 Electrical Drawing
   6.3.5 Plumbing Drawing

**Instructional Objectives**

1. **Understand Techniques of Drawing Building Components.**
   1.1 Define and sketch the spread footing.
   1.2 Define and sketch the Raft foundations.
   1.3 Define and sketch the grillage foundation.
   1.4 Define and sketch the well and pile foundation.
   1.5 Label different parts of spread footing i.e. base concrete, Sub grade, steps offsets, and plinth.
   1.6 Calculate the depth and breadth required for spread footings.
   1.7 Sketch out the X-section of lintels and arches.
   1.8 State the various parts of lintels and arches.
   1.9 Define stair and stair case
   1.10 Define the terms and parts used in different types of stairs.
   1.11 Explain the stairs according to their layout.
1.12 State the suitability of each type of stair.
1.13 Sketch the plans and sections of different types of stairs according to their layout.
1.14 Define different types of floors.
1.15 Draw the sketches of different parts of floors.
1.16 Explain the standard proportions for the different layers of floors.
1.17 State different types of roofs i.e. first class mud roofing, 2nd. class mud roofing, R.C.C. and R.B. roof. Re-cost roof slabs.
1.18 State different types of sloping roof.
1.19 Draw the sketches of steel trusses up to 25' span from the given data.
1.20 Label the sketches of different parts of truss.
1.21 State need of doors and windows.
1.22 Define clerestory windows and ventilators.
1.23 State the different types of doors and windows.
1.24 Explain the various parts of doors and windows.
1.26 State the different materials used for doors, windows and ventilators
1.27 Sketch the elevations, sectional plans and vertical sections of doors, windows and ventilators.

2. **Understand Techniques of Drawing Building Frame Structure**

2.1 Define frame structure buildings.
2.2 Sketch and label the Raft foundation with steel Reinforcement.
2.3 Distribute the space for different views evenly on drawing sheet.
2.4 Define columns.
2.5 Sketch & show steel Reinforcement at appropriate place in the column sections of different shapes.
2.6 State the position of over laps and its length.
2.7 Sketch different types of hooks with their standard dimensions.
2.8 Sketch the X-section and sectional elevation of a singly Reinforced beam.
2.9 Differentiate between the Primary and Secondary beam.
2.10 Sketch and label the details of Reinforcement of T-and L-Beam.
2.11 Sketch and label the details of Reinforcement of two way continuous slab over Tee-Beam.
2.12 State the purpose of stirrups and Bent up bars
3. **Understand Techniques of Drawing Road Structures.**
   3.1 Sketch the X-section & L-section of Road in plain area.
   3.2 Sketch the Long section and X-section of Road in hilly area.
   3.3 Sketch the X-section of metalled Bituminous Road in plain and hilly area.
   3.4 Sketch the X-section of concrete Road.
   3.5 State various parts of culverts i.e. abutment, wing wall, toe wall parapet, Number plate.
   3.6 Sketch the Plan, Foundation Plan, Long Section and X-Section of Culvert.
   3.7 Explain the various terms used in Bridge.
   3.8 State the difference between culvert and Bridge.
   3.9 Explain the various types of bridges.
   3.10 Sketch the Plan, Foundation Plan, Long section and X-Section of two Span Bridge.

4. **Understand Techniques of Drawing Irrigation Structures.**
   4.1 State the different irrigation structures.
   4.2 State the definition of irrigation channel.
   4.3 Define the terms used in irrigation channel i.e. Bed Width, Side Slopes, F.S.L., H.F.L., Free Board, Gradient Spoil Bank, Service Bank, Dowel, Berm etc.
   4.4 Sketch the different Sections of Irrigation channels i.e. fully in cutting, fully in banking, partially in cutting & partially in banking.
   4.5 Select appropriate scale for horizontal and vertical section.
   4.6 Define the A.P.M. Out lets.
   4.7 Sketch and label the different parts of A.P.M. Out lets.
   4.8 Define the Masonry Flume.
   4.9 Sketch & Label the parts of masonry Flume.

5. **Understand the Techniques of Inking and Ferro-Printing.**
   5.1 Explain the inking and Ferro Printing.
   5.2 State the material used for inking process.
   5.3 State the instruments required for inking and their use.
   5.4 Explain the procedure of inking.
   5.5 State the material used for Ferro Printing.
   5.6 State precautionary measures adopted during printing.
   5.7 Explain the structure of Dark Room and its requirements.
5.8 State different types of printing.
5.9 Explain the defects arising during the preparation of Prints.
5.10 Explain the Remedial measures taken to prevent defects in prints.
5.11 Prefer the method of printing from economy point of view.

6. **Understand about Advanced Techniques Involved in Auto CAD**

6.1 Auto CAD drawing by using 3D commands
6.2 Project drawings
6.3 Detailed drawing

**List of Practicals**

1. Detailed Drawings of building components as given in theory (Minimum 10 sheets).
2. Detailed drawings of frame structure building with details of Reinforcement. (Minimum 10 sheets)
3. Detailed drawings of road structures (Minimum 8 sheets).
4. Detailed drawings of Irrigation structures (Minimum 8 sheets).
5. Ink tracing of a given drawing and taking its prints (Minimum 6 sheets)
6. Detailed drawing in auto CAD of different engineering projects.
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
ADVANCE CIVIL SURVEY

Total Hours 256
Theory 64
Practical 192

Curse Contents

1. Theodolite 8 Hours
   1.1 Introduction, parts and types
   1.2 Definition of terms
   1.3 Temporary adjustment of theodolite
   1.4 Functions of theodolite-measuring angles, prolonging a line, lining in, measuring heights & distances

2. Permanent Adjustments of Theodolite 8 Hours
   2.1 Fundamental lines of theodolite
   2.2 Adjustment of the plate level, line of collimation
   2.3 Horizontal axis, level tube on telescope, & vertical Index frame

3. Theodolite Traversing 10 Hours
   3.1 Introduction, traverse & its types, methods of traversing
   3.2 Objects and standard of accuracy of traversing
   3.3 Check of open & closed traverse
   3.4 Plotting & graphical adjustment of closing error
   3.5 Calculation of angles from given bearings and vice versa
   3.6 Computation of co-ordinates

4. Curves 10 Hours
   4.1 Definition, types and necessity of curves
   4.2 Classification of curves
   4.3 Designation of curves
   4.4 Elements and notation of curves & their relationship
   4.5 Calculation of data & methods of setting out simple circular curves
   4.6 Setting out simple curve beyond obstacles
   4.7 Introduction to vertical curves, elements, term and their inter relations.
   4.8 Calculation of data and Setting out vertical curves
   4.9 Description, types and necessity of transition curves
4.10 Characteristics, elements & notation of transition curve and their inter relationship
4.11 Super elevation and length of transition curve with numerical problems
4.12 Calculation of data and methods of setting out of transition curve

5. **Triangulation** 8 Hours
   5.1 Introduction, types of triangulation
   5.2 Selection of station points
   5.3 Measurement of base line
   5.4 Correction of base line measurement

6. **Photo-Grammetry** 4 Hours
   6.1 Definition, purpose and type
   6.2 Fundamental principles
   6.3 Merits, demerits over other types
   6.4 Numerical problems on scale of photograph, and height of objects

7. **Computation of Volume** 4 Hours
   7.1 Introduction
   7.2 Formulae for calculation of cross sectional area
   7.3 Formulae for calculation of volume

8. **Modern Instruments** 6 Hours
   8.1 Introduction, types, main parts and accessories of a total station
   8.2 Functions and modes of a total station.
   8.3 Setting of parameters.
   8.4 Preparation for observations and operations
   8.5 Retrieve the measured data from a total station field data on to a PC.
   8.6 Introduction, measuring range, read-out display, power source and other parts of a distance meter
   8.7 Prisms for a distance meter, single, triple and nine prism's set
   8.8 Advantages of each set of prisms

9. **Project Surveys** 6 Hours
   9.1 Introduction
   9.2 Preparation of mass diagram
   9.3 Flow irrigation
   9.4 Water supply scheme
   9.5 Sanitary scheme
9.6 Docks and harbors

Instructional Objectives

1. Understand the Uses and Importance of Theodolite
   1.1 Understand parts and types of theodolite
   1.2 Explain the basic terms
   1.3 Explain temporary adjustments of theodolite
   1.4 Explain various functions of theodolite-measuring angles, prolonging a line, lining in, measuring heights & distances

2. Understand the Permanent Adjustments of Theodolite
   2.1 Explain fundamental lines of theodolite
   2.2 Explain adjustment of the plate level, line of collimation
   2.3 Explain horizontal axis, level tube on telescope, & vertical Index frame

3. Learn Theodolite Traversing
   3.1 Explain traverse & its types, methods of traversing
   3.2 Explain the objects and standard of accuracy of traversing
   3.3 Describe checks of open & closed traverse
   3.4 Explain plotting & graphical adjustment of closing error
   3.5 Describe calculation of angles from given bearings and vice versa
   3.6 Explain computation of co-ordinates

4. Understand the Types and Setting of Curves
   4.1 Explain types and necessity of curves
   4.2 Classification of curves
   4.3 Explain designation of curves
   4.4 Describe the elements and notation of curves & their relationship
   4.5 Describe the calculation of data & methods of setting out simple circular curves
   4.6 Explain setting out simple curve beyond obstacles
   4.7 Explain vertical curves, elements, term and their inter relations.
   4.8 Explain the calculation of data and Setting out vertical curves
   4.9 Description, types and necessity of transition curves
   4.10 Explain the characteristics, elements & notation of transition curve and their inter relationship
   4.11 Explain the super elevation and length of transition curve with numerical problems
4.12 Explain the calculation of data and methods of setting out of transition curve

5. **Understand the Principles of Triangulation**
   5.1 Describe the types of triangulation
   5.2 Fundamentals of station points
   5.3 Describe measurement of base line
   5.4 Explain the correction of base line measurement

6. **Learn the Principles and Uses of Photo-Grammetry**
   6.1 Describe the purpose and types of photogrammetry
   6.2 Explain the fundamental principles of photogrammetry
   6.3 Describe the merits, demerits over other types
   6.4 Solve numerical problems on scale of photograph, and height of objects

7. **Understand the Techniques to Compute Volume**
   7.1 Introduction to calculation of volumes
   7.2 Explain the formulae for calculation of cross sectional area
   7.3 Explain the formulae for calculation of volume

8. **Familiarize With Modern Instruments Total Station and Distance Meter**
   8.1 Describe the types, main parts and accessories of a total station
   8.2 Explain the functions and modes of a total station.
   8.3 Describe setting of parameters.
   8.4 Explain the preparation for observations and operations
   8.5 Explain retrieval of the measured data from a total station field data on to a PC.
   8.6 Explain the measuring range, read-out display, power source and other parts of a distance meter
   8.7 Describe the prisms for a distance meter, single, triple and nine prism's set
   8.8 Advantages of each set of prisms

9. **Project Surveys**
   9.1 Introduction to various types of projects
   9.2 Explain preparation of mass diagram
   9.3 Explain flow irrigation project survey
   9.4 Explain water supply project survey
   9.5 Explain Sanitary scheme survey
   9.6 Explain docks and harbors project survey
List of Practicals

1. Vernier theodolite and its parts and use
2. Microptic theodolite and its parts and use
3. Practice in setting of theodolite on a station point
4. Measurement of Horizontal & vertical angles
5. Setting out angles in the field
6. Practice in setting an electronic digital theodolite & measuring/setting angles
7. Permanent adjustment of theodolite
8. Theodolite traversing
9. Setting horizontal curves in the field
10. Setting vertical curves in the field
11. Setting transition curve in the field
12. Finding height of inaccessible point with a theodolite
13. Practice in setting a distance-meter and finding distances under various atmosphere conditions
14. Horizontal and vertical angle measurements
16. Demonstration of advance functions of a total station
17. Computation of cross sectional area and volume of an irregular channel

Reference Books
1. Surveying & Levelling by TP Kanetkar
2. Surveying Levelling by N N Basak
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
ENGINEERING MATERIALS

Total Hours 192
Theory 96
Practical 96

T P C
3 3 4

Curse Contents

1. **Brick**

   1.1 Merit as building material
   1.2 Classification according to specification
   1.3 Testing of bricks.
   1.4 Tiles, classification, glazed tiles.

2. **Brick Masonry**

   2.1 Bonds and their types.
   2.2. Methods of bedding bricks.
   2.3 Construction of walls.

3. **stones**

   3.1 Quarrying
   3.2 Characteristics
   3.3 Types
   3.4. Uses
   3.5 Dressing of stones

4. **Stone Masonry**

   4.1 Classification- Ashlars, Random rubble masonry
   4.2 Specifications

5. **Mortars**

   5.1 Classification of mortars.
   5.2 Mixing.
   5.3. Functions & Uses

6. **Lime**

   6.1 Sources of lime
   6.2 Calcinations, slaking and hydraulic
   6.3 Classifications, quick lime, hydraulic lime
   6.4 Uses and storage
7. **Cement**
   7.1 Types of cement and their uses.
   7.2 Storage

8. **Sand**
   8.1 Sources and Classification
   8.2 Grading
   8.3 Bulking
   8.4 Uses

9. **Concrete and Concreting Operation**
   9.1 Compositions and propositioning
   9.2 Batching of materials by volume and weight
   9.3 Mixing of concrete
   9.4 Transportation of concrete
   9.5 Compaction of concrete
   9.6 Finishing of concrete surface types
   9.7 Curing of concrete
   9.8 Joints in concrete
   9.9 Classification of concrete

10. **Ferrous Metals and Non Ferrous Metals**
    10.1 Wrought iron, cast iron, mild steel, properties and uses.
    10.2 Structural steel sections.
    10.3 Steel used in Reinforced cement concrete-Plain steel, deformed bars, Cold twisted steel bars.
    10.4 Special steels-High carbon steel, high tensile steel, properties and uses.
    10.5 Types of non ferrous metals and their uses in construction

11. **Paints and Varnish**
    11.1 Types and uses of paints-oil paints, Enamel, color wash
    11.2 Characteristics of a good paint.
    11.3 Varnishes-French Polish types and uses.

12. **Surface Finishing**
    12.1 Plastering objects, types and procedures.
    12.2 White/color washing, distempering and their specifications.
    12.3 Painting old and new surfaces - wooden, Metal and wall surfaces.
    12.4 Defects in painting.
12.5  Pointing-object and types.

13.  **Timber**  
13.1  Classification and uses.  
13.2  Structure and growth  
13.3  Felling and conversion of timber.  
13.4  Seasoning of timber-importance and types.  
13.5  Defects and decay of timber.  
13.6  Qualities-characteristics, section of timber  
13.7  Wood products-plywood, veneer.

14.  **Classification of buildings.**  
14.1  Definition of building classification based on occupancy.  
14.2  Different parts of building and their functions.

15.  **Foundations**  
15.1  Concepts of foundation, types of soils and bearing capacity.  
15.2  Sub soil investigation-trial pit, trench, drilling holes.  
15.3  Shallow foundation definition, types and suitability.  
15.4  Design of thickness, width and depth of foundation for concrete block wall.  
15.5  Deep foundation - necessity uses and types.  
15.6  Construction of foundation-layout, for excavation.  
15.7  De-watering.

16.  **Damp Proof Course.**  
16.1  Causes and effects of dampness  
16.2  Necessity, Types and materials used.  
16.3  Method of laying damp proof course

17.  **Walls**  
17.1  Purpose of walls.  
17.2  Classification of walls according to functions and material used.

18.  **Scaffolding, Shoring and Underpinning.**  
18.1  Types of scaffolding.  
18.2  Types of shoring.  
18.3  Methods of underpinning.  
18.4  Purpose of formwork  
18.5  Types of formwork
19. **Arches and Lintels.** 4 Hours
   19.1 Arches-definition, parts, and functions
   19.2 Classification-according to material used, function and shapes.
   19.3 Methods of arch construction.
   19.4 Lintels-types and construction.

20. **Doors, Windows and Ventilators** 2 Hours
   20.1 Introduction
   20.2 Doors, windows and ventilators
   20.3 Types of doors
   20.4 Types of windows

21. **Roofs** 4 Hours
   21.1 Definition, functions
   21.2 Classification of roofs-pitched roof, flat roof
   21.3 Pitched roofs-types and roof covering materials
   21.4 Types of trusses for pitched roofs
   21.5 Introduction and construction of false ceiling

22. **Introduction to Construction Machinery** 10 Hours
   22.1 Excavating equipment
   22.2 Loader and rollers along with its types
   22.3 Bulldozer scraper
   22.4 Foundation work equipment
   22.5 Boring machine, Tunnel boring machine
   22.6 Leveling, Sub-base machine
   22.7 Compacting equipment
   22.8 Paving equipment

23. **Electrical and Mechanical Works** 4 Hours
   23.1 Wiring and their types
   23.2 Types of piping works
   23.3 Use of electrical and water supply fittings and fixtures
   23.4 External and internal electric and water supply works

24. **Introduction of Railway** 4 Hours
   24.1 Introduction
   24.2 Permanent way
   24.3 Part of rail track
24.4 Material, ballast, sleeper, section and fish plates
24.5 Type of section
24.6 Joints

**Instructional Objectives**

1. **Understand the Selection of Suitable Bricks for Construction Work**
   1.1 State the classification of bricks according to specifications
   1.2 Describe the characteristics of a good brick
   1.3 Explain standard tests for bricks
   1.4 Describe the common types of tiles and their uses

2. **Understand Masonry Work**
   2.1 Define the technical terms related to masonry work.
   2.2 Explain with sketches bond and their type’s i.e. English bond, Flemish bond, herring bone bond, zigzag bond, garden wall bond.
   2.3 State the general principles to be observed in brick masonry construction

3. **Understand Selection of Stones and Their Acceptability for Construction Work**
   4.1 Define the quarrying
   4.2 Explain the methods of quarrying
   4.3 State the classification of stone and their uses in different items of construction
   4.4 Explain the methods of dressing stone.

4. **Understand the Construction of Stone Masonry**
   5.1 Explain the different types of stone masonry i.e. ashlars masonry, random rubble.
   5.2 Explain specification for carrying out stone masonry work.

5. **Understand the Principles of Preparation of Mortars for Building Work**
   3.1 State the classification of mortars
   3.2 State the different proportions of mortars for various works
   3.3 State the function of mortar
   3.4 Explain the methods of preparation of mortars

6. **Understand the Types and Uses of Lime for Construction Work**
   6.1 State the sources of lime
   6.2 Explain terms, calcinations, slaking and hydraulic city
   6.3 State classification and uses of lime
6.4 Describe the method of storage of lime

7. **Understand the Manufacturing Process And Uses Of Cement For Construction Work**
   7.1 State chemical composition of cement
   7.2 Explain the methods of manufacture of Cement (dry & wet process), also draw flow diagram
   7.3 Explain the types of cement and their uses
   7.4 Explain the methods of storage of cement under various situations

8. **Understand the Characteristics of Sand**
   8.1 State the classification of sand and uses
   8.2 Describe the grading of sand
   8.3 Explain the bulking of sand

9. **Understand the Principles of Preparation of Concrete**
   9.1 Define the concrete, types of concrete
   9.2 State the ingredients of plain and reinforced concrete
   9.3 State the proportions of plain and reinforced concrete for different types of work
   9.4 Explain methods of preparation, placing, finishing and curing of concrete

10. **Know the Properties and Uses of Ferrous Metals in Construction Work**
    10.1 State the properties of cast iron, mild steel and wrought iron with their uses
    10.2 List the common structural steel sections used in construction work
    10.3 Distinguish between plain steel, deformed steel and cold twisted steel bars
    10.4 State the properties and uses of special steels i.e. High carbon steel, high tensile steel

11. **Know the Selection of Suitable Paints and Varnishes for Construction Work**
    11.1 State the constituents of paints and their function
    11.2 Describe the characteristics of a good paint
    11.3 State the types of paints and their uses in construction works
    11.4 State the types and uses of varnishes

12. **Understand the Finishes Provided Over Masonry Wood Work and Metal Work**
    12.1 Describe purpose and types of plastering
    12.2 Explain the methods of cement plastering
    12.3 Explain the specifications and procedures of white washing/ color washing and distempering on old and new surfaces
12.4 State the purpose of pointing
12.5 Explain the types and methods of pointing with sketches
12.6 Explain the purpose and method of painting new and old wall surfaces
12.7 Explain the method of painting wood work and steel work
12.8 State the defects in painting

13. **Understand the Selection of Wood for Construction Work**
13.1 List the common varieties of timber used in civil engineering works
13.2 Describe the structure of tree
13.3 Describe the felling procedure of trees and conversion
13.4 State the importance of seasoning
13.5 Explain the methods of seasoning i.e. air seasoning, kiln seasoning, water seasoning and steam seasoning
13.6 State the defects and decay of timber and method of preservations of timber
13.7 Describe the characteristics of good timber
13.8 Explain the construction and uses of wood products in construction works

14. **Know the Classification of Building as per Building Code**
14.1 State the classification of buildings with examples
14.2 State the components of a building and their functions

15. **Understand the Suitability and Design of Common Types of Foundations**
15.1 Define foundation
15.2 Explain the properties of various soil deposits
15.3 Explain the terms bearing capacity, safe and ultimate bearing capacity
15.4 Explain the types of investigations required for foundation
15.5 Describe with sketches various types of shallow and deep foundations and their suitability
15.6 Explain rules for minimum depth, width of foundation and thickness of concrete block
15.7 Explain the layout of a building
15.8 Explain the procedure of constructing spread footings
15.9 Describe the methods of timbering foundation

16. **Understand the Function of Damp Proof Course in Building**
16.1 State the causes and effects of dampness in building
16.2 Explain the functions and method of laying damp proof courses

17. **Understand the Types and Suitability of Various Types of Wall**
17.1 Describe the purpose of wall
17.2 Explain the classification of walls according to functions and materials
17.3 Select suitable type of wall for given situation

18. **Understand the Methods of Providing Supports to Walls and Foundation During Construction**

18.1 Define the terms, scaffolding, shoring and underpinning.
18.2 Explain the constructional details and suitability of each type of scaffolding
18.3 Explain the methods of shoring.
18.4 Explain methods of underpinning.

19. **Understand the Constructions and Suitability of Various Types of Arches and Lintels in Construction Work**

19.1 Explain the functions of arch and lintels and their suitability in construction work.
19.2 Label the parts of common arch.
19.3 Explain with sketches common types of arches and lintels and their respective suitability in construction work.
19.4 Explain the general procedure of construction of arches and lintels.

20. **Understand the Construction and Methods of Fixation of Common Types of Doors and Windows**

20.1 Explain with sketches common and special types of doors and windows.
20.2 Describe the method of fixing door frame and window in a wall.
20.3 Enlist the fittings and fastenings used for door and windows.

21. **Understand the Methods of Construction of Roofs**

21.1 State the functions of roofs.
21.2 State the classifications of roofs.
21.3 Explain with sketches the different types of pitched roof.
21.4 Explain with sketches the different types of wooden and steel trusses.
21.5 Explain with sketches common types of flat roofs.
21.6 Explain the construction of common types of flat roofs.

22. **Understand the Use of Construction Machinery**

22.1 Introduction to various Excavating equipments
22.2 Basic concept of Loader and Rollers along with its types and uses.
22.3 Describe Bulldozer Scraper and its applications
22.4 Define Foundation work equipment
22.5 Introduction to Boring machine, Tunnel boring machine
22.6 Define Leveling, Sub-base machine
22.7 Define all the Compacting equipments
22.8 Elaborate Paving equipment

23. Understand the Basic Concept of Electrical and Mechanical Works
   23.1 Introduction to Wiring and their types
   23.2 Define Types of piping works and their use
   23.3 Describe Use of electrical and water supply fittings and fixtures
   23.4 Basic Introduction to External and internal electric and water supply works

24. Introduction of Railway
   24.1 Introduction
   24.2 Define permanent way
   24.3 Explain the part of rail track
   24.4 Explain material, ballast, sleeper, section and fish plates
   24.5 Enlist the type of section
   24.6 Explain the joints

List of Practicals

2. Preparation of dry mix, wet mortar and use on some construction work.
3. Construction of small masonry wall.
4. Demonstration of dressing of natural stone.
5. White washing, distempering on plastered surface.
7. Visit to near by quarry/crusher and submission of visit report.
8. Preparation of Hand/machine mix concrete placing, finishing etc of concrete at site for a suitable useful work.
9. Water absorption and crushing strength tests of bricks
10. Visit to pre cast unit factory, demonstration of casting and submission of visit report.
11. Plastering of small wall with the cement mortar.
13. Sketches showing timber structure, defects and methods of conversion.
14. Preparation of layout plan for a building and layout on the ground.
15. Sketching of various types of foundations.
17. Demonstration of fixing of door/windows.
18. Demonstration on setting out of an arch.
19. Practice in knotting, lashing and erection of common scaffold
21. Demonstration of all the construction machinery and brief introduction of their working.
22. Introduction to all the electrical and mechanical fixtures and machinery and their uses.

**Reference Books**

5. Building Construction by Arora & Gupt
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
COST & ESTIMATION - 1

Total Hours 288
Theory 96
Practical 192

AIM Understand the Specification, Procedure and Type of Estimates, complete estimate of different building, Rcc work and Structure, Sanitary and water supply Work, Roads, Irrigation, Culvert, Bridges well

Curse Contents

1. Specifications 9 Hours
   1.1 Specification
      1.1.2. General Specifications of 1st Class, 2nd Class, 3rd Class and 4th Class building
   1.2 Detailed Specifications
      1.2.1 Earthwork in foundation
      1.2.2 Lime concrete in foundation
      1.2.3 Lime concrete in roof terracing
      1.2.4 Cement concrete
      1.2.5 R.C.C. work
      1.2.6 Brickwork I class, II class and III class
      1.2.7 Brickwork in mud mortar
      1.2.8 R.B. work; Plastering, Pointing; Lime pointing
      1.2.9 C.C. floor, Patent stone floor; Mosaic or Terrazzo floor, Mosaic or Terrazzo tile
      1.2.10 For; Brick floor;
      1.2.11 White washing; Colour washing; Distempering; Snowem washing; Decorative. Cement colour washing, painting, Painting iron work Varnishing, Wood work; Doors and windows, Glazing
      1.2.12 D.P.C. Centring and shuttering
      1.2.13 Ashlars masonry
      1.2.14 Coursed rubble stone masonry
      1.2.15 Random rubble stone masonry
1.2.16 Mud phuska terracing, Madras terrace roof
1.2.17 Roofing-A.C. Sheet; Gl. Sheet; Allahabad tile, Mangalore tile
1.2.18 Earthwork in canal and road
1.2.19 Cement mortar
1.2.20 White lime mortar
1.2.21 Kankar lime mortar, White lime; Kankar lime, Brick ballast; Surkhi, Cinder; Sand
1.2.22 Determination of silt content of sand; Bulking of sand

1.3 Road specification
   1.3.1 General Specification of Modern Road
   1.3.2 Detailed Specifications of Road

1.4 Over burnt bricks Brick ballast Kankar stone ballast

1.5 Laying and Consolidation of Stone

1.6 Brick ballast; Kankar; Bituminous painting 1st coat and 2nd coat; Premix carpeting; Requirements of different classes of roads.

2. Type of Estimate (Sanction Project) Estimate, Data, Rates

2.1 Rough cost Estimate
   2.1.1 Preliminary or Approximate or Abstract estimate or Rough cost Estimate
   2.1.2 Plinth area estimate
   2.1.3 Cube rate estimate
   2.1.4 Approximate quantity method estimate

2.2 Detailed estimate
   2.2.1 Revised estimate
   2.2.2 Supplementary Estimate
   2.2.3 Supplementary and Revised estimate
   2.2.4 A.R.A.M estimate

2.3 Contingencies
   2.3.1 Work-charged establishment
   2.3.2 Tools and Plants
   2.3.3 Centage charges

2.4 Report
   2.4.1 Site plan
   2.4.2 Layout plan
2.4.3 Index plan
2.4.4 Electrification
2.4.5 Water Supply and Sanitary works
2.4.6 Summary of estimated cost
2.4.7 Complete set of estimate
2.4.8 Schedule of rates

2.4.9 Building cost Index

2.5 Administrative Approval 3 Hours
2.5.1 Expenditure sanction
2.5.2 Technical sanction,
2.5.3 Power of Technical sanction
2.5.4 Bill of Quantities
2.5.5 Day work; Prime cost;
2.5.6 Provisional sum
2.5.7 Provisional quantities
2.5.8 Quantity survey

2.6 Plinth Area 3 Hours
2.6.1 Floor area
2.6.2 Circulation area
2.6.3 Horizontal circulation areas
2.6.4 Vertical circulation areas
2.6.5 Carpet area

2.7 External services
2.8 Capital cost
2.9 Project, Preliminary estimate
2.10 Solved Examples

3. Procedure of Estimating 3 Hours
3.1 Introduction
3.1.1 Metric system and primary units
3.1.2 International system of units
3.1.3 Method of estimating
3.1.4 Main items of work;
3.1.5 Deduction for opening etc.
3.1.6 R.C.C. and RB. Work
3.1.7 Flooring and roofing
3.1.8 Plastering and pointing Cornice, Pillars, Dgors and Windows
3.1.9 Wood work
3.1.10 Irnn work
3.1.11 White washig; Colour wasHing; Distemperijg; Painting;
3.1.12 Lemp Sum items
3.1.12 Nomenclature of items Rates; reducing calculation
3.1.13 Degree of accuracy

3.2 Units of measurements 3 Hours
3.2.1 Units of works;
3.2.2 Sizes and Dimensions of various Works
3.2.3 Modular bricks Traditional bricks and thickness of wall

4. Method of Building Estimates
4.1 Examples of Estimate of walls 3 Hours
4.1.1 Method 1 of building estimate
4.1.2 Examples of building estimate by Method 1
4.1.3 Method II, Centre line method of building estimate
4.1.4 Examples of building Estimate by Method II...

4.2 Arch Masonry 3 Hours
4.2.1 Calculation and Illustrations
4.2.2 Estimate of steps and Illustrations

5. Estimate of Different Types of Roofs 6 Hours
5.1 Estimates of jack arch roof
5.2 Flat terraced roof
5.3 Madras terrace Roof
5.4 Gl. sheet roof of veranda
5.5 Roof Truss
5.6 G I Sheet
5.7 A.C. Sheet
5.8 Estimate of tiled roof over King Post timber truss
5.9 Estimate of G I. sheet roof over steel truss
5.10 Estimate of a building with jack arch roof and arch openings
6. **R.C.C. Works and Structures**

6.1 **R.C.C. Work**
- 6.1.1 Percentage steel reinforcement
- 6.1.2 Standard hooks and cranks of reinforcement bars
- 6.1.3 Estimate of R. C. C. framed building

6.2 **Estimate of R.C.C. Slab**
- 6.2.1 Estimate of R.C.C. beam
- 6.2.2 Estimate of R.C.C. T-beam slab

6.3 Estimate of R.C.C. column with foundation

6.4 Estimate of R.C.C. staircase

6.5 Estimate of R.C.C. retaining wall

6.6 **Steel stanchion**
- 6.6.1 Estimate of a steel stanchion
- 6.6.2 Steel beams

6.7 Estimate of a Double-storied building

7. **Sanitary and Water Supply Works (Septic tank)**

7.1 **Sanitary works**
- 7.1.1 Soakage pit
- 7.1.2 Sub-soil drains
- 7.1.3 Sizes and capacities of septic tank

7.2 **Design of Septic Tank**
- 7.2.1 Estimate of septic tank and soak pit including sanitary and water supply installations; Estimate of sanitary pit latrine, Manhole, Surface Drain Sanitary fittings and Sewer line

7.3 **Water Supply**
- 7.3.1 Water Supply pipe line
- 7.3.2 Sanitary and Water Supply works of a building
- 7.3.3 Tube Wells

7.4 Example of Estimate of electrification

8. **Road Estimating**

8.1 **Earth Work**
- 8.1.1 Estimate of earthwork by four methods
- 8.1.2 Estimate of pitching of slopes;
- 8.1.3 Estimate of earthwork of road from L-sections
8.1.4 Solved Examples
8.1.5 Estimate of earthwork in road having vertical drop
8.1.6 Estimate of earthwork in hill road
8.1.7 Solved Examples

8.2 **Estimates of metal led road**
8.2.1 Complete estimate of one mile of metal led road
8.2.2 Estimate of C.C. Track way; Premix carpeting
8.2.3 Stabilized soil road Modernizations of a road
8.2.4 Solved Examples

8.3 **Railway Line**
8.3.1 Estimate of a new B.G. Track railway line
8.3.2 Estimate of laying M.G. Track and B.G. Track
8.3.3 Estimate of maintenance of M.G. and B.G. Track

9. **Culverts, Bridges, Wells**
9.1 **Culverts**
9.1.1 Methods of estimating
9.1.2 Estimates of R. C. C. slab culvert;
9.1.3 2 meter span arched culvert
9.1.4 3 meter span arched culvert
9.1.5 3.5 m span arched culvert
9.2 R. C C. T-beam decking;
9.3 Pier; Pipe culvert
9.4 Well foundation
9.5 R. C. C. T-beam Bridge.

10. **Irrigation Works**
10.1 **Earth Work**
10.1.1 Earthwork in canal-different cases
10.1.2 Estimate of earthwork in irrigation. Channels
10.1.3 Solved Examples
10.1.4 Tabular forms of earthwork estimate.

10.2 **Land**
10.2.1 Estimate of Permanent land
10.2.2 Estimate Temporary land
10.2.3 Solved Examples
10.3 **Distributary’s**

- 10.3.1 Estimate of a Distributaries
- 10.3.2 Solved Example

10.4 **Aqueduct**

- 10.4.1 Estimates of Aqueduct
- 10.4.2 Solved Examples

10.5 **Syphon**

- 10.5.1 Estimates of Syphon
- 10.5.2 Solved Examples

10.6 **Fall**

- 10.6.1 Estimates of Fall
- 10.6.2 Solved Examples

**List of Practicals**

1. Visit to under construction works to study Earthwork in foundation, concrete in foundation, R.C.C. work, Brickwork I class, II class and III class, R.B. work; Plastering, Pointing; Lime pointing, Different Type of Floor, D.P.C. Centring and shuttering

2. Practices in preparing Rough cost Estimate, Plinth area estimate, Cube rate estimate, Approximate quantity method estimate

3. Practices in preparing detail estimate, Revised estimate, Supplementary Estimate, Supplementary and Revised estimate


5. Complete estimate of a single storey building.

6. Preparation of Annual repair/special repair estimates
   - a. Practices in preparing Site plan, Layout plan, Index plan, Electrification

7. Practices in preparing Water Supply and Sanitary works estimate
   - a. Practices in preparing Summary of estimated cost
   - b. Practices in preparing Complete set of estimate

8. Practices in preparing Building cost Index

9. Solved Examples on Computation of Floor area, Circulation area, Horizontal circulation areas, Vertical circulation areas, Carpet area, External services, Computation Capital cost, Project, Preliminary estimate

10. Examples of building estimate by Method 1, Centre line method of building estimate

**192 Hours**
Examples of building Estimate by Method II...

Calculation of arch masonry

Practices in Estimation of jack arch roof, Flat terraced roof, Madras terrace Roof, Gl. sheet roof of veranda, Roof Truss, G I Sheet, A.C. Sheet

Practices in Estimation of tiled roof over King Post timber truss

Practices in Estimation of G I. sheet roof over steel truss

Practices in Estimation of a building with jack arch roof and arch openings


Practices in Estimation of a steel stanchion, Steel beams

Practices in Estimation of a Double-storied building

Practices in Estimation of septic tank and soak pit including sanitary and water supply installations; sanitary pit latrine, Manhole, Surface Drain Sanitary fittings and Sewer line

Example of Estimate of electrification

Practices in Estimation of earthwork by four methods, earthwork of road from L-sections

Solved Examples on earthwork in road having vertical drop, Estimate of earthwork in hill road Solved Examples, on complete estimate of one mile of metal led road, C.C. Track way; Premix carpeting, Stabilized soil road Modernizations of a road

Practice in Estimation of Different type of Culverts, Bridges, Wells

Solved Example of Earthwork in canal-different cases, earthwork in irrigation. Channels

Practices in Tabular forms of earthwork estimate.

Solved Examples on Estimate of Permanent land, Temporary land, Distributaries, Aqueduct, Syphon, Fall

Reference Books

3. Estimating and Costing by M.A. Aziz. PROJECT MANAG
4. Quantity Survey-1&2 by Sheikh Asif
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
MEASUREMENT OF CONSTRUCTION WORKS

Total Hours 128  T  P  C
Theory 32  1  3  2
Practical 96

AIM Understand the methods of measurements, complete measurements and recording measurements of civil engineering works.

Course Contents

1. **Introduction** 3 Hours
   1.1 Measurement and its types
   1.2 General rules
   1.3 Civil Engineering STANDARD METHOD OF MEASUREMENT (CESMM)

2. **Systems of Measurements** 3 Hours
   2.1 Taking off systems
   2.2 M.K.S system
   2.3 F.P.S system
   2.4 Principle of units
   2.5 Units of Measurements
      (Length, Area, Volume and Capacity, Mass, Density, Weight and measures)
   2.6 Metric system and conversion tables
   2.7 Conversion factors from F.P.S system to M.K.S system
   2.8 METRIC and FPS equivalent
   2.9 Conversions of units
   2.10 Differentiation of items

3. **Methods of recording Measurements** 3 Hours
   3.1 English method
   3.2 PWD method
   3.3 MES method
   3.4 Tolerance
   3.5 Dimension paper
   3.6 Tabular form
   3.7 Measurement Book
3.8 Use of computer in recording of measurements

4. **Earth Work**
   4.1 Embankments, trenches
   4.2 Solid measure, packed measure, loose measure
   4.3 Lift, Lead, Conversion of lift into lead
   4.4 Conversion Factors
   4.5 Authorized quantities
   4.6 Site clearance (area, roots, trees, demolition etc)
   4.7 Timbering & Battering
   4.8 Conversion of excavated materials into soil for removal
   4.9 Pumping water
   4.10 Return, fill & ram
   4.11 Mean area method
   4.12 Average cross sectional method
   4.13 Prismoidal formula
   4.14 Trapezoidal formula

5. **Building Work**
   5.1 Standard units, co-efficient of multiplying factors for different surfaces to get equivalent plain area
   5.2 Tolerance
   5.3 Deductions
   5.4 Long Wall Short Wall Method
   5.5 Centre Line Method
   5.6 Crossing method
   5.7 Foundations
   5.8 Brick/stone/Block masonry
   5.9 Concrete works
   5.10 Expansion joints
   5.11 Arches, domes
   5.12 Wood work, (Battens, Scantlings, Baulks, and Planks, boarding, Co-efficient of multiplying factors for different surfaces to get equivalent plain area)
   5.13 Truss work
   5.14 Joinery
   5.15 Builder's Hard wares
5.16 Steel & Iron work, Structural Steel work
5.17 Roofs, Roof coverings, Ceilings,
5.18 Decoration works
5.19 Sanitary and water supply installations
5.20 Elect work, Air conditioning

6. **Road works/ Bridges** 3 Hours
   6.1 Parts of road structure
   6.2 Stacks, Loose & Compacted material
   6.3 Concrete roads, bituminous roads, pavements
   6.4 Surface treatment
   6.5 Premix carpets
   6.6 Road Metal
   6.7 Repair/Patch works
   6.8 Bridges

7. **Sewerage Schemes** 2 Hours
   7.1 Manholes, pipes, soakage well, treatment plants
   7.2 Measurement of complete sewerage scheme

8. **Irrigation Channels** 2 Hours
   8.1 Earth work
   8.2 Permanent and temporary lands
   8.3 Lining
   8.4 Aqueduct, siphon, fall

9. **Electric Supply Schemes** 2 Hours
   9.1 Measurement of electric works/services

10. **Water Supply Schemes** 2 Hours
    10.1 Measurement of complete water supply scheme

11. **Sui Gas Works** 2 Hours
    11.1 Measurement of Sui gas pipe lines/installations

**Instructional Objectives**

1. **Know the Importance and Types of Measurement of Works.**
   1.1 Describe the importance of measurements.
   1.2 State the data required for recording of measurements.
   1.3 State the types of measurements.
   1.4 Describe general rules of measurements.
2. **Understand Systems of Measurements.**
   
   2.1 Describe M.K.S and F.P.S systems
   
   2.2 Describe principle of units of measurements.
   
   2.3 List units of measurements for length, area, volume, capacity, mass, density and weight.
   
   2.4 Learn conversion of units to other method.
   
   2.5 List equivalent units of various systems.

3. **Understand Various Methods of Recoding Measurements.**
   
   3.1 Describe methods of recording measurements.
   
   3.2 Distinguish between P.W.D and English method of recording measurements.
   
   3.3 Learn importance, rules of making entries in measurement book.
   
   3.4 Record measurements on computer.
   
   3.5 List all items of works for a building.
   
   3.6 Determine quantities of all items of works for straight, T, L, F, V shaped walls and circular walls.
   
   3.7 List all items of works for a single storey building (building portion only) from a given drawing.
   
   3.8 Measurements for annual and special repair estimates for a given building.

4. **Understand the Principles/Methods Involved in Calculation of Earth Work for Embankments, Roads.**
   
   4.1 Explain methods to determine quantity of earth work and their respective Performa.
   
   4.2 Measurements of quantities of earth work for embankments, roads.
   
   4.3 Explain remodeling of irrigations channels.
   
   4.4 Measurement of quantity of earth work for remodeling of a channel from given X-sections of channel.

5. **Understand the Measurements of Building Work.**
   
   5.1 Describe methods of taking off quantities of a building construction project.
   
   5.2 State the units and methods of measurement of all items of works for a building.
   
   5.3 Understand measurement of trusses.
   
   5.4 Understand measurement of typical items of works.
   
   5.5 Understand measurement of wood work, conversion of different surfaces to equivalent plain area.
6. **Understand the Measurements of Various Types of Roads.**
   6.1 Describe parts of road structure and their specifications.
   6.2 State the units and method of measurement of all items of works for a road.
   6.3 Record measurements for bitumen and cement concrete road.
   6.4 Understand measurements of various types of pavements.
   6.5 Understand measurements of various types of repair/patch works.
   6.6 Understand measurements of various types of culverts/bridges.

7. **Understand the Measurements of Sewerage System/Schemes.**
   7.1 Describe the types of sewerage systems.
   7.2 List all items of works for a sewer line and their units of measurements.
   7.3 Learn measurement of manholes, pipes, septic tanks, sewerage treatment plants.

8. **Understand the Measurements of Irrigation Channels.**
   8.1 Distinguish between permanent and temporary land.
   8.2 Learn measurement of Lining.
   8.3 Learn measurement of Aqueduct, siphon, fall.

9. **Understand the Measurements of Electric Supply Works.**
   9.1 Measurement of electric works/services.

10. **Understand the Measurements of Water Supply Works.**
    10.1 Measurement of complete water supply works/scheme.

11. **Understand the Measurements of Sui Gas Works.**
    11.1 Measurement of Sui gas pipe lines/installations.

**List of Practicals**

96 Hours

1. Measurement of different types of earth work.
7. Measurement of electric works.
8. Measurement of water supply works.
10. Practice in recording measurements on computer.
Reference Books

1. Quantity survey – Sheikh Muhammad Asif/ Rana Muhammad Ashraf
2. Estimating and Costing in Civil Engineering – B.N.Dutta
3. Estimating and Costing - M.A.Aziz
4. Rasul Manual No. 4 on Estimating
5. Quantity Surveying – NISTE
6. Soil mechanics and foundations – Dr B.C.Punima
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 2
OCCUPATIONAL HEALTH & SAFETY ENVIRONMENT (OHSE)

Total Hours: 32
Theory: 32
Practical: 1
T P C: 1 0 1

AIM: On completion of the subject, the student will know about safety practices adopted for civil engineering works. Health hazards, site dangers, and body protection. Welfare of employees/workers.

Course Contents

1. Accident 6 Hours
   1.1 Types
   1.2 Causes
   1.3 Effects
   1.4 Remedial Measures

2. Fire Hazards 4 Hours
   2.1 Introduction
   2.2 Causes
   2.3 Control

3. Health Hazards 6 Hours
   3.1 Introduction
   3.2 Causes
   3.3 Prevention

4. Safety 6 Hours
   4.1 Introduction
   4.2 Industrial ventilation, exhaust systems
   4.3 Industrial noise and its control
   4.4 Safety Precautionary Measures for:
      4.4.1 Scaffolding, Formwork, and Ladder
      4.4.2 Drilling & Blasting
      4.4.3 Demolition
      4.4.4 Hit bituminous work
4.4.5 Fire hazards in building
4.4.6 Excavation

5. Safety Training of Employees 2 Hours
   5.1 Necessity
   5.2 Modes of training

6. Fire Control Systems 2 Hours
   6.1 Types of equipments / tools
   6.2 Operations and practices

7. Legal Aspects of Safety Occupational Health and Building 4 Hours
   7.1 Introduction
   7.2 General Legislation
   7.3 Compensation
   7.4 Insurance

8. Natural Hazards (Earth Quakes,Slides, Etc) 2 Hours
   8.1 Causes
   8.2 Effects
   8.3 Remedial Measures

Recommended / Reference Books
1. Fundamentals of Construction; P. T Armstrong
2. Safety and Security in Building Design; Ralph Sinnott
3. Labour Compensation Act 1923
4. Safety Practices and Procedures; NISTE

Instructional Objectives
1. Understand Accidents
   1.1 Define accidents and explain types of accidents
   1.2 Explain causes of accidents
   1.3 Explain effects of accidents
   1.4 Explain remedial measures

2. Understand Fire Hazards
   2.1 Introduction of fire hazards
   2.2 Explain causes of fire hazards
   2.3 Explain control of fire hazards
3. **Understand Health hazards**
   3.1 Give Introduction
   3.2 Explain causes
   3.3 Explain prevention

4. **Understand Safety Measures w.r.t Building and Environment**
   4.1 Introduction of safety measures
   4.2 Explain industrial ventilation, exhaust system
   4.3 Explain safety precautionary measures for:-
      4.3.1 Scaffolding, formwork, and ladder
      4.3.2 Drilling & Blasting
      4.3.3 Demolition
      4.3.4 Hot bituminous works
      4.3.5 Fire hazards in building
      4.3.6 Excavation

5. **Understand Safety Training of Employees**
   5.1 Explain necessity of safety training of employees
   5.2 Explain modes of training

6. **Understand the Fire Control System**
   6.1 Explain types of equipments / tools
   6.2 Explain operations and practices

7. **Understand Legal Aspects of Safety Occupational Health and Building**
   7.1 Introduction
   7.2 Explain general legislation
   7.3 Explain compensation
   7.4 Explain insurance

8. **Understand Natural Hazards (Earth Quakes, Slides Etc)**
   8.1 State reasons of earthquake, slides
   8.2 Explain remedial measures of earthquake, slides
AIM  The student will be able to express their understanding of communication skills in the form of speaking, listening, reading and writing and use it to supplement their technical skills.

Course Contents

1. **Listening Skills**  
   1.1 Listening comprehension  
   1.2 Principals for teaching listening comprehension  
   1.3 How to listening skill be developed

2. **Speaking Skills**  
   2.1 Starting and Ending conversations  
   2.2 Introducing oneself and others  
   2.3 Greeting, praises and compliments  
   2.4 Interviewing skills

3. **Reading Skills**  
   3.1 Skimming  
   3.2 Scanning  
   3.3 Guessing  
   3.4 Intensive reading  
   3.5 Extensive reading  
   3.6 How to improve reading skill

4. **Writing Skills**  
   4.1 What is writing  
   4.2 Guided writing  
   4.3 Free writing  
   4.4 Creative writing  
   4.5 Kinds of writing  
   4.6 What is effective writing
4.7 The process of writing

5. **Report Writing**

5.1 Introduction importance kinds of report, structure of report
5.2 General principles of report writing, procedure of report writing
5.3 Interview, principles, Merits & Demerits
5.4 Questionnaire
5.5 Rough draft, submission of report, letter of transmittal
5.6 Analysis of different kind of reports

**Recommended / Reference Books**

1. **Communications Skills**; Mathew McKay (2009), New Harbinger Publications
2. **A Course in English Communication**. M Apte, 92009), PHI Learning, New Delhi
5. **Project Management CT-312**: by Sheikh M Asif, Rana M Ashraf, M Arshad Awan Allied Book Centre Lahore

**Instructional Objectives**

Developing Communication Skills by understanding and applying Listening Speaking, Reading and Writing Skills for its practical use at the work place

1. **Explain and Develop Listening Skills**
   1.1 Define listening skill
   1.2 Demonstrate listening skill

2. **Explain and Develop Speaking Skills**
   2.1 Express how to introduce yourself, talk about your skills and exhibit interviewing skills and demonstrate their applications
   2.2 Express and demonstrate how to agree disagree, likes, dislikes, etc
   2.3 Explain how to speak in condensation and demonstrate its use
   2.4 Explaining and demonstrate how to report

3. **Explain and develop Reading Skills**
   3.1 Understand about skimming, scanning guessing, identification and inference and demonstrate their use
   3.2 Understand and demonstrate about identification of contrasting ideas, main and support ideas and attitude of author / writer.
3.3 Explain and demonstrate use of synonyms and antonyms

4. **Explain and Develop Writing Skills**
   4.1 Understand and demonstrate different types of writing and describing a process
   4.2 Explain and demonstrate about writing simple sentences and writing complex sentences
   4.3 Developing and demonstration about coherence and cohesion
   4.4 Explain about beginning of topic and its middle and end and demonstrate its application
   4.5 Explain about linking different paragraphs and demonstrate its use
   4.6 Understand how to write business letters and demonstrate its application

5. **Report Writing**
   5.1 Understand how to write reports
   5.2 Qualities of good reports
   5.3 Model reports
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 3
ISLAMIAT / PAK STUDIES

Aslamiaat / Matala e Pakistan

GEN 311

182

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معلومات:

1. قرآن كيرم

سورتي قرآن کیرم نگارنده اسلام کے بارے میں متعدد معلومات کی طرح سی۔ قرآن کی موضوعات میں مورخت معلومات والوں کی تاریخی اسلام کے بارے میں معلومات

2. عقد و اہمیت

بنی اسلام علی خاص شہادت و الا الله ان محمد ایبادہ و رسول و اقام الصلاة وانہا الرکوت و جمع الیت و صوم رمضان

3. متنصبۃ

البنصحت

المتنصبۃ متقن

للمومن على المسوم من ست خصال بعوداذا مرش و نشئده اذات وما وبحبه اذ دعا

لا تتخ عن خانک

لا يدخل الجنة قاطع

إن الله حرم عليه عقوب الصهبات و اذا اذات

بسرور اولا تعسوار و بشرو ولانفرموا

4. عقد و اہمیت

فائق لطب انسان من رضي بالله ربا الاسلام و محمد رسول

افضل الذكر لا الله الا الله

فوق القدر

حسن عقاب دے کے امراء سو کھلاویں

5. عقد و اہمیت

اسلامی طرق تدریب

عبد، حضرت رضا ر، ایفا عید، امیر، ابوبکر رضی
امام ہیں کہ نمونۂ ہو کر ہے

معاشرتی اور ادیبی زمینی میں احادیث سے رائجہی معاشرت کے

حقیق ترقی بہتر

جوہیر نعیمی اسلامی معاشرت سے کیا کیا چاہئے ہر کسے

صحتی انصاد

ملک میں نمونۂ جمعیت بیان کے

علما اور علماء کے نمونۂ بیان کے

امام میں نمونۂ جمعیت بیان کے

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نانس (ساس می) مقدار پاکستان

مسئله-میهمان

۱۰/۱

۱/یا گرج

۵۴-۲کـگ

GEN III

قیاس پاکستان

بازنده کمیسیون

ریکلف ایواز

نتیجه بیگال ولیان

نتیجه بجهاز

مستقل جامعین

ریاست کانال

ریاست جمع و تنظیم

نیمی بنی چنارا ول

قرار روابط میاندور

علاوه که پاکستان

۱۹۵۶-۱۹۶۲ و ۱۹۷۳ کے دستور (آمیز) کے اساسی و معنویت

پاکستان کل قروی اور بس کی انواع بیانی انتخاب

قرنی و معاصر (تمام گیس گروه)
قیام پاکستان

قیام پاکستان

قدمین متن اسکن

تمام متن متن اسکن: قیام پاکستان کے بعد ریاست مسکل سے آگیا محاصره کے اوروبا کے

خوشی متن اسکن

با عرض کہ میں نے جو بچہ بچہ کرئے گیا، مستثنی بیان کر کے

ریاستہائے متحدہ امریکا کے اباورا کے بارے میں بیان کر کے

بیکثر اورالموکتی تھا کہ جمہوریت بیان کر کے

بجیب ہمیں ہمیشہ بیان کر کے

مہاجرین کی آمد سے نوٹس گیا اور اپنی بیان کر کے

ریاستہائے متحدہ کے ارب قبائل کے بارے میں بیان کر کے

نیپال کی کنیا کے نازک گوہران کے

فرآں وٹپسی کی اقلیت کے بیان کر کے

22 سال کے متن اسکن میں بیان کر کے

قیام پاکستان کے بعد نقاد اسلامی کو ہوش شو گا کیوں کہ

پاکستان کے کل بچوں اور اوراس کے بیشتر فیصلہ انجام دیتی بیان کر کے

پاکستان میں قدرتی وسائل (ویل، ہیم، کولی) کے بارے میں بیان کر کے
جددت

GEN III

ن سال سال

موجودات

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کل 100 گیج

موضوعات

اعتکالات

شہیدت

عدل و انصاف

قومی فرست کانفرنس

دکتر ڈاکٹر

بنگالی

احرمنویت

شمسی

عفوگر

پردہ

فروردین

انگریزی

پہاپرفیت

آپ فلک کے سے ہی جم (نہ رپول ایم ٹی نکے، اس کے سے اپنے نئی ادارے)
نسب اخلاقیت
مطلقود
برعی مراجع.
خصوصی مراجع:
طالب علم اس قابل باقی
منصوبات کا مطلب یہ ہے کہ
عمل یہ نہیں کریں کیونکہ دوسرے کے
منصوبات کی بھی یہ ہے کہ
اپنی شخصیت اور معاملے پر منصوبات کے مطالبہ کا ہے کہ اس سے پہلے یہ ہے کہ
شیعہ کا ساتھ کام کرے
علل و اضافہ سے اور کچھ وہ فضول کے
باتوں کا انقلاب یہ ہوں گا کہ
کارکردنہ اضافہ کم
پانی اور کم کے بروکس سے استفادہ کرے
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Course Contents

1. **Introduction to Construction Project Management** 3 Hours
   1.1 Objectives and functions of Project Management.
   1.2 Construction stages-planning stage, designing stage, tendering stage and execution stage.
   1.3 Types of civil engineering project.

2. **Construction Team**
   2.1 Parties/Professionals - scope of duties & responsibilities.

3. **Organization Aspects** 6 Hours
   3.1 Forms of organizations-line staff, direct and functional organization, their features, merits and demerits
   3.2 Organizational structure of different engineering departments-duties of various officers/officials, power of sanction of various officers
   3.3 Classes of Establishment in works department

4. **Methods of Execution of Works** 3 Hours
   4.1 Departmental execution of works - daily labor, day work and piece work
   4.2 Contract:-
     4.2.1 Definitions-contract, tender.
     4.2.2 Types of contracts-Lump sum contract, item rate contract, cost plus fee contract, cost plus percentage contract, labor contract, Negotiated rate contract, turn-key contract and package contract etc
     4.2.3 Merits and limitations of each contract system
   4.3 Work order-difference between work order and contract

5. **Preliminary planning.** 3 Hours
   5.1 Preliminary aspects of planning-investigation, feasibility report, collection of data and preparation of project report
6. **Construction Planning**  
   6.1 Construction activities  
   6.2 Construction schedule, rate of executing work, time calculations  
   6.3 Material, labour and equipment schedule  
   6.4 Procurement of labour, material and equipment  
   6.5 Planning by bar chart/time and progress chart and its limitations  
   6.6 Project planning with net work analysis (C.P.M)-term used, advantages of C.P.M  
   6.7 Steps in C.P.M method-preparation of net work, critical path, determination of net work time  
   6.8 Review of network and crash programming  
   6.9 Preparation of work progress charts  
   6.10 Site organization of a construction job  

7. **Money- Time Relationship and Equivalence**  
   7.1 Introduction  
   7.2 Simple Interest  
   7.3 Compound Interest  
   7.4 The Concept of Equivalence  
   7.5 Notation and Cash Flow Diagram/Table  
   7.6 Interest Formulas Relating Present and Future Equivalent Values of Single Cash Flows  
   7.7 Interest Formulas Relating to Uniform Series (Amenity) to its Present and Future Equivalent Values  
   7.8 Problems  
   7.9 Spread Sheet Applications  

8. **Applications of Money Time Relations**  
   8.1 Introduction  
   8.2 Determining the Minimum Attractive Rate of Return  
   8.3 The Present Worth Method  
   8.4 The Future Worth Method  
   8.5 The Annual Worth Method  
   8.6 The internal Rate of Return  
   8.7 The External Rate of Return  
   8.8 The Payback Period Method
9. **Planning for Earth Work**  
   9.1. Introduction  
   9.2. Graphical Presentation of Earth Work  
   9.3. Earth Quantities  
   9.4. Mass Diagram  
   9.5. Using of Mass Diagram  
   9.6. Problems  

10. **Equipment Cost, Depreciation and Income Taxes**  
   10.1. Introduction  
   10.2. Owning Cost  
   10.3. Operating Cost  
   10.4. Cost for Bidding  
   10.5. Replacement Decisions  
   10.6. Problems  
   10.7. Depreciation Concept & Terminology  
   10.8. The Classical (Historical) Depreciation Methods  
   10.9. The Modified Accelerated Cost Recovery System  

11. **Calculation of Productively of Machines**  
   11.1. Earth Volume Conversion Factor  
   11.2. Job Efficiency  
   11.3. Bulldozer  
   11.4. Dozer Shovel & Wheel Loader  
   11.5. Hydraulic Excavator  
   11.6. Motor Grader  
   11.7. Compacter  
   11.8. Plant output in the field  

**Reference Books**  
3. Professional practice by Vazirani.  
4. Engineering Economy by William G Sullivan  
5. Construction Planning Equipment and Method by Robert L Peurifoy P.E  
6. Engineer Reccee & Planning Data Book (ERP)  
7. Text Book Operator  
8. Project Management CT-312 by Sheikh M Asif
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 3
COMPUTER APPLICATION IN QS CAD INTEGRATIVE EAGLE POINT

Total Hours  224  
Theory  32  1  6  3  
Practical  192  

Course Contents  

1. Introduction to Eagle Point  2 - 10 hours  
   1.1 Introduction 
   1.2 Installation procedure 

2. Getting Started  6 - 30 hours  
   2.1 Overview  
      2.1.1 Manual layout 
      2.1.2 Manual conventions 
      2.1.3 Opening and selecting files 
      2.1.4 Installation path 
   2.2 User interface terminology and Navigation  
      2.2.1 Menus/toolbars/Command key-ins 
      2.2.2 Dialog boxes 
      2.2.3 Types of dialog boxes 
      2.2.4 Types of dialog box controls 
      2.2.5 Specific buttons/Icons 
      2.2.6 Navigation on dialog boxes 
   2.3 CAD Integration  
      2.3.1 Launch CAD 
      2.3.2 CAD settings 
      2.3.3 Pic in CAD 

3. Running Eagle Point  4 - 20 hours  
   3.1 How to organize your projects 
   3.2 Creating a new project 
   3.3 Adding a project 
   3.4 Adding additional drawings/Design files 
   3.5 Customizing CAD toolbars
4. **Introduction to Road Calc** 6 - 30 hours
   - 4.1 Road calc concepts
   - 4.2 CAD integration
   - 4.3 Menu layout
   - 4.4 Library vs. manage
   - 4.5 Alignment database
   - 4.6 Special alignments and profiles
   - 4.7 Template- typical section
   - 4.8 Slopes

5. **Quantity Takeoff** 12 - 80 hours
   - 5.1 Introduction
   - 5.2 Database
     - 5.2.1 New database entry
     - 5.2.2 Quicksteps
     - 5.2.3 Modify database entry
     - 5.2.4 Database filters
     - 5.2.5 Assemblies
     - 5.2.6 Sub assemblies
     - 5.2.7 QTO import
     - 5.2.8 QTO import file format
     - 5.2.9 Invalid import item
     - 5.2.10 Item ID
       - 5.2.10.1 Assign item ID by project
       - 5.2.10.2 Assign item ID by linear
       - 5.2.10.3 Assign item ID by block/cell
       - 5.2.10.4 Assign item ID by Area
       - 5.2.10.5 Assign item ID by volume
       - 5.2.10.6 Assign item ID by layer/level
       - 5.2.10.7 Modify item ID
       - 5.2.10.8 Remove item ID

6. **Calculations** 2 - 22 hours
   - 6.1 Calculate quantities
   - 6.2 Bill of materials
     - 6.2.1 New bill of materials item
6.2.3  Bill of materials – Table setup
6.2.4  Import bill of materials
6.2.5  Export bill of materials
AIM
Understand the Analysis of Rates for Building works and services, Quantities of Materials and Transport, Valuation, Schedule of Rates Metric and F.P. System Reports, Technical and Design Data, Estimation of Complete Scheme, Repair Estimate, Accounts and Procedure.

Course Contents

1. Analysis of Rates
   1.1 **Overhead costs**
      1.1.1 General Over head cost
      1.1.2 Job Over head cost
      1.1.3 Task or out-turn work
      1.1.4 Labour required for different works
      1.1.5 Loads for carts and trucks
   1.2 **Materials for different items of works**
      1.2.1 Materials for cement concrete
      1.2.2 Cement mortar
      1.2.3 Bulk age and shrinkage
      1.2.4 Rates of materials and labours
      1.2.5 Preparing analysis of rates

2. Analysis of rates Building works
   2.1 **Concrete**
      2.1.1 Lime concrete in foundations in roof terracing
      2.1.2 Cement concrete.
      2.1.3 R. C. C.works,
      2.1.4 Reinforced Brickwork
   2.2 **Brick Masonry**
      2.2.1 Brickwork in foundation
      2.2.2 Brickwork in superstructure
2.2.3 Brickwork in Arches
2.2.4 Half brick wall
2.2.5 Brickwork in mud mortar

2.3 **Stone Masonry**

2.3.1 Random rubble
2.3.2 Coarse rubble
2.3.3 Ashlars

2.4 **Finishing**

2.4.1 Plastering,
2.4.2 Pointing,
2.4.3 White washing, Colour washing;
2.4.4 Distempering
2.4.5 Painting
2.4.6 Varnishing,
2.4.7 Wax polish;
2.4.8 Spirit polish
2.4.9 Coal tarring

2.5 **Flooring**

2.5.1 2.5 cm c.c. over 7.5 cm lime concrete floor
2.5.2 7.5 cm lime concrete floor.
2.5.3 Mosaic or Terrazzo
2.5.4 Tile floor
2.5.5 Brick floor
2.5.6 Brick-tile

2.6 Damp proof course

2.7 Excavation in Rock

2.8 Sand filling in plinth

2.9 Panelled door

2.10 Glazed window

2.11 **Form work**

2.11.1 Cantering and shuttering of beam
2.11.2 Cantering and shuttering slab

2.12 **Roof**

2.12.1 Roofing of Allahabad tile
2.12.2 Mangalore tile
2.12.3 Country tile
2.12.4 Thatch roofing
2.12.5 Timber ceiling
2.12.6 A.C. sheet ceiling
2.12.7 Terraced roofing
2.12.8 Mud roofing

2.13  **Trenches**  
2.13.1 Earthwork in. trenches
2.13.2 Timbering of trenches

2.14  **Laying and Jointing of Pipes**  
2.14.1 Laying S.W. pipe
2.14.2 Laying of R. C. C. Hume pipe
2.14.3 Laying of M.S. Galvanized pipes
2.14.4 Lead joint for GI pipe

2.15  **D.P.C**  
2.15.1 Analysis of Rates of work - Bituminous painting Ist and 2nd coats

2.16. Premix carpet
2.17. Bituminous macadam
2.18  Laying and consolidation of Stone metal and Kankar metal

3.  **Estimating of Quantities of Materials and Transport**  

3.1  **Estimate of materials**
3.1.1 Estimate of materials of - Jail wall and shaped walls
3.1.2 Two-roomed building
3.1.3 R. C. C. roof slab
3.1.4 R.B. roof slab
3.1.5 Aqueduct
3.1.6 3 meter span culvert
3.1.7 CC. road; C.C
3.1.8 Track- way

3.2  **Transport**  
3.2.1 Transport of materials formula
3.2.2 Estimate of Transport work
3.2.3 Solved Example
4. **Valuation**

4.1 Valuation
4.2 Gross income
4.3 Net income
4.4 Outgoings
4.5 Scrap value Salvage value etc.
4.6 Obsolescence
4.7 Annuity, Capitalized value, Year’s purchase, Sinking fund
4.8 Depreciation Valuation of building
4.9 Determination of depreciation
4.10 Method of valuation
4.11 Life of various items of works
4.12 Solved Examples of valuation
4.13 Mortgage Lease
4.14 Fixation of rent
4.15 Solved Examples of rent fixation
4.16 Plinth area required for residential buildings.

5. **Schedule of Rates Metric and F.P. System**

5.1 Schedule of Rates
5.2 Earthwork
5.3 Concrete
5.4 Damp proof course
5.5 Brickwork;
5.6 Stone work
5.7 Wood work
5.8 Mild steel and Iron work
5.9 Roof work
5.10 Ceiling
5.11 Plastering and Pointing
5.12 Flooring; Painting
5.13 Varnishing and. Distempering; White and colour washing, Well work
5.14 Demolishing and Dismantling
5.15 Miscellaneous works
5.16 Road work
5.17 Annual Repair work
5.18 Cartage arid Transport
5.19 Materials Rates
5.20 Labour rates for workers
5.21 Labour rates for different items of works
5.22 Percentage above Schedule of Rates for Water Supply works, Sanitary works, and Electrification

6. **Cost and Estimation of Complete Scheme** 9 Hours
   6.1 Water Supply
   6.2 Sewerage and Sewerage disposal
   6.3 Residential Colony’s
   6.4 Commercial Area

7. **Reports, Technical and Design Data** 6 Hours
   7.1 Report on estimate of residential bldg
   7.2 Report on estimate of water supply
   7.3 Report on estimate of irrigation works
   7.4 Report on estimate of road

8. **Repair Estimate** 9 Hours
   8.1 Bldg Works
   8.2 Sanitry Work
   8.3 Water Supply
   8.4 Road
   8.5 Irrigation Work
   8.6 Periodical Services of Bldg

9. **Accounts and Procedure For work**
   9.1 **Classification of Work** 2 Hours
      9.1.1 Classification of Original Work
      9.1.2 Classification of Major Work
      9.1.3 Classification of Minor Work
      9.1.4 Classification of Petty Work
      9.1.5 Classification of Repair Work
   9.2 **Method of Currying out Work.** 3 Hours
      9.2.1 Daily labour
      9.2.2 Muster Roll
9.2.3 Preparation of M.R
9.2.4 Labour report
9.2.5 Muster Roll Form
9.2.6 Peace Work Agreement Form
9.2.7 Conditions of Termination
9.2.8 Work order

9.3 **Contracts** 2 Hours

9.3.1 Lump sum
9.3.2 Schedule Contract or item rate contract
9.3.3 Labour Contract
9.3.4 Percentage Contract;

9.4 **Contract Document** 2 Hours

9.4.1 Conditions of Contract
9.4.2 Penalty;
9.4.3 Compensation for delay in completion
9.4.4 Liquidated damages;
9.4.5 Extension of time
9.4.6 Termination of contract
9.4.7 Labour engaged through contractor;

9.5 **Measurement Book** 2 Hours

9.5.1 Entries in measurement book
9.5.2 Standard Measurement Book
9.5.3 Checking of measurement
9.5.4 Preparation of bill;
9.5.5 Record drawing

9.6 **Stores** 2 Hours

9.6.1 Unstamped receipt
9.6.2 Account Procedure of Stores
9.6.3 Suspense head
9.6.4 Classes of stores Stock
9.6.5 Reserve limit of stock
9.6.6 Issue rate
9.6.7 Sb-heads of stock
9.6.8 Storage charges
9.6.9 Supervision charges
9.6.10 Market rate
9.6.11 Stock account
9.6.12 Bin card
9.6.13 Stock taking
9.6.14 Stock accounting Forms 7, 8, 9, 10, II, 35 37,
9.6.15 Materials at site account
9.6.16 Road Metal Form 16

9.7 **Tools and Plants**

9.7.1 Classification of Tools and Plants Sub-heads
9.7.2 Numerical account of receipts and issues
9.7.3 Register of Tools and Plants;
9.7.4 Verification of Tocis and Plants
9.7.5 Shortages and Surplusses
9.7.6 Tools Plants Accounting Forms—li, 14, 15
9.7.7 Difference between Accounts of Stock and Tools and Plants
9.7.8 Survey Report
9.7.9 Account Forms 18, 19; Issue of materials

9.8 **Mode of Payment**

9.8.1 Bill; Voucher
9.8.2 First and final bill
9.8.3 Running accoufıt bill
9.8.4 Advance payment
9.8.5 Secured advance payment
9.8.6 Bill Forms
9.8.7 Hand Receipt
9.8.8 Refund of security money
9.8.9 Claim due to Technical Revision
9.8.10 Claim due to Admin Reason

9.9 **Power of Sanction**

9.9.1 Power of sanction
9.9.2 Classification of income and. Expenditure
9.9.3 Note Book:

9.10 Completion Certificate
9.11 Inventory
9.12 Stages of supervision

**List of Practicals / Exercises**

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<td>Calculation of Labour required for different works</td>
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<td><strong>2.</strong></td>
<td>Calculation of Materials for ,cement concrete ,Cement mortar,Rates of materials</td>
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<td><strong>3.</strong></td>
<td>Analysis of rates Building works,Brick Masonry,Stone Masonry,Finishing Flooring ,Form work , Roof,Trenches,Laying and Jointing of Pipes,D.P.C</td>
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<td><strong>4.</strong></td>
<td>Estimate of materials of -Jail wall and shaped walls ,Two-roomed building</td>
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<td><strong>5.</strong></td>
<td>Practice to workout,Gross income, Net income ,Outgoings,Scrap value Salvage value etc., Annuity, Capitalized value, Year’s purchase, Sinking fund</td>
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<tr>
<td><strong>6.</strong></td>
<td>Calculation of Depreciation Valuation of building</td>
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<td><strong>7.</strong></td>
<td>Solved Examples of valuation, Mortgage Lease, Fixation of rent</td>
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<td><strong>8.</strong></td>
<td>Solved Examples of rent fixation , Plinth area required for residential buildings.</td>
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<td><strong>9.</strong></td>
<td>Use of Schedule of Rates for Estimation</td>
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<td><strong>10.</strong></td>
<td>Practice in Estimation of complete Schem for Water Supply ,Sewerage and Sewerage disposal,Residential Colony’s, Commercial Area</td>
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<td><strong>11.</strong></td>
<td>Report on estimate of residential bldg, water supply, irrigation works, road</td>
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<td><strong>12.</strong></td>
<td>Solved example on Repair Estimate,Bldg ,Sanity,Water Supply,Road ,Irrigation Work and Periodical Services of Bldg</td>
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<tr>
<td><strong>13.</strong></td>
<td>Practice in Preprearing of Muster Roll Form ,Peace Work Agreement Form</td>
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<td><strong>14.</strong></td>
<td>Practice for Entries in measurement book</td>
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<td><strong>15.</strong></td>
<td>Practice in Preparation of bill;</td>
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<tr>
<td><strong>16.</strong></td>
<td>Practice in preparation of First and final bill ,Running account bill,Advance payment,Secured advance payment</td>
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**Note:** The above exercises must span over a period of 192 hours and the number of assignments (Projects) should match with this duration.

**Reference Books**

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<tbody>
<tr>
<td><strong>1.</strong></td>
<td>Rasul Manual No.4 on Estimating.</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Estimating and Costing by B.N. Dutta.</td>
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<tr>
<td><strong>3.</strong></td>
<td>Estimating and Costing by M.A. Aziz. PROJECT MANAG</td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>Quantity Survey-1&amp;2 by Sheikh Asif</td>
</tr>
</tbody>
</table>
Course Contents

1. **Ingredients of Concrete.**
   1.1 Cement-types, uses, properties, tests of cement
   1.2 Aggregates-classifications and their properties, bulking of sand, grading of fine and course aggregates.
   1.3 Water-impurities, effect of excess impurities, function of water in concrete.

2. **Workability.**
   2.1 Definition
   2.2 Factors affecting workability
   2.3 Water cements ratio-Hydration of cement, w/c ratio law, relations between w/c ratio and strength of concrete.
   2.4 Measurement of workability-slump test, compacting factor test, vee-bee test.
   2.5 Recommended slumps for various conditions of placement.

3. **Introduction to Concrete**
   3.1 Definition
   3.2 Classification of concrete
   3.3 Properties of fresh concrete-segregation, bleeding, workability, harshness etc.
   3.4 Properties of harden concrete-strength, impermeability, durability, elasticity, shrinkage, creep, thermal expansion, factor affecting properties of concrete.
   3.5 Activities and admixtures-accelerators, retarders, water repelling agents, air entraining agents, puzzolons.

4. **Sampling and Testing of Concrete.**
   4.1 Laboratory conditions.
   4.2 Precautions in making test specimens
   4.3 Testing procedure.
   4.4 Non-destructive testing of concrete.

5. **Special Concretes.**
   5.1 light weight concrete, classifications properties, uses.
5.2 High strength concrete.
5.3 Mass concrete,
5.4 Ready mixed concrete.

6. **Reinforcement for R.C.C.** 4 hours
6.1 Types and their properties.
6.2 Storing cleaning bending, fixing, placing, binding.

7. **Concreting Under Special Conditions.** 5 hours
7.1 Effects of temperature on concrete.
7.2 Recommended precautions and practice for hot weather concreting.
7.3 Recommended precautions and practice for cold weather concreting.
7.4 Under water concreting-method, precautions.

8. **Introduction of R.C.C. Design.** 30 hours
8.1 Introduction to R.C.C. Design.
8.2 Advantages and disadvantages of R.C.C.
8.3 Working and ultimate stresses of concrete and steel
8.4 Bending moment and shear force in beams bending moment and shear force co-efficient.
8.5 Loads to be adopted in R.C.C design-live loads, dead loads, wind load, seismic loads.
8.6 Methods of design-service load method (working stress method), strength method (limit-state)
8.7 Shear stresses in beam-horizontal shear, diagonal tension and compression
8.8 Types of shear reinforcements-stirrups, inclined bars
8.9 Method of design (working stress method), assumptions used in working stress design
8.10 Design of simple R.C.C beam code provisions, steps in design of R.C.C simple beam-design of simple supported.
8.11 Definition, one way slab, two way slabs
8.12 Design steps and formulae
8.13 Definition, code provisions and assumption related to design.
8.14 Short column
8.15 Design of column section, longitudinal and transverse reinforcement.
8.16 Design depth of footing and reinforcements Stairs:
8.17 Types, spanning horizontally and spanning longitudinally.
9. **Principles of Prestressed Concrete.**
   9.1 Principles of prestressing
   9.2 Methods of tensioning-post tension pretensioning
   9.3 System of prestressing
   9.4 Steel and concrete used.
   9.5 Advantages of prestressed concrete over R.C.C.

10. **Interpretation of Test Report of Soil**
    10.1 Sieve analysis test of soil.
    10.2 Core cutter test
    10.3 Sand replacement test
    10.4 Proctor test.
    10.5 Atterberg limits.
    10.6 Soil classification.
    10.7 CBR.
    10.8 Bearing capacity test.

11. **Interpretation Of Test Report Of Concrete & Steel**
    11.1 Gradation and sieve analysis.
    12.2 Fineness modulus.
    12.3 Mix design.
    12.4 Compressive strength of concrete.
    12.5 Tensile test for steel.

12. **Introduction of Codes & Specifications**
    12.1 ACI codes.
    12.2 UBC codes
    12.3 AASHTO Specifications.

13. **Introduction Of Roads And Highways**
    13.1 Urban and rural roads.
    13.2 Types of Concrete roads
    13.3 Introduction of Highway

14. **Introduction of Irrigation Work**
    14.1 Types of canals
    14.2 Canal Lining
    14.3 Canals works
Instructional Objectives

1. **Understand the Properties and Functions of Ingredients of Concrete**
   1.1 Explain tests of cement i.e Initial and final setting time test, soundness test, compression strength test and tensile test
   1.2 State classification of aggregates according to nature of formation, size and shape
   1.3 State the characteristics of good fine and course aggregates
   1.4 Explain the effects of bulking of sand on proportioning of materials and on strength of concrete
   1.5 Define importance of gradation of aggregated in strength design of concrete
   1.6 Explain the function of water in concrete
   1.7 Explain the effects of excess impurities in water on strength of concrete

2. **Understand the Importance of Workability in Strength Design of Connect**
   2.1 Define the term workability
   2.2 Explain the factors effecting on workability
   2.3 State relation ship between hydrations of cement and water content
   2.4 State the water cement ratio
   2.5 Explain the effects of w/c ratio on strength of harden concrete
   2.6 Describe various methods of measurement of workability such as, slump test, compacting factor test

3. **Understand the Basic Concept of Concrete**
   3.1 Define the term concrete
   3.2 Explain the classification of concrete
   3.3 describe the properties of fresh concrete-segregation, bleeding, workability, harshness etc.
   3.4 Explain the properties of harden concrete-strength, impermeability, durability, elasticity, shrinkage, creep, thermal expansion, factor affecting properties of concrete.
   3.5 Activities and admixtures-accelerators, retarders, water repelling agents, air entraining agents, puzzolons

4. **Understand The Factors Influencing Concrete Properties.**
   4.1 Explain the properties of fresh concrete such as workability, aggregation, bleeding and hardness.
4.2 Explain the properties of hardened concrete such as strength, impermeability, durability, elasticity, shrinkage, creep and thermal expansion

4.3 Explain compressive strength, tensile strength, shear strength, bond strength of concrete

4.4 Explain the factors affecting properties of concrete

4.5 State the purposes of additives and admixtures in concrete

4.6 Explain the suitability and function of different types of admixtures

5. **Understand Principles and Techniques of Testing Concrete to Practical Situation**

5.1 List tests on concrete

5.2 Explain standard laboratory conditions for testing of concrete

5.3 Explain the procedure of testing specimen in laboratory as well as in field in order to test various strengths of concrete

5.4 Enumerate precautions in making test specimen and testing/breaking of test specimen

5.5 State the non-destructive tests of concrete

6. **Understand Light Weight Concrete, High Strength Concretes Mass Concrete and Ready Mixed Concrete**

6.1 State the types of light weight aggregates

6.2 Explain properties and uses of light weight concretes

6.3 State importance and uses of high strength concrete

6.4 Explain the special techniques involved in mass concreting

6.5 Explain necessity and manufacturing of ready mixed concrete

7. **Understand Know Methods and Procedures of Laying Reinforcement**

7.1 State the types of steel and their properties used in R.C.C

7.2 State standards for storing, straightening, cutting, bending, placing and binding reinforcement

8. **Understand Standard Practices For Concreting Under Special Conditions**

8.1 Introduction to R.C.C. Design.

8.2 List the advantages and disadvantages of R.C.C.

8.3 Explain working and ultimate stresses of concrete and steel

8.4 Explain bending moment and shear force in beams bending moment and shear force co-efficient.

8.5 Explain loads to be adopted in R.C.C design-live loads, dead loads, wind load, seismic loads.
8.6 Explain methods of design-service load method (working stress method), strength method (limit-state des Beams:

8.7 Explain Shear stresses in beam-horizontal shear, diagonal tension and compression

8.8 Describe the types of shear reinforcements-stirrups, inclined bars

8.9 Method of design (working stress method), assumptions used in working stress design

8.10 Explain design of simple R.C.C beam code provisions, steps in design of R.C.C simple beam-design of simple supported.

8.11 Define, one way slab, two way slabs

8.12 Explain design steps and formulae

8.13 Explain define, code provisions and assumption related to design.

8.14 Define short column

8.15 Explain design of column section, longitudinal and transverse reinforcement.

8.16 Explain design depth of footing and reinforcements Stairs:

8.17 Explain Types, spanning horizontally and spanning longitudinally.

9. Know About Principles of Prestressed Concrete

15.1 Understand principles of prestressing and methods of tensioning

15.2 State the systems of prestressing such as Freyssinet, Magnel Blaton, and Lee Mcall systems

15.3 State the requirements of concrete and steel for prestressing

15.4 Explain the advantages of prestressed concrete over conventional R.C.C

10. Interpretationing of Test Report Of Soil

10.1 Sieve analysis test of soil.

10.2 Core cutter test

10.3 Sand replacement test

10.4 Proctor test.

10.5 Atterberg limits.

11. Know About the Interpretation of Test Report of Concrete & Steel

11.1 Understand the Gradation and sieve analysis.

11.2 Define Fineness modulus.

11.3 Explain Mix design and its uses.

11.4 State the basic concepts of Compressive strength of concrete.

11.5 Elaborate Tensile test for steel.
12. **Know the Introduction of Codes & Specifications**
   12.1 ACI codes.
   12.2 UBC codes
   12.3 AASHTO Specifications.

13. **Know About the Basic Introduction to Codes & Specifications**
   17.1 State ACI codes, UBC codes and AASHTO Specifications.

14. **Introduction of Irrigation Work**
   14.1 Explain types of canals
   14.2 Explain canal Lining
   14.3 Explain canals works

**List of Practicals**

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<td><strong>1. Test on Cement</strong></td>
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<td>1.1 Preparation of cement paste of standard consistence</td>
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<td>1.2 Determination of Initial and final setting time</td>
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<td>1.3 Le-chatrelier’s test for soundness of cement</td>
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<td>1.4 Test for compressive strength of cement using mortar(1:3) cube</td>
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<td>1.5 Briquette test for tensile strength of cement using motor(1:3)</td>
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<td><strong>2. Test on Aggregates</strong></td>
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<td>2.1 Determine clay percentage in sand</td>
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<td>2.2 Determination of particle size distribution of fine and coarse aggregates by sieve analysis</td>
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<td>2.3 Determination of bulk density and voids in aggregates</td>
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<td>2.4 Determination of flakiness index and elongation index of coarse aggregates</td>
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<td>2.5 Determination of specific gravity and water absorption of aggregates</td>
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<td><strong>3. Test on Concrete</strong></td>
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<td>3.1 Test for workability of concrete by slump cone</td>
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<td>3.2 Test for workability of concrete by compacting factor apparatus</td>
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<td>3.3 Preparation of concrete cubes and cylinders vibrated and hand compacted, hand mixed and machine mixed and with different water cement ratio</td>
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<td>3.4 Determination of compression strength of concrete using cubes</td>
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<td>3.5 Preparation of standard size beams for flexural strength of concrete</td>
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<tr>
<td>3.6 Modules of rupture test, (breaking of beam prepared in above practical)</td>
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<td>3.7 Split cylinder test for tensile strength of R.C.C concrete Design</td>
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3.8 Solve problems on bending moment and shear force in beams
3.9 Prepare a chart showing the values of moment of resistance for different values of fc, ft. and m.
3.10 Design and drawing of simple rectangular R.C.C beam with U.D.L
3.11 Design and drawing of simply supported and overhanging one way slab
3.12 Design and drawing shear force reinforcements for a rectangular beam and check for bond

Reference Books
1 Concrete Technology by Hando
2 Properties of Concrete by Nevile
3 Concrete technology by Alyas Mughal
4 Elementary Reinforced concrete design by W. Morgan
5 R.C.C Design by J.L Sharma
6 R.C.C Design by C.K Wang
7 R. C. C. design by Nelson
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 3
QUALITY CONTROL / PROCEDURE PROJECT LIFE CYCLE

Total Hours 160
Theory 64 T P C
Practical 96

AIM
- Understanding of quality control and its impact on the work
- Importance, understanding of professional practices of construction industry
- Understanding the project life cycle starting from the need and initiation of project passing through tendering procedure, execution of project till the completion / documentary closure of the project

Course Contents

1. Quality Control 12 Hours
   1.1 Introduction
   1.2 Principals of supervision
   1.3 Duties of various inspecting officers
   1.4 Site order book
   1.5 Objects of quality control
   1.6 Methods of quality control
   1.7 Enforcing specifications
   1.8 Sampling and testing
   1.9 Methods of inspection of executed works
   1.10 Deming’s 14 points of quality and its implication on construction

2. Professional Practices & Procedures 20 Hours
   2.1 Structure of the construction industry
   2.2 Determine the interrelation ship of the various profession involved in the construction industry
   2.3 Examine the concept and objectives of the various related professional institutions
   2.4 Explain the duties of the parties involved in pre-contract and post contract procedures
   2.5 State examination membership, conditions / procedures of the professional controlling institutions
2.6 Analyze the implication of advice given by the professional quantity surveyor - up & down of contract
2.7 Duties of engineers at different position in a projectized organizations
2.8 Pakistan Engineer Council (PEC) introductions, importance of the organization and its impact on constructions industry.
2.9 Public procurement Regulatory Authority

3. **Project Life Cycle**

3.1 **Preparing the Bid Package**

3.1.1 Project concept and need (feasibility)
3.1.2 Conceptual drawings and estimates
3.1.3 Preliminary and detail design
3.1.4 Notice to bidders
3.1.5 Bid package
3.1.6 General / supplementary conditions
3.1.7 Technical specification
3.1.8 Addenda
3.1.9 Decision to bid and comparative statement
3.1.10 Prequalification
3.1.11 Sub contractor and vendor quotations / contracts
3.1.12 Bid Bond
3.1.13 Performance and payment bonds
3.1.14 Cost and requirement for bonds

15 Hours

3.2 **Construction / Execution Phase**

3.2.1 Acceptance – Acceptance period / withdrawal
3.2.2 Award of contract / notice to proceed / commence
3.2.3 Contract agreement
3.2.4 Time extensions
3.2.5 Change orders
3.2.6 Changed conditions
3.2.7 Value engineering
3.2.8 Suspension. Delay, or interruption
3.2.9 Liquidated damages
3.2.10 Progress payments and retainage
3.2.11 Progress reporting

17 Hours
Instructional Objectives

1. Quality Control
   1.1 Introducing the word quality control and its implications
   1.2 State the principles of the supervision
   1.3 Enumerate the duties of the inspecting officer and importance of inspection
   1.4 What is site order book and its importance
   1.5 State the objects of quality control & its understanding
   1.6 What are the methods of quality control its statement & explanation
   1.7 Need of enforcement of specification in a project
   1.8 State the methods of inspection of executed works
   1.9 Importance of the sampling and testing to ensure quality
   1.10 Statement and explanation of Dr Deming’s 14 points of quality and their relationship with the construction projects

2. Professional Practices & Procedures
   2.1 Introduction of the construction industry
   2.2 Description of the various professions involved and their interrelationship with civil technology and quantity survey
   2.3 Explanation of the concepts and objects of existence of various related professional institutions
   2.4 Determination of duties of various parties involved in pre contract and post contract procedure
   2.5 The explanation of process of examination membership, conditions / procedures of the professional controlling institutions
   2.6 What is the importance of the advice given by a professional quantity survey
   2.7 State the duties of engineer working at different positions / organizations
   2.8 The role of PEC need to be introduced and recent development in PEC affecting the construction industry
   2.9 Introduction of PPRA, rules and regulations for procurement.

3. Project Life Cycle
   3.1 Explanation different phases of a project starting from need & initiations till the completions and documentary closure
   3.2 What all documents involved in each phase and their importance.
3.3 The knowledge of a professional quantity survey is very important, which should cover the whole some picture of the project life cycle.

3.4 Tendering procedure is very important in a project. All documentary necessities required to be fully understood and actions required to be taken at each step

**List of Practicles**

<p>| | |</p>
<table>
<thead>
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<tr>
<td>1</td>
<td>Application of quality control key features in a given project.</td>
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<td>Visit the web site of PEC and PPRA and its usage for construction works.</td>
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<td>Preparation of a Bid package.</td>
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<tr>
<td>4</td>
<td>Drafting of a contract agreement.</td>
</tr>
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</table>

**Reference Books**

2. Project Management By Shaikh Asif
4. Project management by shaihk asif
### Course Contents

**1. Contract Law**
- 1.1 Agreement
- 1.2 Contracts
- 1.3 Typical Contracts & Types of Contract

**2. Introduction**
- 2.1 Contractors Prime Responsibilities under FIDIC

**3. Risk Allocation**
- 3.1 Indemnities under FIDIC Conditions
  - 3.1.1 Employer indemnifies the contractor
  - 3.1.2 Contractor indemnifies the employer
  - 3.1.3 Contractor and employer indemnifies each other
- 3.2 Sub Contractors
- 3.3 Temporary work
- 3.4 Clearing, Grubbing & Strapping of site
- 3.5 Rate analysis
- 3.6 Tendered Price
- 3.7 Remedies in FIDIC
  - 3.7.1 Remedies available to the contractor
  - 3.7.2 Remedies available to the employer
  - 3.7.3 Release from performance
- 3.8 Performance on Day work Basis
- 3.9 Provisional Sums and Prime costs
- 3.10 Claim Procedure
Selected Topic In FIDIC

1. Employer’s Assistance 2 Hours
   1.1 Mobilization Advance
   1.2 Secured advance on materials brought to site

2. Engineer Authority

3. Engineer’s Certificate 4 Hours
   3.1 Payment certificate
   3.2 Taking over certificate
   3.3 Defect Liability Certificate
   3.4 Contractor’s Default Certificate

4. Engineer’s valuation 2 Hours
   4.1 Valuation scheme-varied work
   4.2 Scheme of valuation

5. Cost & Time Compensation 4 Hours
   5.1 Money only
   5.2 Time only
   5.3 Money & Time only
   5.4 Set-off against the contractor
   5.5 Turning the store in favor or against the contractor
   5.6 Works not to be paid

6. Payment Scheme Under FIDIC 4 Hours
   6.1 Reimbursement
   6.2 On account payments
   6.3 Payment from provisional funds
   6.4 Payment to nominated sub contractor
   6.5 Payment during usual course of work
   6.6 Payment after contractor expulsion from site

7. Notices under FIDIC 3 Hours
   7.1 Necessary Notifications
   7.2 Essential notice of intention

8. Testing of materials

9. Price Adjustment 4 Hours
   9.1 Compensatory arrangements under law
4.9.2 Fluctuation in cost
4.9.3 Compensation under clause 70
4.9.4 Additional cost
4.9.5 Price adjustment formula

4.10 Substantial Completion and taking over certificate
4.11 Suspension of works

5. Local law applicable to FIDIC Provisions 2 Hours

5.1 Arbitration procedure & practice

6. Introduction to Supplementary / Special Conditions of Contract (PEC) by Laws 12 Hours

6.1 Commencement and Compilation of Work
6.2 Liquidated Damages
6.3 Contract Drawings & Specification
6.4 Variation in Estimated Quantity
6.5 Water
6.6 Damage to Work
6.7 Scheduling and Determination of Progress
6.8 Testing
6.9 Use of Local Roads and Street
6.10 Payment
6.11 Performance of Work by Contractor
6.12 Inspection & Testing

Instructional Objectives
1. What is an agreement, when agreement is made – a simplest form
2. What a contract, how it is made whether a contract is legal or illegal.
3. The types of contract and how they are different from each other.
4. Numerate the responsibilities of contractor under the FIDC.
5. What indemnities are offered by FIDIC to employer and contractor and risk are attached with work. What are the remedies provided in FIDIC.
6. Who employer assist the contractor by providing mobilization advance and secured advance.
7. What is the meaning of engineer authority how it is executed.
8. What are the certificates issued by “The Engineer”.

9. How “the engineer” valuate the work and its associated rule.
10. What is the ruling of FIDIC for time and compensation.
11. What is the payment scheme under FIDIC.
12. The Notices issued by the “The Engineer”
13. Law applicable to testing of material
14. Price adjustment under the law
15. What is substantial completions and taking over certificate in law
16. When the work is suspended and its legal implications
17. What is an arbitration and its procedure and its importance under the law
18. Explanation of different supplementary / special conditions of contract drafted by PEC

Reference Book
1. FIDIC general conditions by Sajid Ali Qureshi.
2. Supplemental / special conditions of contract (PEC)
3. Contract law by Sajid Ali Qureshi
DAE IN ADVANCE QUANTITY SURVEY FIELDS
YEAR 3
QUANTITY SURVEY PROJECTS

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1. Preparation of Contract Documents for Residential/nonresidential buildings

2. Preparation of Contract Documents for Sewerage System of Colonies (Minimum 250 Houses)


4. Preparation of Contract Documents for Road Min 5 Km length including protective works like Culverts, Wing Walls, Retaining Wall and Drain.
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# LIST OF DRAFTING TOOLS

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# LIST OF COMPUTER ITEMS

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EMPLOYABILITY OF PASS-OUTS

The pass-outs of this course can find job / employment opportunities in the following sector / areas:

1. Industry (all types)
2. Hospitals
3. Railways
4. Technical Institution as instructors/Sub instructors
5. Self employment
6. Establishments such as:
   a. WAPDA
   b. PAEC
   c. SPD
   d. Capital Development Authority
   e. Rawalpindi Development Authority
   f. National Highway Authority
   g. Frontier Works Organization
   h. Civil Works Organization
   j. Consulting firms & civil works
   k. Railway Department
   l. Sui Gas Department
   m. Public Health Department
   n. Irrigation Department
   o. Overseas Construction Companies
   p. Pakistan Construction Companies
   q. Civil Aviation Department
   r. Estate and property business holder, etc.