PUNJAB BOARD OF TECHNICAL EDUCATION

21-A, Kashmir Block Allama Iqbal Town, Lahore

www.pbte.edu.pk R&D Section Tel # 042-99260273

SAY NO TO CORRUPTION

No PBTE/R&D/2024/624 Dated:- 26-08-25

NOTIFICATION

In pursuance of NAVTTC Notification No. DG(SS&C)/DAE/2024 dated 25-07-2025, it is notified that the following old courses of DAE (3 years) have been repealed and replaced with revised courses in respective fields of technology as detailed below:

i- Diploma of Associate Engineer in Mechanical Technology (Power) with specialization in Auto & Farm Machinery (3 Years).
ii- Diploma of Associate Engineer in Architecture Technology (3 Years).
iii- Diploma of Associate Engineer in Food Processing and Preservation Technology (3 Years).
iv- Diploma of Associate Engineer in Electronics Technology (3 Years).
v- Diploma of Associate Engineer in Telecommunication Technology (3 Years).

The implementation of said revised technologies shall be effective on the students who shall be registered from academic session 2025-26 and onward. Punjab Board of Technical Education, Lahore shall conduct the examinations of the said revised technologies w.e.f. 1st Annual Examination 2026 and onwards accordingly. However, the candidates enrolled in the previous versions of the aforesaid DAE technologies will avail the prescribed chances under the old curricula. Soft copy of the revised curricula of the aforesaid technologies may be downloaded from the website of PBTE i.e. www.pbte.edu.pk/textbooks.html

SECRETARY

CC To

1- PA to Chairperson, PBTE, Lahore.
2- PA to DG Academics, TEVTA, Lahore.
3- PA to DG Operations, TEVTA, Lahore.
4- PA to Secretary, PBTE, Lahore.
5- PA to Controller of Examinations, PBTE, Lahore.
6- The Principals concerned.
7- Deputy Controller of Examinations (Conduct), PBTE, Lahore.
8- Deputy Controller of Examinations (Secrecy), PBTE, Lahore.
9- System Analyst, PBTE Lahore.
10- Assistant Controller of Examinations (Technical), PBTE, Lahore.
11- Assistant Controller of Examinations (Secrecy), PBTE, Lahore.
12- Assistant Controller of Examinations (P&P-I), PBTE, Lahore.
13- Assistant Controller of Examinations (P&P- II), PBTE, Lahore.
14- Web Administrator, PBTE Lahore to upload on Board Website.
15- In-Charge P&S Section, PBTE, Lahore.
16- In-Charge Operation Wing, PBTE Lahore.

THREE (03) YEARS CURRICULUM DAE ARCHITECTURE TECHNOLOGY

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DESCRIPTION	PAGE NO
SCHEME OF STUDIES (ARCHITECTURE TECHNOLOGY)	
CURRICULUM DAE 1st YEAR	
CURRICULUM DAE 2nd YEAR	
CURRICULUM DAE 3rd YEAR	

ARCHITECTURE TECHNOLOGY

Revised Scheme of Studies, March-2025

1st Year

Subject Code	Course Title	T	P	C
Gen 111	Islamiat and Pakistan Studies	1	0	1
TTQ/Civics-111	Tarjuma-tul Quran / Civics-I	1	0	1
Eng 112	English	2	0	2
Math 113	Applied Mathematics-I	3	0	3
Phy 122	Applied Physics	1	3	2
Ch-112	Applied Chemistry	1	3	2
MGM-111	Professional Communication Skills	0	3	1
ArchT-112	Introduction to Architecture	1	3	2
ArchT-123	Architectural Graphics	0	9	3
ArchT-133	Building Materials and Construction-I	2	3	3
ArchT-143	Computer-Aided Drafting and Presentation-I	1	6	3
	Total	**13**	**30**	**23**

2nd Year

Subject Code	Course Title	T	P	C
GEN-201	Islamiat and Pakistan Studies	1	0	1
TTQ/Civics-211	Tarjuma-tul Quran/ Civics-II	1	0	1
MATH-212	Applied Mathematics-II	2	0	2
ArchT-212	Environmental Studies-I	2	0	2
ArchT-223	Structural Mechanics and R.C.C Design	2	3	3
ArchT-233	Architectural Drawing and Design-I	0	9	3
ArchT-242	Computer-Aided Drafting and Presentation-II	0	6	2
ArchT-253	Building Materials and Construction-II	2	3	3
ArchT-262	History of Architecture	2	0	2
ArchT-274	Surveying and Leveling	2	6	4
	Total	**14**	**27**	**23**

3rd Year

Subject Code	Course Title	T	P	C
Gen 301	Islamiat / Pakistan Studies	1	0	1
ArchT-312	Environmental Studies-II	2	0	2
ArchT-323	Architectural Drawing and Design-II	0	9	3
ArchT-332	Model Making	0	6	2
ArchT-343	Specification and Estimation	2	3	3
ArchT-353	Building Materials and Construction-III	2	3	3
ArchT-362	Construction Management and Safety Practices	2	0	2
ArchT-373	Computer-Aided Drafting and Presentation-III	0	9	3
MGM-381	Entrepreneurship	1	0	1
Total		**10**	**30**	**20**

CURRICULUM
DAE 1st YEAR
ARCHITECTURE
TECHNOLOGY

اسلامیات/مطالعہ پاکستان

		ٹی	پی	سی
حصہ اول اسلامیات	GEN III			
حصہ دوم مطالعہ پاکستان		1	0	1
موضوعات حصہ اول اسلامیات	سال اول	کل وقت: 20 گھنٹے		

کتاب و سنت

(ا) قرآن مجید

-1 تعارف قرآن مجید 2- نزول قرآن 3- مکی و مدنی سورتوں کی خصوصیات 4- وحی کی اقسام 5- پندرہ منتخب آیات مع ترجمہ

1.1 تنالو البر حتی تنفقوا مما تحبون
1.2 واعتصموا بحبل اللّٰہ جمیعا" ولا تفرقو
1.3 ولا یجرمنکم شنان قوم علی ان لا تعدلوا
1.4 ان اللّٰہ یامرکم ان تودوا الامانات الی اھلھا
1.5 ان اللّٰہ یامر بالعدل والاحسان
1.6 ان الصلوتہ تنھی عن الفحشاء والمنکر
1.7 لقد کان لکم فی رسول اللّٰہ سوۃ حسنتہ
1.8 ان اکرمکم عند اللّٰہ اتقاکم
1.9 وما آتاکم الرسول فخرزوو مانھی عنھوانتھوا
1.10 ولوفو بالعھد
1.11 وماشروھن بالمعروف
1.12 یمحق اللّٰہ الربوویر بی الصمدقات
1.13 واصبر علی ما اصابک
1.14 وقولو قولا سدیدا
1.15 ان الدین عند اللّٰہ السلام

(ب) سنت

-1 سنت کی اہمیت
-2 دس منتخب احادیث مع ترجمہ و تشریح

1- انما الاعمال بالنیات

2- انما بعثت لاتمم مکارم الاخلاق

3- لا یومن احدکم حتی یحب لاخیہ ما یحب لنفسہ

4- المسلم من سلم المسلمون من لسانہ ویدہ

5- قل امنت باللہ ثم استقم

6- خیرکم خیرکم لاہلہ

7- سباب المسلم فسوق وقتالہ کفر

8- المومن اخو المومن

9- کل المسلم علی المسلم حرام دمہ وعرضہ ومالہ

10- ایتہ المنافق ثلاث اذا حدیث کذب واذا اوتمن خان واذا وعد اخلف

دین اسلام

2.1 اسلام کے بنیادی مقاصد کی وضاحت اور انسان کی انفرادی و اجتماعی زندگی پر ان کے اثرات

1- توحید

2- رسالت

3- آخرت

4- ملائکہ

5- آسمانی کتب

2.2 عبادات

1- نماز 2- روزہ 3- حج 4- زکوٰۃ

مندرجہ بالا عبادات کی اہمیت و فضیلت، مکمل اور انسان کی انفرادی و معاشرتی زندگی پر اس کے اثرات

حصہ اول

حصہ اسلامیات

تدریسی مقاصد

۱۔ قرآن مجید

عمومی مقصد: طالب علم یہ سمجھنے کے قابل ہو کہ اسلام کی تعلیمات کا اصل سرچشمہ قرآن مجید ہے

خصوصی مقاصد: طالب علم اس قابل ہو جائے گا کہ

☆ قرآن مجید کی تعریف کر سکے گا

☆ قرآن مجید کے نزول کی صورت بیان کر سکے

☆ قرآن مجید کی کی دس مدنی سورتوں کی پہچان کر سکے

☆ منتخب آیات کا ترجمہ و تشریح کر سکے

عمومی مقصد: یہ سمجھنے کے قابل ہو جائے گا کہ منتخب قرآنی آیات کے ذریعے اسلامی تعلیمات کا مفہوم کیا ہے

☆ قرآنی آیات کا ترجمہ تشریح کر سکے

☆ قرآنی تعلیمات کی روشنی میں اپنی اور معاشرتی اصلاح کر سکے

2۔ سنت

عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت کو اچھی طرح سمجھنے کے قابل ہو جائے گا

خصوصی مقصد:

☆ سنت کی تعریف بیان کر سکے

☆ سنت کی اہمیت و ضرورت کی وضاحت کر سکے

☆ سنت کی روشنی میں اسوہ حسنہ پر عمل کر سکے

3۔ منتخب احادیث نبویہ

عمومی مقصد: احادیث کی روشنی میں اخلاقی اقدار سے آگاہی حاصل کر سکے

خصوصی مقصد: احادیث کا ترجمہ و تشریح کر سکے

رسول اللہ ﷺ کے اسوۂ حسنہ کی پیروی کا جذبہ پیدا ہو سکے

دین اسلام

عمومی مقاصد: دین اسلام کے بنیادی مقاصد اور عبادات کے بارے میں جان سکے اور بیان کر سکے

خصوصی مقاصد

لفظ دین اسلام کے لغوی اور اصطلاحی معنی بیان کر سکے

اسلام کے بنیادی مقاصد کی اہمیت بیان کر سکے

اسلام کے بنیادی مقاصد سے انسان کی انفرادی و اجتماعی زندگی پر پڑنے والے اثرات بیان کر سکے

عبادت کے لغظی و اصطلاحی معنی بیان کر سکے

عقیدے اور عبادت کا فرق بیان کر سکے

عبادات (نماز، روزہ، حج، زکواۃ) کے فوری، اخلاقی اور انسانی زندگی پر ان کی اثرات بیان کر سکے

اسلامی مقاصد و عبادات کے مطابق اپنی زندگی ڈھال کر ایک اچھا مسلمان بن سکے

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات سال اول — GEN 101

حصہ دوم مطالعہ پاکستان

ک	ع	ت
1	0	1

کل وقت - 20 گھنٹے

موضوعات

اخلاقیات کی تعریف اور اہمیت

اخلاقیات کا معیار (قانون، عقل، الہامی کتب)

مندرجہ ذیل اخلاق کی وضاحت

- ☆ دیانت داری
- ☆ وعدہ داری
- ☆ نظم و ضبط
- ☆ راست گوئی
- ☆ صبر و استقلال
- ☆ حوصلہ مندی
- ☆ وقت کی پابندی
- ☆ صفائی
- ☆ ایثار
- ☆ باہمی احترام
- ☆ مصلحت

تدریسی مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے ملکی ترقی میں قابل قدر اضافہ کر سکے

خصوصی مقاصد: طالب اس علم سے اس قابل ہو گا کہ

- ☆ موضوعات کا مطلب بیان کر سکے
- ☆ عملی زندگی سے مثالوں کی نشاندہی کر سکے
- ☆ اپنی شخصیت اور معاشرے پر موضوعات کے مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے
- ☆ وراثت داری کی اہمیت بیان کر سکے
- ☆ وفاداری کی اہمیت بیان کر سکے
- ☆ نظم و ضبط کی افادیت بیان کر سکے
- ☆ صدق بیان کی ضرورت بیان کر سکے
- ☆ حوصلہ مندی کے فوائد بیان کر سکے
- ☆ وقت کی پابندی کے فوائد بیان کر سکے
- ☆ صفائی اور باہمی اختیار سے حسن کارکردگی کو بیان کر سکے
- ☆ مصلحت کے فوائد بیان کر سکے

نصاب (سال اول) Gen III

حصہ دوئم　　مطالعہ پاکستان　　کل وقت 12 گھنٹے

موضوعات

☆ حریت فکر: مسلمان قوم میں آزادی فکر کی تاریخ۔ مسلمانوں میں سیاسی آزادی کی اہمیت اور ضرورت - ذاتی، جماعتی غلامی کے نقصانات

☆ نظریہ پاکستان

قیام پاکستان کی اساس (دین اسلام) قیام پاکستان کی غرض و غایت نظریہ پاکستان کی وضاحت۔ نظریہ پاکستان اور مسلم اقبال اور قائداعظم کے ارشادات کی روشنی میں

☆ نظریہ پاکستان کا تاریخی پس منظر

محمد بن قاسم کی آمد۔ مجدد الف ثانی اور شاہ ولی اللہ کی تبلیغی خدمات سید احمد شہید کی تحریک مجاہدین

☆ اصلاحی تحریکیں

علی گڑھ - ندوۃ العلماء (لکھنؤ - مدرسۃ الاسلام - (کراچی) اسلامیہ کالج (پشاور) انجمن حمایت اسلام (لاہور)

مطالعہ پاکستان (حصہ دوئم)

تدریسی مقاصد

حریت فکر:

عمومی مقصد

طالب علم یہ جان لے کہ اسلام میں اور مسلمان قوم میں آزادی فکر کی کیا اہمیت ہے

خصوصی مقاصد

☆ حریت فکر کا معنی و مفہوم بیان کر سکے

☆ آزادی فکر کی اہمیت بیان کر سکے

☆ خصوصاً اسلام میں آزادی اظہار رائے کی اہمیت بیان کر سکے

☆ ذہنی غلامی کے قومی سطح پر نقصانات بیان کر سکے

☆ جسمانی غلامی قومی سطح پر نقصانات بیان کر سکے

نظریہ پاکستان

عمومی مقصد:

نظریہ پاکستان (دین اسلام) سے پوری طرح واقفیت ہو جائے

خصوصی مقاصد:

☆ نظریہ کی تعریف بیان کر سکے اور اس کی وضاحت کر سکے

☆ نظریہ پاکستان کی تعریف کر سکے اور اس کا مفہوم بیان کر سکے

☆ علامہ اقبال اور قائداعظم کے فرمودات کی روشنی میں نظریہ پاکستان بیان کر سکے

نظریہ پاکستان کا تاریخی پہلو

عمومی مقصد

☆ نظریہ پاکستان کے تاریخی پس منظر سے واقفیت حاصل کر سکے

خصوصی مقاصد:

☆ محمد بن قاسم کے بارے میں بیان کر سکے

- محمد بن قاسم کے ہندوستان پر حملہ کی وجہ بیان کر سکے
- محمد بن قاسم کے ہندوستان پر حملہ کے اثرات بیان کر سکے
- بیان کر سکے کہ ہندوستان میں ہندو مسلم دو قومی نظریہ کا نکتہ آغاز کیا ہے
- مجدد الف ثانی کی علمی خدمات بیان کر سکے
- شاہ ولی اللہ کی علمی خدمات بیان کر سکے
- مجدد الف ثانی اور شاہ ولی اللہ نے جو تبلیغ دین اور مسلمانوں میں سیاسی شعور پیدا کیا اسے بیان کر سکے

علمی تحریکیں

عمومی مقصد

- برصغیر کی علمی تحریکوں سے آگاہی حاصل ہو سکے

خصوصی مقاصد:

- علی گڑھ - دیوبند - ندوۃ العلماء مدرسۃ السلام ، اسلامیہ کالج۔ انجمن حمایت اسلام نے تعلیم کے ذریعہ سیاسی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے
- آزادی ہند کے سلسلہ میں تحریک مجاہدین کی خدمات بیان کر سکے

TTQ-111 / Civic-111;

Tarjumat-ul-Quran / Civics

T	P	C
1	0	1

Total Contact Hours:

Theory: 32

Practical: 0

Note: Syllabi for these subject would be as per BISEs / General education, developed by Punjab Curriculum TextBook Board (PCTB)

Eng-112 ENGLISH

Total contact hours:	**64 Hrs**	**T**	**P**	**C**
Theory:	**64 Hrs**	**2**	**0**	**2**
Practical	**0 Hrs**			

LEARNING OUTCOMES: At the end of the course, the students will be equipped with cognitive skill to enable them to present facts in a systematic and logical manner to meet the language demands of dynamic field of commerce and industry for functional day-to-day use and will inculcate skills of reading, writing and comprehension.

COURSE CONTENTS

ENGLISH PAPER "A"

1 PROSE/TEXT 16 Hrs

1.1 First eight essays of Intermediate English Book-II

2 CLOZE TEST 4 Hrs

2.1 A passage comprising 50-100 words will be selected from the text. Every 11th word or any word for that matter will be omitted. The number of missing words will range between 5-10. The chosen word may or may not be the one used in the text, but it should be an appropriate word.

ENGLISH PAPER "B"

1. GRAMMAR 26 Hrs

1.1 Sentence Structure.
1.2 Tenses.
1.3 Parts of speech.
1.4 Punctuation.
1.5 Change of Narration.
1.6 One word for several
1.7 Words often confused

2. COMPOSITION 12 Hrs

2.1 Letters/Messages
2.2 Job application letter
2.3 For character certificate/for grant of scholarship
2.4 Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles
2.5 Essay writing
2.6 Technical Education, Science and Our life, Computers, Environmental Pollution, Duties of a Student.

3. TRANSLATION 6 Hrs

3.1 Translation from Urdu into English.
3.2 For Foreign Students: A paragraph or a dialogue.

RECOMMENDED BOOKS

Technical English developed by Mr. Zia Sarwar, Mr. Habib-ur –Rehman, Evaluated by Mr.Zafar Iqbal Khokhar, Mr. Zahid Zahoor, Vol - I, National Book Foundation

Eng-112 ENGLISH

INSTRUCTIONAL OBJECTIVES

PAPER-A

1. DEMONSTRATE BETTER READING, COMPREHENSION AND VOCABULARY

1.1 Manipulate, skimming and scanning of the text.
1.2 Identify new ideas.
1.3 Reproduce facts, characters in own words
1.4 Write summary of stories

2. UNDERSTAND FACTS OF THE TEXT

2.1 Rewrite words to fill in the blanks recalling the text.
2.2 Use own words to fill in the blanks.

PAPER-B

3. APPLY THE RULES OF GRAMMAR IN WRITING AND SPEAKING

3.1 Use rules of grammar to construct meaningful sentences containing a subject and a predicate.
3.2 State classification of time, i.e present, past and future and use verb tense correctly in different forms to denote relevant time.
3.3 Identify function words and content words.
3.4 Use marks of punctuation to make sense clear.
3.5 Relate what a person says in direct and indirect forms.
3.6 Compose his writings.
3.7 Distinguish between confusing words.

4. APPLY THE CONCEPTS OF COMPOSITION WRITING TO PRACTICAL SITUATIONS

4.1 Use concept to construct applications for employment, for character certificate, for grant of scholarship.
4.2 Define and write telegrams, cablegrams and radiograms, telexes, facsimiles
4.3 Describe steps of a good composition writing.
4.4 Describe features of a good composition.
4.5 Describe methods of composition writing
4.6 Use these concepts to organize facts and describe them systematically in practical situation.

5. APPLIES RULES OF TRANSLATION

5.1 Describe confusion.
5.2 Describe rules of translation.
5.3 Use rules of translation from Urdu to English in simple paragraph and sentences.

Math-113 APPLIED MATHEMATICS

Total contact hours:	**96 Hrs**	**T**	**P**	**C**
Theory:	**96Hrs**	**3**	**0**	**3**

LEARNING OUTCOMES: After completing the course the students will be able to

1. Solve problems of Algebra, Trigonometry, vectors. Menstruation, Matrices and Determinants.
2. Develop skill, mathematical attitudes and logical perception in the use of mathematical instruments as required in the technological fields.
3. Acquire mathematical clarity and insight in the solution of technical problems.

COURSE CONTENTS

1.	**QUADRATIC EQUATIONS**	**6 Hrs**
1.1	Standard Form	
1.2	Solution	
1.3	Nature of roots	
1.4	Sum & Product of roots	
1.5	Formation	
1.6	Problems	
2.	**ARITHMETIC PROGRESSION AND SERIES**	**3Hrs**
2.1	Sequence	
2.2	Series	
2.3	nth term	
2.4	Sum of the first n terms	
2.5	Means	
2.6	Problems	
3.	**GEOMETRIC PROGRESSION AND SERIES**	**3Hrs**
3.1	nth term	
3.2	sum of the first n terms	
3.3	Means	
3.4	Infinite Geometric progression	
3.5	Problems	
4.	**BINOMIAL THEOREM**	**6 Hrs**
4.1	Factorials	
4.2	Binomial Expression	
4.3	Binomial Co-efficient	
4.4	Statement	
4.5	The General Term	
4.6	The Binomial Series.	
4.7	Problems	
5.	**PARTIAL FRACTIONS**	**6 Hrs**
5.1	Introduction	
5.2	Linear Distinct Factors Case I	
5.3	Linear Repeated FactorsCase II	
5.4	Quadratic Distinct Factors Case III	
5.5	Quadratic Repeated Factors Case IV	

5.6 Problems

6. FUNDAMENTALS OF TRIGONOMETRY 6 Hrs

6.1 Angles
6.2 Quadrants
6.3 Measurements of Angles
6.4 Relation between Sexagesimal & circular system
6.5 Relation between Length of a Circular Arc & the Radian Measure of its central angle
6.6 Problems

7. TRIGONOMETRIC FUNCTIONS AND RATIOS 6 Hrs

7.1 Trigonometric functions of any angle
7.2 Signs of trigonometric Functions
7.3 Trigonometric Ratios of particular Angles
7.4 Fundamental Identities
7.5 Problems

8. GENERAL INDENTITIES 6 Hrs

8.1 The Fundamental Law
8.2 Deductions
8.3 Sum & Difference Formulae
8.4 Double Angle Identities
8.5 Half Angle Identities
8.6 Conversion of sum or difference to products
8.7 Problems

9. SOLUTION OF TRIANGLES 6 Hrs

9.1 The law of Sines
9.2 The law of Cosines
9.3 Measurement of Heights & Distances
9.4 Problems

10. MENSURATION OF SOLIDS 30 Hrs

10.1 Review of regular plane figures and Simpson's Rule
10.2 Prisms
10.3 Cylinders
10.4 Pyramids
10.5 Cones
10.6 Frusta
10.7 Spheres

11. VECTORS 9 Hrs

11.1 Sealers & Vectors
11.2 Addition & Subtraction
11.3 The unit Vectors I, j, k
11.4 Direction Cosines
11.5 Sealer or Dot Product
11.6 Deductions
11.7 Dot product in terms of orthogonal components
11.8 Deductions
11.9 Analytic Expression for a x b.
11.10 Problems.

12. MATRICES AND DETERMINANTS 9 Hrs

12.1 Definition of Matrix
12.2 Rows & Columns
12.3 Order of a Matrix
12.4 Algebra of Matrices
12.5 Determinants
12.6 Properties of Determinants
12.7 Solution of Linear Equations
12.8 Problems

RECOMMENDED BOOKS

Applied Mathematics Math-113, Developed by Nasir -ud-Din Mahmood, Sana-ullah Khan, Tahir Hameed, Evaluated by Syed Tanvir Haider, Javed Iqbal, Vol - I, National Book Foundation

Math-113 APPLIED MATHEMATICS

INSTRUCTIONAL OBJECTIVES

1 USE DIFFERENT METHODS FOR THE SOLUTION OF QUADRATIC EQUATIONS

1.1 Define a standard quadratic equation.
1.2 Use methods of factorization and method of completing the square for solving the equations.
1.3 Derive quadratic formula.
1.4 Write expression for the discriminant
1.5 Explain nature of the roots of a quadratic equation.
1.6 Calculate sum and product of the roots.
1.7 Form a quadratic equation from the given roots.
1.8 Solve problems involving quadratic equations.

2 UNDERSTAND APPLY CONCEPT OF ARITHMETIC PROGRESSION AND SERIES

2.1 Define an Arithmetic sequence and a series
2.2 Derive formula for the nth term of an A.P.
2.3 Explain Arithmetic Mean between two given numbers
2.4 Insert n Arithmetic means between two numbers
2.5 Derive formulas for summation of an Arithmetic series
2.6 Solve problems on Arithmetic Progression and Series

3 UNDERSTAND GEOMETRIC PROGRESSION AND SERIES

3.1 Define a geometric sequence and a series.
3.2 Derive formula for nth term of a G.P.
3.3 Explain geometric mean between two numbers.
3.4 Insert n geometric means between two numbers.
3.5 Derive a formula for the summation of geometric Series.
3.6 Deduce a formula for the summation of an infinite G.P.
3.7 Solve problems using these formulas.

4 EXPAND AND EXTRACT ROOTS OF A BINOMIAL

4.1 State binomial theorem for positive integral index.
4.2 Explain binomial coefficients: (n,0), (n,1)……..(n,r),…….(n,n)
4.3 Derive expression for the general term.
4.4 Calculate the specified terms.
4.5 Expand a binomial of a given index. -
4.6 Extract the specified roots
4.7 Compute the approximate value to a given decimal place.
4.8 Solve problems involving binomials.

5 RESOLVE A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS.

5.1 Define a partial fraction, a proper and an improper fraction.
5.2 Explain all the four types of partial fractions.
5.3 Set up equivalent partial fractions for each type.
5.4 Explain the methods for finding constants involved.
5.5 Resolve a single fraction into partial fractions.
5.6 Solve problems involving all the four types.

6 UNDERSTAND SYSTEMS OF MEASUREMENT OF ANGLES.

6.1 Define angles and the related terms.
6.2 Illustrate the generation of angle.

6.3 Explain sexagesimal and circular systems for the measurement of angles
6.4 Derive the relationship between radian and degree.
6.5 Convert radians to degrees and vice versa.
6.6 Derive a formula for the circular measure of a central angle.
6.7 Use this formula for solving problems.

7 APPLY BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS

7.1 Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.
7.2 Derive fundamental identities.
7.3 Find trigonometric ratios of particular angles.
7.4 Draw the graph of trigonometric functions.
7.5 Solve problems involving trigonometric functions.

8 USE TRIGONOMETRIC IDENTITIES IN SOLVING ECHNOLOGICAL PROBLEMS

8.1 List fundamental identities
8.2 Prove the fundamental law
8.3 Deduce important results
8.4 Derive-sum and difference formulas
8.5 Establish half angle, double angle & triple angle formulas
8.6 Convert sum or difference into product& vice versa
8.7 Solve problems

9 USE CONCEPTS, PROPERTIES AND LAWS OF TRIGONOMETRIC FUNCTIONS FOR SOLVING TRIANGLES

9.1 Define angle of elevation and angle of depression.
9.2 Prove the law of sins and the law of cosines.
9.3 Explain elements of a triangle.
9.4 Solve triangles and the problems involving heights and distances.

10 USE PRINCIPLES OF MENSTRUATION IN FINDING SURFACES, VOLUME AND WEIGHTS OF SOLIDS.

10.1 Define menstruation of plane and solid figures
10.2 List formulas for perimeters & areas of plane figure.
10.3 Define pyramid and cone.
10.4 Define frusta of pyramid and cone.
10.5 Define a sphere and a shell.
10.6 Calculate the total surface and volume of each type of solid.
10.7 Compute weight of solids.
10.8 Solve problems of these solids.

11 USE THE CONCEPT AND PRINCIPLES OF VECTORS IN SOLVING TECHNOLOGICAL PROBLEMS.

11.1 Define vector quantity.
11.2 Explain addition and subtraction of vector
11.3 Illustrate unit vectors I, j, k.
11.4 Express a vector in the component form.
11.5 Explain magnitude, unit vector, direction cosines of a vector.
11.6 Derive analytic expression for dot product and cross product of two vector.
11.7 Deduce conditions of perpendicularly and parallelism of two vectors.
11.8 Solve problems

12 USE THE CONCEPT OFMATRICES & DETERMINANTS IN SOLVING TECHNOLOGICAL PROBLEMS

12.1 Define a matrix and a determinant.
12.2 List types of matrices.
12.3 Define transpose, ad joint and inverse of a matrix.
12.4 State properties of determinants.
12.5 Explain basic concepts.
12.6 Explain algebra of matrices.
12.7 Solve linear equation by matrices.
12.8 Explain the solution of a determinant.
12.9 Use Crammers Rule for solving linear equations

CH – 112 APPLIED CHEMISTRY

Total contact hours:	**128 Hrs**	**T**	**P**	**C**
Theory:	**32 Hrs**	**1**	**3**	**2**
Practical	**96 Hrs**			

LEARNING OUTCOMES: After studying this course a student will be able to:

1. Understand the significance and role of chemistry in the development of modern technology
2. Become acquired with the basic principles of chemistry as applied in the study of relevant technology.
3. Know the scientific methods for production, and use of materials of industrial & technological significance.
4. Gains skill for the efficient conduct of Practical in a chemistry lab.

COURSE CONTENTS

1.	**INTRODUCTION AND FUNDAMENTAL CONCEPTS**	**2 Hrs**
1.1.	Orientation with reference to this technology	
1.2.	Terms used & units of measurements in the study of chemistry	
1.3.	Chemical reactions & their types	
2.	**ATOMIC STRUCTURE**	**2 Hrs**
2.1	Sub atomic particles	
2.2	Architecture of atoms of elements. Atomic no. & atomic weight	
2.3	The periodic classification of elements periodic law	
2.4	General characteristics of a period and group	
3.	**CHEMICAL BOND**	**2 Hrs**
3.1.	Nature of chemical bond	
3.2.	Electrovalent bond with examples	
3.3.	Covalent bond (polar and non-polar, sigma & pie bonds with examples)	
3.4.	Co-ordinate bond with examples	
4.	**WATER**	**2 Hrs**
4.1.	Chemical nature and properties	
4.2.	Impurities	
4.3.	Hardness of water (types, causes and removal)	
4.4.	Scales of measuring hardness (degrees Clark French, PPM, Mg- per liter)	
4.5.	Boiler feed water, scales and treatment	
4.6.	Sea water desalination, sewage treatment	
5.	**ACIDS, BASES AND SALTS**	**2 Hrs**
5.1.	Definitions with examples	
5.2.	Properties, their strength, basicity and acidity	
5.3.	Salts and their classification with examples	
5.4.	Ph – value and scale	
6.	**OXIDATION & REDUCTION**	**2 Hrs**
6.1.	The process, definition and examples	
6.2.	Oxidizing and reducing agents	
6.3.	Oxides and their classifications	
7.	**NUCLEAR CHEMISTRY**	**2 Hrs**

7.1.	Introduction	
7.2.	Radioactivity (alpha, beta and gamma rays)	
7.3.	Half-life process	
7.4.	Nuclear reaction and transformation of elements	
8.	**CEMENT**	**2 Hrs**
8.1.	Introduction	
8.2.	Composition and manufacture	
8.3.	Chemistry of setting and hardening	
8.4.	Special purpose cements	
9.	**GLASS**	**2 Hrs**
9.1.	Composition and raw material	
9.2.	Manufacture	
9.3.	Varieties and uses	
10.	**PLASTICS AND POLYMERS**	**2 Hrs**
10.1.	Introduction and importance	
10.2.	Classification	
10.3.	Manufacture	
10.4.	Properties and uses	
11.	**PAINTS, VARNISHES AND DISTEMPER**	**2 Hrs**
11.1.	Introduction	
11.2.	Constituents	
11.3.	Preparation and use	
12.	**CORROSION**	**2 Hrs**
12.1.	Introduction with causes	
12.2.	Types of corrosion	
12.3.	Rusting of iron	
12.4.	Protective measures against corrosion	
13.	**REFRACTORY MATERIALS AND ABRASIVE**	**2 Hrs**
13.1.	Introduction to refractories	
13.2.	Classification of refractories	
13.3.	Properties and uses	
13.4.	Introduction to abrasives	
13.5.	Artificial and natural abrasives and their uses	
14.	**ALLOYS**	**2 Hrs**
14.1.	Introduction with need	
14.2.	Preparation and properties	
14.3.	Some important alloys and their composition	
14.4.	Uses	
15.	**FUELS AND COMBUSTION**	**2 Hrs**
15.1.	Introduction of fuels	
15.2.	Classification of fuels	
15.3.	Combustion	
15.4.	Numerical problems of combustion	
16.	**LUBRICANTS**	**1 Hrs**
16.1.	Introduction	
16.2.	Classification	
16.3.	Properties of lubricants	
16.4.	Selection of lubricants	

17. POLLUTION **1 Hr**

17.1. The problems and its dangers

17.2. Causes of pollution

17.3. Remedies to combat the hazards of pollution

RECOMMENDED BOOKS

Text Book of Ch-112, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

CH – 112 APPLIED CHEMISTRY

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 fundamentals 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 levels
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 CHEMICAL NATURE OF WATER

4.1. Describe the chemical nature of water with its formula
4.2. Describe the general impurities present in water
4.3. Explain the causes and methods to removing hardness of water
4.4. Express hardness in different units like mg / liter, p.p.m, degrees clark and degrees French
4.5. Describe the formation and nature of scales in boiler feed water
4.6. Explain the method for the treatment of scales
4.7. Explain the sewage treatment and desalination of sea water

5. UNDERSTAND THE NATURE OF ACIDS, BASES AND SALTS

5.1. Define acids, bases and salts with examples
5.2. State general properties of acids and bases
5.3. Differentiate between acidity and basicity and use the related terms
5.4. Define salts, state their classification with examples
5.5. Explain p-h value of solution and pH-scale

6. UNDERSTAND THE PROGRESS OF OXIDATION AND REDUCTION

6.1. Define oxidation
6.2. Explain the oxidation process with examples
6.3. Define reduction
6.4. Explain reduction process with examples
6.5. Define oxidizing and reducing agents and give at least six examples of each
6.6. Define oxides
6.7. Classify the oxides and give examples

7. UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY

7.1. Define nuclear chemistry and radioactivity
7.2. Differentiate between alpha, beta and gama particles
7.3. Explain half life process

7.4. Explain at least six nuclear reactions resulting in the transformation of some elements
7.5. State important uses of isotopes

8. UNDERSTAND THE MANUFACTURE, SETTING AND HARDENING OF CEMENT

8.1. Define Portland cement and give its composition
8.2. Describe the method of manufacture
8.3. Describe the chemistry of setting and hardening of cement
8.4. Distinguish between ordinary and special purpose cement

9. UNDERSTAND THE PROCESS OF MANUFACTURE OF GLASS

9.1. Define glass
9.2. Describe its composition and raw materials
9.3. Describe the manufacture of glass
9.4. Explain its varieties and uses

10. UNDERSTAND THE NATURE AND IMPORTANCE OF PLASTIC AND POLYMERS

10.1. Define plastics and polymers
10.2. Explain the mechanism of polymerization
10.3. Describe the preparation and uses of some plastic / polymers

11. KNOW THE CHEMISTRY OF PAINTS, VARNISHES AND DISTEMPERS

11.1. Define paints, varnishes and distemper
11.2. State composition of each
11.3. State methods of preparation of each and their uses

12. UNDERSTAND THE PROCESS OF CORROSION WITH ITS CAUSES AND TYPES

12.1. Define corrosion
12.2. Describe different types of corrosion. State the causes of corrosion
12.3. Explain the process of rusting of iron
12.4. Describe methods to prevent/ control corrosion

13. UNDERSTAND THE NATURE OF REFRACTORY MATERIALS ABRASIVE

13.1. Define refractory materials
13.2. Classify refractory materials
13.3. Describe properties and uses of refractory
13.4. Define abrasive
13.5. Classify natural and artificial abrasives
13.6. Describe uses of abrasives `

14. UNDERSTAND THE NATURE AND IMPORTANCE OF ALLOYS

14.1. Define alloy
14.2. Describe different methods for the preparation of alloys
14.3. Describe important properties of alloys
14.4. Enlist some important alloys with their composition, properties and uses

15. UNDERSTAND THE NATURE OF FUELS AND THEIR COMBUSTION

15.1. Define fuels
15.2. Classify fuels and make distinction of solid, liquid and gaseous fuels
15.3. Describe important fuels
15.4. Explain combustion
15.5. Calculate air quantities in combustion gases

16. UNDERSTAND THE NATURE OF LUBRICANTS

16.1. Define a lubricant
16.2. Explain the uses of lubricants
16.3. Classify lubricants and site examples
16.4. State important properties of oils, greases and solid lubricants

16.5. State the criteria for the selection of lubricant for particular purpose / job

17. UNDERSTAND THE NATURE OF POLLUTION

17.1. Define pollution (air, water, food)

17.2. Describe the causes of environmental pollution

17.3. Enlist some common pollutants

17.4. Explain methods to prevent pollution

CH-112: APPLIED CHEMISTRY

LIST OF PRACTICALS

96 Hrs

On completion of this course, the trainees will be able to;

1. To introduce the common apparatus, glassware and chemical reagents used in the chemistry lab.
2. To purify a chemical substance by crystallization.
3. To separate a mixture of sand and salt.
4. To find the melting point of substance.
5. To find the pH of a solution with pH paper.
6. To separate a mixture of inks by chromatography.
7. To determine the co-efficient of viscosity of benzene with the help of Ostwald's vasomotor.
8. To find the surface tension of a liquid with a stalagmometer.
9. To perform electrolysis of water to produce Hydrogen and Oxygen.
10. To determine the chemical equivalent of copper by electrolysis of Cu SO_4.
11. Determination of Heat of Neutralization of NaOH and HCl.
12. Determination of Heat of Solution of C_2H_5OH and H_2O.
13. Determination of %age of O_2 in air.
14. Determination of %age of N_2 in air.
15. Determination of %age of CO_2 in air.
16. To get introduction with the methods/apparatus of conducting volumetric estimation.
17. To prepare standard solution of a substance.
18. To find the strength of a given alkali solution.
19. To estimate HCO_3^{-1} contents in water.
20. To estimate Cl^{-1} contents in water.
21. To estimate SO_4^{-2} contents in water.
22. To estimate total solids in water.
23. To find out the %age composition of a mixture solution of KNO_3 and KOH volumetrically.
24. To find out the amount of Na_2SO_4 and NaOH in their mixture with titration method.
25. To find the boiling point of Freon-12, or R-134a and Freon-22.
26. To find the density of Freon-12, or R 134a and Freon-22 with the help of sp. gravity bottle.
27. To prepare Ammonia gas in Laboratory and perform its tests.
28. To get introduction with the scheme of analysis of salts for basic radicals.
29. To analyse Ist group radials (Ag^{+1}, Pb^{+2}, Hg^{+1}).
30. To exercise Practice for detection of Ist group radicals.
31. To detect and confirm II-A group radicals (Hg^{+2}, Pb^{+4}, Cu^{+2}, Bi^{+3}, Cd^{+2})
32. To detect and confirm II-B group radicals (AS^{+3}, Sb^{+3}, $Sn^{+2, +4}$)

Phy-122 APPLIED PHYSICS

Total Contact Hours 128 Hrs

			T	P	C
Theory	**:**	**32 Hrs**			
Practicals	**:**	**96 Hrs**	**1**	**3**	**2**

LEARNING OUTCOMES: The students will be able to understand the fundamental principles and concept of physics, use these to solve problems in practical situations/technological courses and understand concepts to learn advance physics/technical courses.

COURSE CONTENTS

1.	**MEASUREMENTS.**	**2 Hrs**
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.	**SCALARSAND VECTORS.**	**4 Hrs**
2.1.	Revision of head to tail rule	
2.2.	Laws of parallelogram, triangle and polygon of forces	
2.3.	Resolution of a vector	
2.4.	Addition of vectors by rectangular components	
2.5.	Multiplication of two vectors, dot product and cross product	
3.	**MOTION**	**4 Hrs**
3.1.	Review of laws and equations of motion	
3.2.	Law of conservation of momentum	
3.3.	Angular motion	
3.4.	Relation between linear and angular motion	
3.5.	Centripetal acceleration and force	
3.6.	Equations of angular motion	
4.	**TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA.**	**5 Hrs**
4.1.	Torque	
4.2.	Centre of gravity and centre of mass	
4.3.	Equilibrium and its conditions	
4.4.	Torque and angular acceleration	
4.5.	Rotational inertia	
5.	**WAVE MOTION.**	**4 Hrs**
5.1.	Review Hooke's law of elasticity	
5.2.	Motion under an elastic restoring force	
5.3.	Characteristics of simple harmonic motion	
5.4.	S.H.M. and circular motion	
5.5.	Simple pendulum	
5.6.	Wave form of S.H.M.	
5.7.	Resonance	
5.8.	Transverse vibration of a stretched string	

6. SOUND. 4 Hrs

6.1. Longitudinal waves
6.2. Intensity, loudness, pitch and quality of sound
6.3. Units of Intensity of level and frequency response of ear
6.4. Interference of sound waves silence zones, beats
6.5. Acoustics
6.6. Doppler effect.

7. LIGHT. 4 Hrs

7.1. Review laws of reflection and refraction
7.2. Image formation by mirrors and lenses
7.3. Optical instruments
7.4. Wave theory of light
7.5. Interference, diffraction, polarization of light waves
7.6. Applications of polarization in sunglasses, optical activity and stress analysis

8. OPTICAL FIBER. 2 Hrs

8.1. Optical communication and problems
8.2. Review total internal reflection and critical angle
8.3. Structure of optical fiber
8.4. Fiber material and manufacture
8.5. Optical fiber - uses.

9. LASERS. 3 Hrs

9.1. Corpuscular theory of light
9.2. Emission and absorption of light
9.3. Stimulated absorption and emission of light
9.4. Laser principle
9.5. Structure and working of lasers
9.6. Types of lasers with brief description.
9.7. Applications (basic concepts)
9.8. Material processing
9.9. Laser welding
9.10. Laser assisted machining
9.11. Micro machining
9.12. Drilling, scribing and marking
9.13. Printing
9.14. Lasers in medicine

RECOMMENDED BOOKS

Text Book of Phy-122, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

Phy-122 APPLIED PHYSICS

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. USE THE LAW OF CONSERVATION OF MOMENTUM AND CONCEPTS OF ANGULAR MOTION TO PRACTICAL SITUATIONS.

3.1. Use law of conservation of momentum to practical/technological problems.
3.2. Explain relation between linear and angular motion
3.3. Use concepts and equations of angular motion to solve relevant technological problems.

4. USE CONCEPTS OF TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA TO PRACTICAL SITUATION/PROBLEMS.

4.1. Explain Torque
4.2. Distinguish between Centre of gravity and centre of mass
4.3. Explain rotational Equilibrium and its conditions
4.4. Explain Rotational Inertia giving examples
4.5. Use the above concepts in solving technological problems.

5. USE CONCEPTS OF WAVE MOTION IN SOLVING RELEVANT PROBLEMS.

5.1. Explain Hooke's Law of Elasticity
5.2. Derive formula for Motion under an elastic restoring force
5.3. Derive formulae for simple harmonic motion and simple pendulum
5.4. Explain wave form with reference to S.H.M. and circular motion
5.5. Explain Resonance
5.6. Explain Transverse vibration of a stretched string
5.7. Use the above concepts and formulae of S.H.M. to solve relevant problems.

6. UNDERSTAND CONCEPTS OF SOUND.

6.1. Describe longitudinal wave and its propagation
6.2. Explain the concepts: Intensity, loudness, pitch and quality of sound
6.3. Explain units of Intensity of level and frequency response of ear
6.4. Explain phenomena of silence zones, beats
6.5. Explain Acoustics of buildings
6.6. Explain Doppler effect giving mathematical expressions.

7. USE THE CONCEPTS OF GEOMETRICAL OPTICS TO MIRRORS and LENSES.

7.1. Explain laws of reflection and refraction
7.2. Use mirror formula to solve problems

7.3. Use the concepts of image formation by mirrors and lenses to describe ing of optical instruments, e.g. microscopes, telescopes, camera and sextant.

8. UNDERSTAND WAVE THEORY OF LIGHT

8.1. Explain wave theory of light

8.2. Explain phenomena of interference, diffraction, polarization of light waves

8.3. Describe uses of polarization given in the course contents.

9. UNDERSTAND THE STRUCTURE, WORKING AND USES OF OPTICAL FIBER.

9.1. Explain the structure of the Optical Fiber

9.2. Explain its principle of working

9.3. Describe use of optical fiber in industry and medicine.

Phy-122 APPLIED PHYSICS

LIST OF PRACTICALS.

96 Hrs

1. Draw graphs representing the functions:
1.1. y=mx for m=0, 0.5, 1, 2
1.2. y=x2
1.3. y=1/x
2. Find the volume of a given solid cylinder using Vernier callipers.
3. Find the area of cross-section of the given wire using micrometer screw gauge.
4. Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.
5. Verify law of parallelogram of forces using Grave-sands apparatus.
6. Verify law of triangle of forces and Lami's theorem
7. Determine the weight of a given body using
7.1. Law of parallelogram of forces
7.2. Law of triangle of forces
7.3. Lami's theorem
8. Verify law of polygon of forces using Grave-sands apparatus.
9. Locate the position and magnitude of resultant of like parallel forces.
10. Determine the resultant of two unlike parallel forces.
11. Find the weight of a given body using principle of moments.
12. Locate the center of gravity of regular and irregular shaped bodies.
13. Find Young's Modules of Elasticity of a metallic wire.
14. Verify Hooke's Law using helical spring.
15. Study of frequency of stretched string with length.
1 Study of variation of frequency of stretched string with tension.
2 Study resonance of air column in resonance tube and find velocity of sound.
3 Find the frequency of the given tuning fork using resonance tube.
4 Find velocity of sound in rod by Kundt's tube.
5 Verify rectilinear propagation of light and study shadow formation.
6 Study effect of rotation of plane mirror on reflection.
7 Compare the refractive indices of given glass slabs.
8 Find focal length of concave mirror by locating centre of curvature.
9 Find focal length of concave mirror by object and image method
10 Find focal length of concave mirror with converging lens.
11 Find refractive index of glass by apparent depth.
12 Find refractive index of glass by spectrometer.
13 Find focal length of converging lens by plane mirror.
14 Find focal length of converging lens by displacement method.
15 Find focal length of diverging lense using converging lens.
16 Find focal length of diverging lens using concave mirror.
17 Find angular magnification of an astronomical telescope.
18 Find angular magnification of a simple microscope (magnifying glass)
19 Find angular magnification of a compound microscope.
20 Study working and structure of camera.
21 Study working and structure of sextant.
22 Compare the different scales of temperature and verify the conversion formula.
23 Determine the specific heat of lead shots.

24 Find the coefficient of linear expansion of a metallic rod.
25 Find the heat of fusion of ice.
26 Find the heat of vaporization.
27 Determine relative humidity using hygrometer.

MGM-111 PROFESSIONAL COMMUNICATION SKILLS

	T	P	C
Total Contact Hours: 96			
Theory: 0	0	3	1
Practical: 96			

LEARNING OUTCOMES:

The students will be able to: -

- Express their ideas systematically and coherently: orally and written.
- Apply reading, writing, and speaking skills in comprehension and presentation.
- Meet the communication demands of professional organizations and industries.

LIST OF PRACTICALS

1. Assignments on components, characteristics, and types of communication. (06 Hours)
2. Practice and discuss Intrapersonal communication**,** its significance, characteristics, and techniques. (09 Hours)
3. Practice and discuss Interpersonal communication**,** its significance, characteristics, and techniques. (09 Hours)
4. Practice and discuss non-verbal communication, its significance, types, and techniques. (06 Hours)
5. Practice and discuss the English language, its development, and characteristics of the English language. (09 Hours)
6. Practice and discuss professional verbal communication, its significance, and techniques. (06 Hours)
7. Practice and assignments on written communication, its significance, and the quality of a good piece of writing. (09 Hours)
8. Practice and assignments on the writing process, its different stages, data collection techniques, and ethical writing considerations. (06 Hours)
9. Practice and assignments on letters, applications, and C.V. writing. (06 Hours)
10. Practice professional digital communication (E-mail and Social Media platform) (06 Hours)
11. Professional practical applications and assignments, including Mock Interviews and Role-Plays. (09 Hours)
12. Prepare assignments on report writing. (15 Hours)

RECOMMENDED BOOKS

1. Larry, B. L. (1981). *Communication (2nd. Edition)*. Prentice-Hall Inc.
2. Oshima, A., & Hogue, A. (2006). *Writing academic English*. Pearson.
3. Gerson, S. J., & Gerson, S. M. (2000). *Technical writing*. Upper Saddle River, NJ: Prentice Hall.

ARCHT-112 INTRODUCTION TO ARCHITECTURE

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

LEARNING OUTCOMES

The students will be able to: -

- Understand architecture as a creative profession
- Understand the development of architecture
- Familiar with the design process

COURSE CONTENTS

1. INTRODUCTION TO ARCHITECTURE (**06 Hours)**
- 1.1. Meaning/ Definitions of Architecture
- 1.2. Characteristics of Architecture
- 1.3. Architecture as a Science
- 1.4. Architecture as an Art
- 1.5. Architecture as a Social Science
- 1.6. Different forces shaping up architecture

2. INTRODUCTION TO FUNDAMENTALS (**08 Hours)**
- 1.1. Elements of Architecture
- 1.2. Principles of Architecture

3. INTRODUCTION TO ARCHITECTURAL DESIGN (04 Hours)
- 3.1. Different Stages of Architectural Design Process

4. CONTEXT AND ARCHITECTURE (04 Hours)
- 4.1. Components of Built Environment
- 4.2. Architecture as the most significant feature
- 4.3. How Context influence architecture

5. ARCHITECTURE AND SOCIETY (**04 Hours)**
- 5.1. Relationship between Architecture and Society
- 5.2. Importance of Architecture in a Society
- 5.3. Architecture as an Index of a Society

6. CONTEMPORARY ISSUES IN ARCHITECTURE (**03 Hours)**
- 6.1. Green Building Practices
- 6.2. Net-Zero and Passive Design Practices
- 6.3. Smart and Sustainable Urban Development

7. Technological Integration in Architecture (03 Hours)
- 7.1. Parametric Design
- 7.2. Building Information Modeling (BIM)

RECOMMENDED BOOKS

1. Ching, F. D. (2023). *Architecture: Form, space, and order*. John Wiley & Sons.

2. Ching, F. D., & Eckler, J. F. (2012). *Introduction to architecture*. John Wiley & Sons.
3. Szokolay, S. (2012). *Introduction to architectural science*. Routledge.

ARCHT-112 **INTRODUCTION TO ARCHITECTURE**

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND INTRODUCTION TO ARCHITECTURE**
   - 1.1. Define Architecture
   - 1.2. Describe the Characteristics of architecture
   - 1.3. Describe Architecture as a science
   - 1.4. Describe Architecture as an Art
   - 1.5. Describe Architecture as a social science
   - 1.6. Explain different forces shaping up Architecture
2. **UNDERSTAND INTRODUCTION TO FUNDAMENTALS**
   - 2.1. Describe Elements of Architecture
   - 2.2. Describe Principles of Architecture
3. **UNDERSTAND INTRODUCTION TO ARCHITECTURAL DESIGN**
   - 3.1. Explain the Different stages of the Architectural Design Process
4. **UNDERSTAND CONTEXT AND ARCHITECTURE**
   - 4.1. Describe the Components of the Built Environment
   - 4.2. Explain Architecture as the most significant feature
   - 4.3. Explain: How Context influences architecture.
5. **UNDERSTAND ARCHITECTURE AND SOCIETY**
   - 5.1. Describe the Relationship between Architecture and Society
   - 5.2. Describe the Importance of Architecture in a Society
   - 5.3. Explain Architecture as an Index of a Society
6. **UNDERSTAND CONTEMPORARY ISSUES IN ARCHITECTURE**
   - 6.1. Describe Green Building Practices
   - 6.2. Describe Net-Zero and Passive Design Practices
   - 6.3. Explain Sustainable Urban Development
7. **UNDERSTAND TECHNOLOGICAL INTEGRATION IN ARCHITECTURE**
   - 7.1. Introduction to Parametric Design
   - 7.2. Introduction to Building Information Modeling (BIM)

ARCHT-112 **INTRODUCTION TO ARCHITECTURE**

LIST OF PRACTICALS

1. Prepare Assignments on "Characteristics of Architecture" through Photographs (12 hours)
2. Prepare the drawing sheets by using the Elements of Architectural Design (21 hours)
3. Prepare the drawing sheets by using Principles of Architectural Design (21 hours)
4. Visit Historical Monuments / Heritage Sites (Built Environment) and prepare a comprehensive presentation (12 hours)
5. Prepare Assignments on "Architecture and Society" (12 hours)
6. Prepare assignments on Contemporary Issues in Architecture (09 hours)
7. Site Visits for the study of Technological Integration in Contemporary Architectural Designs and submit the comprehensive report (09 hours)

ARCHT-123 ARCHITECTURAL GRAPHICS

	T	P	C
Total Contact Hours: 288			
Theory: 0	0	9	3
Practical: 288			

LEARNING OUTCOMES

The students will be able to: -

- Understand the Art and skill of freehand drawing
- Various techniques of freehand drawing using different materials and tools
- Graphics as a language/tool of expression for architects
- Elements and principles through two-dimensional patterns and three-dimensional composition and their relationship to the design of the building

LIST OF PRACTICALS

1. Develop Freehand Drawings/Sketches in the sketchbook focusing on: - (54 Hours)

1.1. Practice with materials and tools for Freehand Sketching (03 Hours)
1.2. Understanding the elements of freehand sketches (06 Hours)
1.2.1. Line Exploration (06 Hours)
1.2.2. Shape representation (06 Hours)
1.2.3. Volume rendering (06Hours)
1.2.4. Techniques of Light and Shadows (06 Hours)
1.2.5. Composition Principles (06 Hours)
1.2.6. Color Application (09 Hours)
1.2.7. Form Studies (03 Hours)
1.2.8. Hatching Techniques (03 Hours)

2. Create Precise Technical Drawings using Architectural scale and Drawing instruments (30 Hours)

2.1. Lines (06 Hours)
2.2. Angles (06 Hours)
2.3. Triangles (06 Hours)
2.4. Quadrilaterals (06 Hours)
2.5. Polygons (06 Hours)

3. Draw different types of architectural dimensions on the sheets (12 hours)

4. Draw different styles of Lettering on sheets (12 Hours)

5. Draw Pictorial and orthographic projections of solids on sheets (27 Hours)

6. Draw the following solid Forms on sheets (27 Hours)

6.1. Polyhedral (Cubes, Prisms, Pyramids, etc.) (09 Hours)
6.2. Solids of revolution (Cone, Cylinder, Sphere, etc.) (09 Hours)
6.3. Oblique solids (Frustum, Truncated, etc.) (09 Hours)

7. Draw Architectural Drawings of a building on sheets (81 Hours)

7.1. Plan (27 Hours)
7.2. Elevations (27 Hours)
7.3. Sections (27 Hours)

8. Draw both one-point and two-point perspective Drawings (45 Hours)

RECOMMENDED BOOKS

1. Ching, F. D. (2019). *Design drawing*. John Wiley & Sons.
2. Ching, F. D. (2023). *Architectural graphics*. John Wiley & Sons.
3. Yanes, M. D., & Dominguez, E. R. (2005). *Freehand drawing for architects and interior designers*. WW Norton & Company.

ARCHT-133 **BUILDING MATERIALS AND CONSTRUCTION-I**

		T	P	C
Total Contact Hours: 160				
Theory	: 64	2	3	3
Practical	: 96			

LEARNING OUTCOMES

The students will be able to: -

- Familiarize with different building materials to attain suitable knowledge and skills in the use of materials in various buildings.

COURSE CONTENTS

1. INTRODUCTION (06 Hours)

1.1. Classification of materials
1.2. Natural materials
1.3. Man-made materials

2. STRUCTURAL MATERIALS (16 Hours)

2.1. Brick
2.2. Stone
2.3. Cement
2.4. Concrete
2.5. Steel
2.6. Timber

3. NON- NON-STRUCTURAL MATERIALS (16 Hours)

1.1. Glass
1.2. Metal (Aluminum, steel, etc.)
1.3. Timber
1.4. Plastics
1.5. Gypsum

4. FINISHING MATERIALS (14 Hours)

1.1. Plasters
1.2. Paints
1.3. Tiles
1.4. Marble
1.5. Gypsum

5. INSULATING / WATERPROOFING MATERIALS (12 Hours)

5.1. Rigid and flexible materials
5.2. Sound / Thermal insulation materials such as wood, Glass wool, Cork, Vermiculite (e.g., Gypsum, etc.), Polystyrene (e.g., thermopore, etc.), Polyurethane (e.g., matters Foam, etc.)

RECOMMENDED BOOKS

1. Sharma, S. K. (1982). *Textbook of building construction*. S. Chand.
2. Duggal, S. K. (2017). *Building materials*. Routledge.
3. Arora, N. L., & Gupta, B. R. (1974). *Building construction (*2024th edition). Satya Prakashan, India
4. PTEVTA (2022). A Textbook of Building Material & Construction – I. PTEVTA

ARCHT-133 **BUILDING MATERIALS AND CONSTRUCTION-I**

INSTRUCTIONAL OBJECTIVES

1. INTRODUCTION

1.1. Describe the Classification of materials

1.2. State Natural materials

1.3. State Man-made materials

2. UNDERSTAND THE STRUCTURAL MATERIALS

2.1. Brick

2.1.1. Define the brick

2.1.2. Classify the types of bricks

2.1.3. Explain the properties of bricks

2.1.4. State advantages and disadvantages of Bricks

2.1.5. Explain types of brick bonds

2.1.6. Describe the merits and demerits of the English and Flemish bond

2.1.7. Define brick masonry

2.2. Stone

2.2.1. Define stone

2.2.2. Classification of Stones

2.2.3. Describe kinds of building stones

2.2.4. Define stone masonry

2.2.5. Classification of stone masonry

2.3. Concrete

2.3.1. State composition of concrete (Cement, sand, Aggregates, water)

2.3.2. Define the types of aggregate

2.3.3. Explain the Concrete process in the following sequence

a. Mixing of concrete
b. Placing of concrete
c. Curing of concrete

2.3.4. Define precast concrete

2.3.5. Define hollow block

2.3.6. Describe the comparison of in-situ and precast concrete

2.4. Steel

2.4.1. Define steel

2.4.2. Describe the properties of steel

2.4.3. Describe the behavior of steel against the temperature

2.4.4. Describe the uses of steel

2.5. Timber

2.5.1. Define Timber

2.5.2. Types of timber

2.5.3. Explain Seasoning of timber

3. UNDERSTAND NON- STRUCTURAL MATERIALS

3.1. Glass

3.1.1. Define glass

3.1.2. State the types of glass

3.1.3. Describe the uses of glass

3.2. Metal

3.2.1. Define Metal

3.2.2. Describe different types of metals

3.2.3. Explain the properties of metals (such as Aluminum, steel, etc.)

3.2.4. Describe the uses of different Metals

3.3. Timber

3.3.1. Enlist the non-structural uses of timber

3.3.2. Explain the uses of Timber

3.4. Plastics

3.4.1. Define plastic

3.4.2. State the types of plastics

3.4.3. Describe the uses of plastics

4. UNDERSTAND FINISHING MATERIALS

4.1. Plasters

4.1.1. Describe the constituents of plaster

4.1.2. State the types of plasters

4.1.3. Explain the process of plastering

4.2. Paints

4.2.1. Describe the constituents of paint

4.2.2. Describe different types of paints

4.2.3. Describe the uses of paints

4.2.4. Define varnish

4.2.5. Describe the uses of varnish

4.3.Tiles

4.3.1. Define tiles

4.3.2. Classify tiles.

4.3.3. Describe uses of tiles

4.4. Marble

4.4.1. Define Marble

4.4.2. Classify Marbles

4.4.3. Describe uses of marbles

5. UNDERSTAND INSULATING/WATERPROOFING MATERIALS

5.1. Rigid and flexible materials

5.1.1. Define Rigid and flexible materials

5.1.2. Classify the Rigid and flexible materials

5.1.3. Describe the uses of Rigid and flexible materials

5.2. Sound/Thermal insulating materials.

5.2.1. Define Sound/Thermal insulating materials

5.2.2. Classify Sound/Thermal insulating materials

5.2.3. Describe the uses of Sound/Thermal insulating materials

ARCHT-133 BUILDING MATERIALS AND CONSTRUCTION-I

LIST OF PRACTICALS

1. Prepare a material board of Natural and Man-made materials (09 Hours)
2. Draw various types of brick bonds (06 Hours)
3. Visit a local ceramic tile industry and submit a report (12 Hours)
4. Draw sheets of Ashlar masonry and Rubble masonry (06 Hours)
5. To visit the display room for materials and prepare assignments on different types of aggregates (06 Hours)
6. To visit the display room for materials and comparison of different types of steel (06 Hours)
7. To visit the display room for materials and compare different types of glass with properties and sizes (06 Hours)
8. To visit the display room for materials and study different timbers and prepare a sheet of different types of timber, reconverted wood (chipboard, MDF, vin board) (09 Hours)
9. To visit the display room for materials, compare different plastics, and prepare a board of different types of plastic variety like PVC sheets, PVC pipes and pipe fittings (09 Hours)
10. To visit the display room for materials and verify the aluminum variety and prepare a sheet of aluminum doors & windows (09 Hours)
11. To visit the display room for materials and prepare a report on various types of thermopore sheets in roof insulation and pipe insulation for water supply and air conditioning systems (06 Hours)
12. To visit the market for a collection of brochures for various paints and submit the report (06 Hours)
13. To visit the display room for materials and study waterproofing materials and prepare the presentation: (06 Hours)
    - 13.1. Flexible materials
    - 13.2. Rigid materials

ARCHT-143 COMPUTER-AIDED DRAFTING AND PRESENTATION-I

		T	P	C
Total Contact Hours: 224				
Theory	: 32	1	6	3
Practical	: 192			

LEARNING OUTCOMES

The students will be able to: -

- Understand the basics of computers (MS Windows, MS Office, Internet and E-mail)
- Introduce the basics of computer designing (AutoCAD)
- Gain insight into the theoretical as well as practical aspects of AutoCAD
- Equip students with the tools and techniques required for modern designing/ drawing

COURSE CONTENTS

1. INTRODUCTION OF COMPUTER (03 Hours)

1.1. Definition of Computer
1.2. Types of Computers
1.3. Input and Output Devices
1.4. Storage Devices
1.5. Hardware and Software

2. INTRODUCTION TO MS-WINDOWS (03 Hours)

2.1. Introduction to Windows
2.2. Loading and Shut down Process
2.3. An Introduction to Desktop Items (Creation of Icons, Creation of Folders, Shortcut and Taskbar)
2.4. Desktop Properties
2.5. Use of Control Panel
2.6. Searching a Documents
2.7. Software Installation and Un-Installation
2.8. Protection Against Viruses

3. MS-OFFICE (MS-WORD) (04 Hours)

3.1. Introduction to MS Office
3.2. Introduction to MS Word and its Interface
3.3. Create a new Document
3.4. Editing and Formatting the Text
3.5. Saving and Opening a Document
3.6. Page Setup
3.7. Spell Check and Grammar
3.8. Paragraph Alignment
3.9. Inserting Page Numbers, Symbols, Text Box, and Pictures in the Document
3.10. Insert the Table and its editing

3.11. Printing the document

4. MS-OFFICE (MS-EXCEL) (03 Hours)

4.1. Introduction to MS Excel and its Interface
4.2.Entering Data and Apply Formulas in Worksheet
4.3. Editing and Formatting the Cells, Row and Column
4.4. Insert Graphs/Charts/Smart Art in Sheet
4.5. Page Setup, Print Preview and Printing

5. MS-OFFICE (MS POWERPOINT) (03 Hours)

5.1. Introduction to MS PowerPoint and its Interface
5.2. Creating a Presentation
5.3. Insert, Editing, and Formatting a Text Box
5.4. Adding Pictures and Colors to a Slide
5.5. Making Slide Shows
5.6. Slide Transition

6. INTERNET AND E-Mail (02 Hours)

6.1. Introduction to Internet and Browser Window
6.2. Advantages and Disadvantages of the Internet
6.3. Important Technical Terms (Web Page, www, URL, ISP, Web Site, FAQ, HTML, Web Browsing, Search Engine)
6.4. Searching, Saving, and Printing a Page from the Internet
6.5. Creating, Reading, and Sending E-Mail

7. AUTO CAD MENUS (02 Hours)

8. DISPLAY COMMANDS (02 Hours)

8.1. Pan
8.2. Redraw
8.3. Regent
8.4. Zoom

9. DRAW COMMANDS (04 Hours)

9.1. Line
9.2. Arc
9.3. Circle
9.4. Ellipse
9.5. Polyline
9.6. Point
9.7. Polygon
9.8. Text
9.9. Hatch
9.10. Insert
9.11. Dimensioning

10. CONSTRUCT AND EDIT COMMANDS (04 Hours)

10.1. Array
10.2. Break
10.3. Change

10.4. Copy
10.5. Divide
10.6. Erase
10.7. Explode
10.8. Extend
10.9. Entity
10.10. Move
10.11. Rotate
10.12. Poly edit
10.13. Offset
10.14. Fillet
10.15. Chamfer
10.16. Trim

11. DIFFERENT SETTINGS TO PRODUCE ARCHITECTURAL DRAWINGS

(02 Hours)

11.1. Grid
11.2. Snap
11.3. Limits
11.4. O-snap
11.5. Unit
11.6. Layers

RECOMMENDED BOOKS

1. Wilson, K. (2018). Essential Office 365 Third Edition: The Illustrated Guide to Using Microsoft Office. United Kingdom: Elluminet Press.
2. Shih, R. (2020). AutoCAD 2021 Tutorial First Level 2D Fundamentals. SDC publications.
3. Moss, E. (2023). Autodesk AutoCAD Architecture 2024 Fundamental. SDC Publications.

ARCHT-143 COMPUTER-AIDED DRAFTING AND PRESENTATION-I

INSTRUCTIONAL OBJECTIVES

1. INTRODUCTION OF COMPUTER

1.1. Definition of Computer
1.2. Describe Types of Computers
1.3. Describe Input and Output Devices
1.4. Describe Storage Devices
1.5. Define Hardware with examples
1.6. Define Software with examples

2. UNDERSTAND MS-WINDOWS

2.1. Definition of MS Windows with examples
2.2. Describe the Loading and Shut Down Process
2.3. Explain Introduction to Desktop Items (Creation of Icons, Creation of Folders,
2.4. Shortcut and Taskbar)
2.5. Explain Desktop Properties
2.6. Describe uses of the Control Panel (Add/Remove/programs, Date and Time,
2.7. Mouse and Create a user Account)
2.8. Explain the method of Searching a documents
2.9. Explain Software Installation and Un-Installation
2.10. Define Virus in Computer and Anti-Virus Programs with examples

3. UNDERSTAND MS OFFICE (MS WORD)

3.1. Define MS-Office
3.2. Define MS Word and describe its Interface
3.3. Describe how to create a new Document
3.4. Explain Editing and Formatting the Text
3.5. Describe Saving and Opening a Document
3.6. Explain page setup
3.7. Explain Spell Check and Grammar
3.8. Explain Paragraph Alignment
3.9. Explain Inserting Page Numbers, Symbols, Text Box, and Pictures in
3.10. the Document
3.11. Explain Insert the Table and its Editing
3.12. Describe printing the document

4. UNDERSTAND MS OFFICE (MS EXCEL)

4.1. Define MS-Excel and describe its interface.
4.2. Describe Entering data and Apply Formulas in Worksheet
4.3. Describe Editing and Formatting the Cells, Row and Column
4.4. Describe Insert Graphs/Charts/Smart Art in sheet
4.5. Describe Page setup, print preview and printing

5. UNDERSTAND MS OFFICE (MS POWERPOINT)

5.1. Define MS-Power point and describe its interface

5.2. Explain Creating a Presentation
5.3. Describe Insert, Edit, and Formatting a Text Box
5.4. Explain how to add Pictures and colors to a Slide
5.5. Describe making Slide Shows
5.6. Explain Slide Transition

6. UNDERSTAND INTERNET AND E-Mail

6.1. Define Internet and Browser Window
6.2. Explain the Advantages and Disadvantages of the internet
6.3. Definition of important Technical Terms (Web Page, www, URL, ISP, Web Site, FAQ, HTML, Web Browsing, Search Engine)
6.4. Describe searching, saving, and printing a page from the internet
6.5. Describe Creating, Reading, and Sending E-Mail

7. AUTO CAD MENU

7.1. Define Auto Cad
7.2. Explain the screen menus
7.3. Explain the pull-down menus
7.4. Define UCS

8. DISPLAY COMMANDS

Define the following commands:

8.1. Pan
8.2. Redraw
8.3. Regenerate
8.4. Zoom

9. DRAW COMMANDS

Define the following commands:

9.1. Line
9.2. Arc
9.3. Circle
9.4. Ellipse
9.5. Polyline
9.6. Point
9.7. Polygon
9.8. Text
9.9. Rectangle
9.10. Hatch
9.11. Dimensioning

10. CONSTRUCT AND EDIT COMMANDS

Define the following commands.

10.1. Array
10.2. Break
10.3. Change
10.4. Copy

10.5. Divide
10.6. Erase
10.7. Explode
10.8. Extend
10.9. Entity
10.10. Move
10.11. Rotate
10.12. Poly edit
10.13. Offset
10.14. Fillet
10.15. Chamfer
10.16. Trim

11. SETTINGS TO PRODUCE ARCHITECTURAL DRAWINGS

Define the utility of the following commands:

11.1. Grid
11.2. Snap
11.3. Limits
11.4. O-snap
11.5. Unit
11.6. Layers

ARCHT-143 COMPUTER-AIDED DRAFTING AND PRESENTATION-I

LIST OF PRACTICALS

1. Identify different hardware (keyboard, mouse, CPU, disk drives, disks, monitor and printer) (09 Hours)
2. Practice of MS-Windows 10 (Operating system) (09 Hours)
3. Practice of application of different commands of MS-OFFICE (MS-WORD) and submit assignments (21 Hours)
4. Practice of application of different commands of MS-OFFICE (MS-EXCEL) and submit assignments (18 Hours)
5. Practice of application of different commands of MS-OFFICE (MS-POWER POINT) and submit assignments (18 Hours)
6. Practice using Internet and E-MAIL (06 Hours)
7. Practice of AutoCAD menus (09 Hours)
8. Practice of Display commands (15 Hours)
9. Practice of Draw commands (24 Hours)
10. Practice of Construct commands (24 Hours)
11. Practice of all settings (15 Hours)
12. Draw and plot plans, sections, and elevation of the house (24 Hours)

CURRICULUM
DAE 2nd YEAR
ARCHITECTURE
TECHNOLOGY

اسلامیات/مطالعہ پاکستان

نصاب سال دوئم

حصہ اول اسلامیات

حصہ دوئم مطالعہ پاکستان

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کل وقت 20 گھنٹے:

موضوعات:

1۔ سورۃ المومنون ایک تا گیارہ آیات کا ترجمہ مع تشریح

2۔ دس منتخب احادیث مع ترجمہ وتشریح

() خیر کم من تعلم القرآن و علمه

() لا ایمان لمن لا امانته له ولا دین لا من لا اعهد له

() و یاکم والظن ان الظن اکرب الحدیث

() من احدث فی امرنا هذا ما لیس منه فهورد

() من حمل علینا السلاح فلیس منا

() انا و کافل الیتیم فی الجنه

() لا ضرور ولا ضرار فی السلام

() کلکم راع و کلکم راع و کلکم مسول عن رعیته

3۔ سیرۃ طیبہ

() مکی زندگی۔ولادت۔بعثت۔ہجرت

() مدنی زندگی۔مواخات۔میثاق مدینہ۔فتح مکہ(اسباب ونتائج)

4۔ حضور ﷺ بحیثیت

() خطبہ حجۃ الوداع۔انسانی حقوق کا اعلامیہ/حقوق انسانی پالیسی 2018

() معلم کامل۔سربراہ خاندان

5۔ اسلامی معاشرہ

نظام تعلیم اور اس کے مقاصد۔عدل وانصاف۔امر بالمعروف۔نہی عن المنکر۔انسانی حقوق کا معاشرتی اور معاشی ترقی میں کردار

جہاد۔کسب حلال۔مسجد(اہمیت وفضیلت)

6۔ اسلامی ریاست کی تعریف۔اسلامی ریاست کی خصوصیات۔اسلامی حکومت کے فرائض۔اسلامی طرز حکومت۔

حقوق آگاہی رمعلومات تک رسائی

۔ ملازم پیشہ خواتین کا تحفظ

اسلامیات

تدریس مقاصد:

عمومی مقاصد: طالب علم یہ جان سکے کہ آیات قرآنی کی روشنی میں مومن کے اوصاف کیا ہیں

() قرآن مجید () منتخب آیات قرآنی

خصوصی مقاصد:

() قرآنی آیات کا ترجمہ

() قرآنی آیات کی تشریح

() قرآنی آیات کی روشنی میں ایک مومن کے اوصاف بیان کر سکے

() قرآنی آیات میں بیان کردہ مومن کے اوصاف اپنے اندر پیدا کر سکے

احادیث نبوی:

عمومی مقاصد:

() احادیث کی روشنی میں اسلامی اخلاقی اقدار (انفرادی واجتماعی) سے آگاہ ہو سکے

خصوصی مقاصد:

() احادیث کا ترجمہ بیان کر سکے

() احادیث کی تشریح کر سکے

() احادیث کی روشنی میں اسلام کی اخلاقی اقدار کی وضاحت کر سکے

() احادیث کی دی گئی تعلیمات کے مطابق اپنی زندگی گزار سکے

سیرت طیبہ:

() عمومی مقاصد: حضورﷺ کی سیرت طیبہ کے بارے میں جان سکے

خصوصی مقاصد:

() حضورﷺ کی ابتدائی زندگی اختصار کے ساتھ بیان کر سکے

() حضورﷺ کی ہجرت کا واقع بیان کر سکے

() حضورﷺ کی مدنی زندگی اختصار سے بیان کر سکے

() حضورﷺ کی بطور معلم خصوصیات بیان کر سکے

( ) حضور ﷺ کی بطور سربراہ بیان کر سکے

حضور ﷺ بحیثیت

( ) خطبہ حجۃ الوداع ۔ انسانی حقوق کا اعلامیہ رحقوق انسانی پالیسی 2018 کے بارے جان سکے

اسلامی معاشرہ:

عمومی مقاصد: اسلامی معاشرہ کی خصوصیات سے آگاہی حاصل کر سکے

خصوصی مقاصد:

( ) اسلامی معاشرہ کا معنی ومفہوم کر سکے

( ) اسلامی معاشرہ کی امتیازی خصوصیات بیان کر سکے

( ) اسلامی معاشرہ میں عدل واحسان کی اہمیت بیان کر سکے

( ) تبلیغ کے لغوی معنی بیان کر سکے

( ) تبلیغ کی اہمیت اور ضرورت بیان کر سکے

( ) جہاد کے لفظی واصطلاحی معنی بیان کر سکے

( ) جہاد کی اہمیت بیان کر سکے

( ) جہاد اور قتل میں فرق بیان کر سکے

( ) جہاد کی مختلف اقسام بیان کر سکے

( ) لفظ مسجد کی تعریف بیان کر سکے

( ) مسجد کی سابقہ حیثیت کو بحال کرنے کے بارے میں اقدامات کو مان سکے

( ) انسانی حقوق کی معاشی اور معاشرتی ترقی میں اہمیت اور کردار بیان کر سکے

اسلامی ریاست:

عمومی مقاصد:

( ) اسلامی ریاست کی خصوصیات بیان کر سکے

خصوصی مقاصد:

( ) ریاست کی تعریف بیان کر سکے

( ) اسلامی ریاست میں طرز حکومت سے آگاہی حاصل کر سکے

( ) اسلامی ریاست کی خصوصیات بیان کر سکے

- () اسلامی ریاست کے اغراض ومقاصد بیان کر سکے
- () اسلامی ریاست کے قیام کی لیے جدوجہد کر سکے
- () حقوق آگاہی رمعلومات تک رسائی کا قانون جان سکے
- () ملازمت پیشہ خواتین کے حقوق کا تحفظ جان سکے اور
- () معاشرے میں خواتین کے حقوق کا تحفظ یقینی بنائے

نصاب مطالعہ پاکستان

سال دوئم

حصہ دوم

ٹی	پی	سی
1	0	1

کل وقت 12 گھنٹے

موضوعات:

- () دوقومی نظریہ
- () تحریک پاکستان
- () انڈین کانگریس
- () مسلم لیگ
- () تقسیم بنگال
- () میثاق لکھنو
- () تحریک خلافت
- () سندھو تحریک
- () تجاویز دہلی
- () نہرو رپورٹ
- () قائداعظم کے چودہ نکات
- () خطبہ آلہ آباد
- () انتخابات 1938 اور انتقال اقتدار
- () قرارداد پاکستان

حصہ دوم

مطالعہ پاکستان

تدریس مقاصد:

تحریک پاکستان:

عمومی مقاصد:

() قیام پاکستان کے اسباب وتحریک کو بیان کر سکے

خصوصی مقاصد:

() قومیت کے مفہوم کو بیان کر سکے

() دو قومی نظریہ کی تعریف وتوضیح کر سکے

() دوقومی نظریہ کی اہمیت بیان کر سکے

() ہندوستانی مسلمانوں کی محرومیوں کو بیان کر سکے

() قومی تشخص کو بحال رکھنے کے لیے مسلمانان ہند کی مساعی بیان کر سکے

() آزادی ہند اور قیام پاکستان علامہ اقبال اور قائداعظم کی مساہیام کریں

() قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لیے مسلم عوام کی کوششوں کو بیان کر سکے

() مسلم لیگ کے قیام پاکستان کے لیے جدو جہد بیان کر سکے

(غیر مسلم طلباء کے لیے)

نصاب اخلاقیات

ٹی	پی	سی
1	0	1

سال دوم

کل وقت 20 گھنٹے

موضوعات:

معاشرتی اقدار بلحاظ ہمسایہ۔قوم۔قومی سطح۔شہری سطح۔صنعتی اداروں کی سطح۔ضروریات۔ورثہ

() حقوق وفرائض

() قوت برداشت

() قوت ارادی

() لگن وجذبہ

() وسیع النظری

() بے غرضی

() انسانی دوستی

() حفاظتی شعور

() پاس آزادی

() کامل آگاہی

() تغیرات کو قبول کرنا

() خودشناسی

() انسانی حقوق کا اعلامیہ رحقوق انسانی پالیسی 2018

() انسانی حقوق کا معاشرتی اور معاشی ترقی میں کردار

() حقوق آگاہی رمعلومات تک رسائی۔ملازم پیشہ خواتین کا تحفظ

نصاب اخلاقیات

سال دوم

تدریس مقاصد:

طالب علم اخلاقیات کی اہمیت وضرورت سے آگاہ ہوسکے اور بیان کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو کہ

() موضوعات کا مطلب بیان کر سکے

() عملی زندگی سے مثالوں کی نشاندہی کر سکے

() اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کر سکے

() اعلیٰ اخلاقی اقدار میں سے قوت برداشت۔قوت ارادی۔لگن وجذبہ۔وسیع النظری۔بے غرض۔انسانی دوستی شعور۔پاس آزادی۔کامل آگاہی اور خودشناسی کی اہمیت

() اخلاقیات سے متصف ہوکر قومی خدمت بہتر طور پر انجام دے سکے

() انسانی حقوق کا اعلامیہ/حقوق انسانی کی پالیسی 2018 کے بارے میں جان سکے

() انسانی حقوق کا معاشرتی اور معاشی ترقی میں اہمیت اور کردار بیان کر سکے

() حقوق اگاہی/معلومات تک رسائی کے قانون کو جان سکے

() ملازم پیشہ خواتین کا تحفظ کو اخلاقیات کا حصہ تصور کرے

TTQ / Civic-211;

Tarjumat-ul-Quran / Civics

T	P	C
1	0	1

Total Contact Hours:

Theory: **32**

Practical: **0**

Note: Syllabi for these subject would be as per BISEs / General education, developed by Punjab Curriculum TextBook Board (PCTB)

MATH-212 APPLIED MATHEMATICS-II

Total Contact Hours: 64

T	P	C
2	0	2

Pre-requisite:

Must have completed Mathematics-I

LEARNING OUTCOMES:

After Completing the course the students will be able to

1. Solve problems of the Calculus and Analytic Geometry.
2. Mathematical skill. Attitudes and logical perception in the use of mathematical instruments.
3. Apply principles of differential calculus to work out rate measure velocity, acceleration maxima & minima values.
4. Use principles of integral calculus to compute areas and volumes.
5. Acquire proficiency in solving technological problems with mathematical alacrity and insight

COURSE CONTENTS

1. Functions & Limits **04 Hours**

1.1 Constant & Variable Quantities
1.2 Function & their classification
1.3 The concept of limit
1.4 Limit of a function
1.5 Fundamental theorems on 1 unit
1.6 Some important limits
1.7 Problems

2. Differentiation **04 Hours**

2.1 Increments

2.2 Differential Coefficient or Derivative

2.3 Differential ab-initio or by first Principle

2.4 Geometrical interpretation of differential coefficient

2.5 Differential coefficient of X””+(ax-b)a

3. Differentiation of Algebraic Functions **04 Hours**

3.1 Explicit functions

3.2 Implicit functions

3.3 Parametric forms

3.4 Problems

4. Differentiation of Trigonometric Functions **04 Hours**

1.1 Differentiation Coefficient of Sin x, Tan x, from first principle

1.2 Differentiation Coefficient of cosec x, Sec x, Cot x

1.3 Differentiation of inverse trigonometric functions

1.4 Problems

5. Differentiation of Logarithmic & Exponential Functions **04 Hours**

5.1 Differentiation of in x

5.2 Differentiation of Log ax

5.3 Differentiation of ay

5.4 Differentiation of c

5.5 Problems

6. Rate of Change of Variable **04 Hours**

1.1 Increment and decreasing functions

1.2 Maxima and minima values

1.3 Criteria for maximum and minimum values

1.4 Methods of finding maxima and minima

1.5 Integration

7. Integration **08 Hours**

7.1 Concept

7.2 Fundamental Formulas

7.3 Important rules

7.4 Problems

8. Methods of Integration **06 Hours**

8.1 Integration by substitution

8.2 Integration by parts

8.3 Problems

9. Definite Integrals **06 Hours**

9.1 Properties

9.2 Application to area

9.3 Problems

10. Plane Analytic Geometry & Straight Line **06 Hours**

10.1 Co-ordinate system

10.2 Distance formula

10.3 The ratio formulas

10.4 Inclination and slope of line

10.5 The slope formula

10.6 Problems

11. Equations of the Straight Line **06 Hours**

11.1 Some important forms

11.2 General forms

11.3 Angle forms

11.4 Parallelism & perpendicularity

11.5 Problems

12. The Equations of the Circle **08 Hours**

12.1 Standard form of equation

12.2 Central form of equation

12.3 General form of equation

12.4 Radius & Co-ordinates of the centre

Recommended Books

i. **Thomas Finny**- Calculus an analytic geometry

ii. **Ghulam Yasin Minhas** – Technical Mathematics VOL-II Ilmi Kitab Khana Lahore

iii. **Prof. Riaz Ali Khan**- Polytechnic Mathematics series VOL-I & II Majeed Sons Faisalabad

iv. **Prof. Sana Ullah Batthi-**Calculus and analytic geometry. Punjab Text Book Board, Lahore

MATH-212 **APPLIED MATHEMATICS–II**

INSTRUCTIONAL OBJECTIVES

1. Use the Concept of Functions and Their Limits in Solving Simple Problems

1.1 Define a function

1.2 List of all type of functions

1.3 Explain the concept of limit and limit of a formula

1.4 Explain fundamental theorems on limits

1.5 Derive some important limits

1.6 Solve simple problems on limits

2. Understand and the Concept of Differential

2.1 Derive mathematical expression for a differential coefficient

2.2 Explain geometrical interpretation of differential coefficient

2.3 Differentiate a constant, a constant associated with a variable and sum of finite number of functions

2.4 Solve related problems

3. Use Rules of Differentiation To Solve Problems of Algebric Functions

3.1 Differentiate ab-initio Xn and (ax-b)n

3.2 Derive product, quotient and chain rules

3.3 Find derivatives of implicit functions & explicit functions

3.4 Differentiate parametric forms, functions w.r i. another function and by rationalization

3.5 Solve problems using these formulas

4. **Use Rules of Differentiation To Solve Problems Involving Trigonometric Functions**

   4.1 Differentiate from first principle sin x, cos x, cot x

   4.2 Derive formulas for derivation of sec x, cosec x, cot x

   4.3 Find differential coefficient of inverse trigonometric functions

5. **Use Rules of Differentiation To Logarithmic and Exponential Functions**

   5.1 Derive formulas for differential coefficient of logarithmic and exponential functions

   5.2 Solve problems

6. **Understand Rate of Change of One variable With Respect To Another**

   6.1 Write expression for velocity, acceleration and slope of a line

   6.2 Define and increasing and a decreasing function, maxima and minima value, point of inflexion

   6.3 Explain criteria for maxima and minima values of a function

   6.4 Solve problems involving rate of change of variables

7. **Apply Concept of Integration In Solving Technological Problems**

   7.1 Explain the concept of integration

   7.2 Write basic theorems of integration

   7.3 List some of formulas of integration

   7.4 Derive fundamental formulas of integration

   7.5 Solve problems based on these formulas/rules

8. **Understand Different Methods of Solving Definite Integrals**

   8.1 List standard formulas

   8.2 Integrate a function by substitution method

8.3 Find integrals by the method of integration by parts

8.4 Solve problems using these methods

9. Understand The Methods of Solving Definite Integrals

9.1 Define definite integral

9.2 List properties of definite integrals using definite integrals

9.3 Find area under the curves

9.4 Solve problems of definite integrals

10. Understand And The Concept of Plane Analytic Geometry

10.1 Explain the rectangle co-ordinate system

10.2 Locate points in different quadrants

10.3 Derive distance formula

10.4 Derive section formula

10.5 Derive slope formula

10.6 Solve problems using the above formulas

11. Use Equations of Straight Line In Solving Problems

11.1 Define Straight line

11.2 State general forms of equation of a straight line

11.3 Derive slope intercept and intercept forms equations of a straight line

11.4 Derive expression for angle two straight lines

11.5 Derive conditions of perpendicularity and parallelism of two straight lines

11.6 Solve problems involving these equations / formulas

12. Use Technological Problems Using Equation of Circle

12.1 Define a circle

12.2 Describe standard, central and general forms of the equation of a circle

12.3 Convert general forms to the central forms of equation of a circle.

12.4 Deduce formulas for the radius and the co-ordinates of the centre of a circle

12.5 From the general form derive equation of the circle passing through three given points

12.6 Solve problems involving these equations

ARCHT-212 ENVIRONMENTAL STUDIES -I

Total Contact Hours:	64	T P	C
Theory:	2	2 0	2
Practical:	0		

LEARNING OUTCOMES

The students will be able to: -

- Understand the processes in the physical environment and their effects on humans and buildings and be able to counteract their negative effects through design
- Address the environmental issues as enshrined in our architectural heritage

COURSE CONTENTS

1. PHYSICAL ENVIRONMENT (08 Hours)

1.1 Introduction
1.2 Components of Environment
1.3 Types of Environments
1.4 Aesthetics and Ecological Aspects

2. CLIMATE (08 Hours)

2.1 Introduction
2.2 Characteristics of Climate
2.3 Tropical Climate
2.4 Effects of Climate on Residential Buildings

3. VENTILATION (08 Hours)

3.1 Introduction
3.2 Importance of Ventilation
3.3 Types of Ventilation
3.4 Design Guidelines of Opening for Ventilation

4. ILLUMINATION (10 Hours)

4.1 Introduction
4.2 Importance of Illumination
4.3 Solar Geometry
4.4 Day Light
4.5 Artificial Illumination

5. HEAT TRANSFER IN BUILDINGS (10 Hours)

5.1 Introduction
5.2 Need of Heat Transfer in Buildings
5.3 Insulating Material and their Application
5.4 Shading Devices
5.5 Trees (Different types of trees and bushes to control temperature)

6. WATER SUPPLY AND DRAINAGE SYSTEMS (08 Hours)

6.1 Introduction
6.2 Sources of water supply

6.3 Domestic water supply system (OHWT, UGWT)
6.4 Water supply equipment
6.5 Introduction to Drainage System

7. PLUMBING AND SANITATION (12 Hours)

7.1 Definition
7.2 Needs
7.3 Symbols
7.4 Plumbing Fittings and Fixtures
7.5 Sanitary Fittings
7.6 Water Pollution, Sources and Control Techniques

RECOMMENDED BOOKS

1. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., & Szokolay, S. V. (1975). *Manual of tropical housing and building: Climate design.* Orient Blackswan.
2. Olgyay, V. (1963) Design with Climate: Bioclimatic Approach to Architectural Regionalism. Princeton University Press, Princeton.
3. Krishan, A. (Ed.). (2001). *Climate responsive architecture: A design handbook for energy efficient buildings*. Tata McGraw-Hill Publishing Company.

ARCHT-212 ENVIRONMENTAL STUDIES-I

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND VARIOUS ASPECTS OF PHYSICAL ENVIRONMENT**
   - 1.1 Explain the term Physical Environment (Both Natural and Man-Made)
   - 1.2 Explain Components of Environment.
   - 1.3 Explain various types of environments.
   - 1.4 Explain the Aesthetics and Ecological aspects of Physical Environment
2. **UNDERSTAND CLIMATE AND ITS EFFECTS ON BUILDINGS**
   - 2.1 Explain the term Climate.
   - 2.2 Explain the Characteristics of Climate.
   - 2.3 Describe the main features of Tropical Climate.
   - 2.4 Explain the effect of Climate on Residential Buildings.
3. **UNDERSTAND THE CONCEPT OF VENTILATION IN DESIGNING OPENINGS**
   - 3.1 Explain the term ventilation.
   - 3.2 Explain the importance of ventilation in buildings.
   - 3.3 Describe types of ventilation
   - 3.4 Explain the Design consideration of openings for ventilation
4. **UNDERSTAND ILLUMINATION IN BUILDINGS**
   - 4.1 Define the term illumination
   - 4.2 Explain the importance of illumination in different buildings.
   - 4.3 Explain Solar Geometry
   - 4.4 Describe Day Light effects on buildings
   - 4.5 Explain Artificial Illumination in Buildings
5. **UNDERSTAND HEAT TRANSFER IN BUILDINGS**
   - 5.1 Explain different ways of Heat Transfer in buildings
   - 5.2 Describe the need for Thermal Insulation in buildings
   - 5.3 State Insulating material and their application for Thermal Insulation
   - 5.4 Explain Shading devices used in buildings
   - 5.5 Explain the role of trees and bushes to control temperature
6. **UNDERSTAND WATER SUPPLY AND DRAINAGE SYSTEMS IN BUILDINGS**
   - 6.1 Define water supply
   - 6.2 Describe Sources of water supply
   - 6.3 Explain Domestic water supply system
   - 6.4 Explain the Equipment used in the water supply
   - 6.5 Explain Storage of water supply (UGWT, OHWT)
   - 6.6 Explain Drainage systems used in buildings
7. **UNDERSTAND PLUMBING AND SANITATION**
   - 7.1 Define Plumbing and Sanitation
   - 7.2 Describe the need of Plumbing and Sanitation in domestic buildings

7.3 Describe Symbols used in Plumbing and Sanitation of buildings
7.4 Describe Plumbing Fittings and Fixtures used in buildings
7.5 Describe different Sanitary Fittings used in domestic buildings
7.6 Explain Water pollution its sources and different techniques to Control Water pollution

ARCHT-223 STRUCTURAL MECHANICS AND R.C.C. DESIGN

Total Contact Hours: 160 Hours	T	P	C
Theory: 64	2	3	3
Practical: 96			

LEARNING OUTCOMES

The students will be able to: -

- Understand the effects of forces/loads on different structural elements of buildings
- Understand the behavior of the material under different loading conditions
- Familiarize with various structural design elements along with their strength

COURSE CONTENTS

1. STRESS (**04 Hours)**

1.1 Introduction
1.2 Types of stress
1.3 Numerical Problems

2. STRAIN **(04 Hours)**

2.1 Introduction
2.2 Types of Strain
2.3 Numerical Problems

3. ELASTICITY **(04 Hours)**

3.1 Introduction
3.2 Plasticity
3.3 Limit of Elasticity
3.4 Yield Point
3.5 Hook's Law
3.6 Modulus of Elasticity
3.7 Stress-Strain Curve
3.8 Calculation of Modulus of Elasticity

4. CENTRE OF GRAVITY **(04 Hours)**

4.1 Introduction
4.2 Center of Gravity of Basic Geometric Sections
4.3 Centroid
4.4 Technical terms (Reference axes, centroidal distance, composite section)
4.5 Symmetrical and Un symmetrical sections
4.6 Numerical Problems

5. MOMENT OF INERTIA **(04 Hours)**

5.1 Introduction
5.2 Moment of area
5.3 M.O.I of sections (Channel, I, Rectangle)
5.4 Radius of Gyration
5.5 Parallel Axes and Perpendicular Axes Theorems
5.6 Numerical Problems

6. BENDING MOMENT AND SHEAR FORCE **(10 Hours)**

6.1 Introduction to Shear Force and Bending Moment
6.2 Beam and its Types

6.3 Supports of Beam
6.4 Loads on Beam (Point load, U.D.L)
6.5 Span of Beam
6.6 Moments and its Types
6.7 S.F.D and B.M.D
6.8 Numerical problems regarding cantilever and simply supported beam

7. SOIL MECHANICS **(04 Hours)**

7.1 Introduction
7.2 Types
7.3 Technical terms
7.4 Bearing capacity of soil

8. R.C.C. DESIGN (**06 Hours)**

8.1 Introduction
8.2 Difference between R.C.C. and P.C.C.
8.3 Advantages and Disadvantages of R.C.C.
8.4 Different types of loads
8.5 Types of Reinforcement
8.6 Design Service Load Method
8.7 Technical terms

9. R.C.C. COLUMN AND FOOTING **(08 Hours)**

9.1 Introduction
9.2 Types of R.C.C. Columns
9.3 Technical terms
9.4 Calculations for approximate sizing

10. R.C.C. BEAM **(08 Hours)**

10.1 Introduction
10.2 Types of R.C.C. beam
10.3 Technical terms
10.4 Calculations for approximate sizing

11. R.C.C. SLAB **(08 Hours)**

11.1 Introduction
11.2 Types of R.C.C. Slab
11.3 Technical terms
11.4 Calculations for approximate sizing

RECOMMENDED BOOKS

1. Morgan, W., Durka, F., & Williams, D. (1996). *Structural mechanics* (5th ed., illustrated, revised). Longman.
2. Fanella, David A. 2016. *Reinforced Concrete Structures: Analysis and Design*. 2nd ed. New York: McGraw-Hill Education.
3. Nash, W. A. (1957). *Theory and problems of strength of materials.* McGraw-Hill.

ARCHT-223 STRUCTURAL MECHANIC AND R.C.C. DESIGN

INSTRUCTIONAL OBJECTIVES

1. **STRESS**
   - 1.1 Define stress
   - 1.2 Enlist various types of stress
   - 1.3 Distinguish between tensile, compressive and shear stress
2. **STRAIN**
   - 2.1 Define strain
   - 2.2 Enlist different types of strain
   - 2.3 Differentiate between tensile, compressive and volumetric strain
3. **ELASTICITY**
   - 3.1 Define elasticity
   - 3.2 Define plasticity
   - 3.3 State elastic limit
   - 3.4 State yield point
   - 3.5 State Hook's law
   - 3.6 State modulus of elasticity
   - 3.7 Define stress-strain curve
   - 3.8 Compute modulus of elasticity
4. **CENTRE OF GRAVITY**
   - 4.1 Define center of gravity
   - 4.2 Describe center of gravity of basic geometrical shapes (line, square, rectangle, triangle, circle)
   - 4.3 Define centroid
   - 4.4 Definition of technical terms (reference axes, centroidal distances, composite sections)
   - 4.5 Define symmetrical and un-symmetrical sections
5. **MOMENT OF INERTIA**
   - 5.1 Define Moment of Area.
   - 5.2 Describe M.O.I of sections (channel, I, rectangle)
   - 5.3 Define radius of gyration
   - 5.4 State parallel axes and perpendicular axes theorems
   - 5.5 Calculation M.O.I of various sections
6. **BENDING MOMENT AND SHEAR FORCE**
   - 6.1 Introduction to shear force and bending moment
   - 6.2 Describe significance of S.F and B.M in R.C.C. structures
   - 6.3 Define beam and its types
   - 6.4 Describe supports of beam
   - 6.5 Describe loads on beam
   - 6.6 Describe span of beam
   - 6.7 Describe moment and its types
   - 6.8 Define S.F.D, B.M.D and point of inflexion
   - 6.9 Numerical problems regarding simply supported beam

7. SOIL MECHANICS

7.1 Introduction to soil

7.2 Types of soils

7.3 Description of technical terms used in soil mechanics

7.4 Explain bearing capacity of soil

8. R.C.C. DESIGN

8.1 Define R.C.C.

8.2 State the difference between R.C.C and P.C.C.

8.3 Describe Advantages and Disadvantages of R.C.C.

8.4 Describe different types of loads

8.5 Explain various types of Reinforcement (shape, surface, use, stress, strength, material)

8.6 Describe Design Service load method (working stress method i.e. load factor and elastic theory)

8.7 Technical terms (grades of concrete, compressive strength, tensile strength, modulus of elasticity, modular ratio)

9. UNDERSTAND R.C.C. COLUMN AND FOOTING

9.1 Introduction to R.C.C. columns and footings

9.2 Describe different types of R.C.C. columns and footings

9.3 Explain technical terms related to R.C.C. column and footing.

9.4 Calculations for approximate sizing

10. UNDERSTAND R.C.C. BEAM

10.1 Introduction to R.C.C. beams

10.2 Describe different types of R.C.C. beams

10.3 Explain technical terms related to R.C.C. beam

10.4 Calculations for approximate sizing

11. UNDERSTAND R.C.C. SLAB

11.1 Introduction R.C.C. to slab

11.2 Describe different types of R.C.C. slabs

11.3 Explain technical terms related to R.C.C. slab

11.4 Calculations for approximate sizing

ARCHT-223 STRUCTURAL MECHANIC AND R.C.C. DESIGN

LIST OF PRACTICALS

1. Calculations of different types of stresses in beams (06 Hours)
2. Calculations of different types of strains in beams (06 Hours)
3. Calculation of modulus of elasticity of different materials (09 Hours)
4. Calculation of center of gravity/centroid of different symmetrical and un-symmetrical composite sections (Channel, H, I, T, Z) (09 Hours)
5. Calculation of M.O.I of different composite sections (Channel, I, T, Z) (12 Hours)
6. Study visit of the site to observe a frame structure building and submit a report (06 Hours)
7. Prepare graph sheets of S.F.D and B.M.D of simply supported beams with different loading conditions (12 Hours)
8. Designing of R.C.C. columns and also prepare sheets showing reinforcement details (12 Hours)
9. Designing of R.C.C. rectangular beams and prepare sheets showing reinforcement details (12 Hours)
10. Designing of RCC slab and prepare sheets showing reinforcement details (12 Hours)

ARCHT-233 ARCHITECTURAL DRAWING AND DESIGN-I

Total Contact Hours: 288 Hours

T	P	C
0	9	3

LEARNING OUTCOMES:

The students will be able to: -

- Understand the architectural design process, Flow diagrams, and circulation systems
- Design spaces, ranging from single-function to multi-function spaces
- Apply the skills learned in the course "Architectural Graphics"

LIST OF PRACTICAL

1. Designing a bathroom (Plan, Sections) (18 Hours)
2. Designing a kitchen (Plan, Sections) (18 Hours)
3. Designing a bedroom with an attached bathroom (Plan, Internal Layout) (27 Hours)
4. Designing a T.V. lounge / Living room (Plan, Layout) (27 Hours)
5. Designing a drawing room and a dining room (Plan, Sections, and Layouts) (27 Hours)
6. Designing of different types of stairs (Plan, Elevation, and Section) (36 Hours)
7. Planning a vehicle parking lot. (18 Hours)
8. Designing a house (Plans, Elevations, Sections, and Details) (36 Hours)
9. Preparing a submission drawing of a house for the local Authority's approval. (45 Hours)
10. Designing a small commercial building e.g. Bank, Restaurant and Architect's office (Plans, Elevations, and Sections) (36 Hours)

RECOMMENDED BOOKS

1. Ching, F. D. (2023). *Architecture: Form, space, and order*. John Wiley & Sons.
2. De Chiara, J., & Callender, J. H. (Eds.). (1990). *Time-saver standards for building types* (3rd ed.). McGraw-Hill.
3. Townsend, G., & Dalzell, J. R. (1952). *How to plan a house.* American Technical Society.

ARCHT-242 COMPUTER-AIDED DRAFTING AND PRESENTATION-II

	T	P	C
Total Contact Hours: 192			
Theory: 0	0	6	2
Practical: 192			

LEARNING OUTCOMES

The students will be able to: -

- Understand advanced commands of AutoCAD
- Prepare drawings in addition to a plan, e.g., sections, elevations
- Prepare working drawings
- Achieve the goals in the least possible time
- Prepare 3D drawings
- Render the 3D AutoCAD Model in 3D Studio Max

LIST OF PRACTICAL

1. **Advanced commands of AutoCAD (**To be determined by the teacher**)** (**18 Hours)**
2. **Introduction to Elevations and Section** (**15 Hours)**
   - 2.1 Concept of Elevation
   - 2.2 Drawing elevation through plan rotation methods
   - 2.3 Introduction to "Ray" and Construction Line
   - 2.4 Concept of section
   - 2.5 Drawing section through "Plan rotation Method"
   - 2.6 Specifications
     - 2.6.1 Traditional specifications
     - 2.6.2 Regional Specifications
     - 2.6.3 Specifications writing
3. **Working Drawings** **(27 Hours)**
   - 3.1 Introduction of working drawing
   - 3.2 Purpose of working drawing
   - 3.3 International standards of drafting and meanings of different types of lines
   - 3.4 Preparation of working drawing
   - 3.5 Dimensioning
   - 3.6 Editing dimensions
   - 3.7 Changing dimensions style
   - 3.8 Line-type scale
   - 3.9 Adjusting line type scale
4. **Shortcuts** **(06 Hours)**
   - 4.1. Multiple commands for the same outcome and then selecting the one that suits best to any situation

5. Scale Adjustment In Drawing And Getting Print On Any Given Scale (06 Hours)

5.1 Concept of scale

5.2 Difference between drawing scale and print scale

5.3 Printing scales

6. 3D Modeling in AutoCAD (24 Hours)

6.1. Concept of 3D Modeling

6.2. Terminology of 3D

6.2.1. Isometric

6.2.2. Perspective

6.3. Drawing manually on a 3D coordinates system to understand the concept of x-y axes

6.4. Extrude

6.4.1. Through extrusion angle

6.4.2. Through path

6.5. Changing the thickness of the line

6.6. Difference between extrude and changing thickness

6.7. Solid editing

6.8. UCS

6.9. Views

6.10. Following toolbars will be studied

6.10.1. Edit

6.10.2. Dimensioning

6.10.3. Layers

6.10.4. Modify

6.10.5. Object Snap

6.10.6. Insert

6.10.7. Express tools

6.10.8. Text

7. 3D Studio Max (78 Hours)

7.1. Introduction to 3D Studio Max

7.1.1. Grid and Units

7.1.2. Basic Tools

7.2. 2D Drawing

7.2.1. Basic Shapes

7.2.2. Editable Spline

7.3. 3D Modeling

7.4. Basic Modeling

7.4.1. Standard Primitives

7.4.2. Extended Primitives

7.5. Mesh

7.5.1. Editable Mesh

7.5.2. Editable Poly Mesh

7.6. Surface

7.6.1. Plan

7.6.2. Patch Grid

7.7 Materials

7.7.1. Standard Materials

7.7.2. Mapping

7.8 Lighting

7.8.1 Standard Lighting

7.8.2 Introduction to Photometric Lighting

7.8.3 Advance Lighting

7.8.4 Lighting Effect

7.8.5 Photoshop

7.9 Camera

7.9.1 Introduction and Camera Composition

7.10. Rendering

7.10.1 Scan line Renderer

7.10.2 Rendering Effects

7.10.3 Different File Formats

7.10.4 Introduction to Photoshop

8. Prepare a project at the end of the subject (18 Hours)

RECOMMENDED BOOKS

1. Moss, E. (2024). *Autodesk AutoCAD Architecture 2023 fundamentals*. SDC Publications.
2. Murdock, K. L. (2009). *3ds Max 2010 Bible*. John Wiley & Son
3. Autodesk. **(**2022). *Autodesk 3ds Max 2022 fundamentals*. Autodesk.

ARCHT-253 BUILDING MATERIALS AND CONSTRUCTION-II

	T	P	C
Total Contact Hours: 160			
Theory: 64 Hours	2	3	3
Practical: 96 Hour			

LEARNING OUTCOMES

The students will be able to:

- Familiar with the construction of buildings.

COURSE CONTENTS

1. FOUNDATIONS (08 Hours)

1.1. Site Preparation and Demarcation
1.2. Excavation
1.3. Types of Foundations
1.4. Termite Proofing
1.5. Moisture Insulation and Thermal Insulation

2. WALLS (10 Hours)

2.1. Types of Walls, load bearing, and non-load bearing Walls
2.2. Masonry Works
2.3. Lintels, Sills, and Arches
2.4. D.P.C. in Walls

3. FLOORS (08 Hours)

3.1. Flooring Types and their Components
3.2. Specifications for various Flooring Materials

4. ROOFS (10 Hours)

4.1. Roof Specifications
4.2. Types of Roofs
4.3. R.C.C. Roofs
4.4. Wooden Roofs
4.5. Shell Roof and Dome

5. STAIRS (08 Hours)

5.1. Types of Stairs, their uses and applications
5.2. Lift well, Escalator, Ramps

6. DOORS (06 Hours)

6.1. Different types of Doors
6.2. Construction of Wooden and Steel Doors
6.3. Termite Protection of Wooden Doors

7. WINDOWS (06 Hours)

7.1. Different types of Windows
7.2. Construction techniques of Wooden and Metal Windows

8. SCAFFOLDING, SHORING AND UNDERPINNING (08 Hours)

8.1. Scaffolding: types and construction techniques

8.2. Shoring: types and applications
8.3. Underpinning: techniques and importance

RECOMMENDED BOOKS

1. Arora, N. L., & Gupta, B. R. (1974). *Building construction (*2024th edition). Satya Prakashan, India
2. Sharma, S. K. (1987). *A textbook of building construction.* S. Chand & Company.
3. Ching, F. D. K. (2014). *Building construction illustrated* (5th ed.). Wiley.

ARCHT-253 BUILDING MATERIALS AND CONSTRUCTION-II

INSTRUCTIONAL OBJECTIVES

1. UNDERSTANDING THE TYPES OF FOUNDATIONS

1.1 Describe the site preparation and Demarcation
1.2 Define excavation and techniques of excavation including basement
1.3 Define foundation and their details
1.4 State the types of foundations
1.5 Describe the termite proofing
1.6 Describe the moisture insulation and thermal insulation

2. UNDERSTANDING THE TYPES OF WALLS AND THEIR CONSTRUCTION

2.1 Describe the types of walls, load bearing, non-load bearing walls,
2.2 Explain the construction Process for brick walls
2.3 Detailed Explanation of Stone Wall Construction
2.4 Step-by-Step Process for Constructing Block Walls
2.5 Explain the construction of partition walls and cavity walls
2.6 Explain the construction of lintels, sills and arches
2.7 Describe D.P.C. in walls

3. UNDERSTANDING THE FLOORS

3.1 Explain the types of floors
3.2 Explain the details of concrete floors
3.3 Describe the floor specifications and Requirements

4. UNDERSTANDING THE DETAILS OF DIFFERENT TYPES OF ROOFS

4.1 State the classifications of roof types
4.2 Explain the types of wooden roof
4.3 Provide a detailed description of roof components
4.4 Describe shell roofs and their applications
4.5 Describe domes
4.6 Describe the roof covering materials
4.7 Describe the uses of roofs
4.8 Explain trusses and their applications

5. UNDERSTANDING THE DETAILS OF STAIRS

5.1 Explain the details of the stair
5.2 Explain the types of stairs
5.3 Describe the uses of stairs
5.4 Define technical terms used in stairs

6. UNDERSTANDING THE DETAILS OF DIFFERENT DOORS

6.1 Identify the different types of doors
6.2 Explain the construction of wooden and steel doors
6.3 Describe the uses of different types of doors

7. UNDERSTAND THE DIFFERENT TYPES OF WINDOWS AND THEIR CONSTRUCTION

7.1 Explain the types of windows
7.2 Explain the construction of wooden and metal windows

7.3 Explain the use of different types of windows

8. UNDERSTANDING THE SCAFFOLDING, SHORING AND UNDERPINNING IN BUILDING

8.1 Definitions of scaffolding, shoring and underpinning

8.2 Explain the types of scaffolding, shoring and underpinning

8.3 Describe the construction methods of scaffolding, shoring and underpinning

ARCHT-253 BUILDING MATERIALS AND CONSTRUCTION-II

LIST OF PRACTICALS

1.	Draw the different types of foundations	(12 Hours)
2.	Draw a section of a Brick Wall from the foundation to the Parapet	(09 Hours)
3.	Draw a Section of a Cavity Wall	(06 Hours)
4.	Study visits to a construction site	(12 Hours)
5.	Draw details of different types of floors	(09 Hours)
6.	Draw different types of Roofs	(12 Hours)
7.	Draw the different types of stairs according to;	(09 Hours)
	7.1. Shapes	
	7.2. Materials	
8.	Draw the different types of Doors	(09 Hours)
9.	Draw the different types of Windows	(09 Hours)
10.	Draw the different types of Scaffolding	(09 Hours)

ARCHT-262 HISTORY OF ARCHITECTURE

		T	P	C
Total Contact Hours:	64			
Theory:	64	2	0	2
Practical:	0			

LEARNING OUTCOME

The students will be able to: -

- Create awareness about different driving forces shaping architecture
- Implant better understanding with relevance to time and context
- Create an understanding of world architecture
- Create an understanding of the architecture of Pakistan

COURSE CONTENTS

1. PRE-HISTORIC ARCHITECTURE (04 Hours)

1.1 Introduction to Prehistoric Architecture

1.1.1 Paleolithic

1.1.2 Mesolithic

1.1.3 Neolithic

2. ANCIENT CIVILIZATIONS (08 Hours)

2.1 Introduction

2.1.1 Indus valley

2.1.2 Mesopotamia

2.1.3 Egyptian

3. GREEK ARCHITECTURE (08 Hours)

3.1. Introduction

3.2. Salient features

3.3. Orders of Greek Architecture

3.4. Study of famous buildings

4. ROMAN ARCHITECTURE (08 Hours)

4.1. Introduction

4.2. Salient features

4.3. Study of famous buildings

5. BYZANTINE AND GOTHIC ARCHITECTURE (10 hours)

5.1. Salient features

5.2. Byzantine style of architecture

5.3. Gothic style of architecture

5.4. Introduction to Byzantine and Gothic Architecture

5.5. Study of Famous-buildings of Byzantine and Gothic style

6. RENAISSANCE ARCHITECTURE (08 Hours)

6.1. Introduction

6.2. Salient Features

6.1.1. Early Renaissance

6.1.2. High Renaissance

6.3. Study of Famous Buildings

7. MUSLIM ARCHITECTURE (08 Hours)

7.1 Characteristics of Early Muslim Architecture

7.2 Main Characteristics of Muslim Architecture in Subcontinent

7.3 Study of famous buildings in Pakistan (Lahore Fort and Shalimar Garden (Punjab), Buddhist Ruins of Takht-i-Bahi (Khyber Pakhtunkhwa), Mohenjo-Daro (Sindh)

8. MODERNISM AND POST-MODERNISM (10 Hours)

8.1 Introduction

8.2 Salient Features of Modern Architecture

8.3 Emergence of Post-Modern Architecture

8.4 Salient Features of Post-Modern Architecture

RECOMMENDED BOOKS

1. Cruickshank, D., Fletcher, B., Saint, A., Frampton, K., & Blundell Jones, P. (Eds.). (1996). *Sir Banister Fletcher's A History of Architecture* (20th ed.). Routledge.
2. Ching, F. D. K., Jarzombek, M. M., & Prakash, V. (2017). *A global history of architecture* (3rd ed.). Wiley
3. Mumtaz, K. K. (1985). *Architecture in Pakistan.* Concept Media.

ARCHT-262 **HISTORY OF ARCHITECTURE**

INSTRUCTIONAL OBJECTIVES

1. UNDERSTAND ANCIENT CIVILIZATION

1.1 Describe the main features of prehistoric Architecture
- 1.1.1 Paleolithic
- 1.1.2 Mesolithic
- 1.1.3 Neolithic

1.2 Explain the salient features of the following Famous Building
Megalithic Monuments: Stonehenge (England, c. 3000–2000 BCE)

2 UNDERSTAND ANCIENT CIVILIZATION

2.1 Explain the salient features of the following ancient civilization:
- 2.1.1 Indus valley civilization
- 2.1.2 Explain the salient features of the following famous building
  - a. Great Bath (Mohenjo-Daro)
  - b. Granaries (Harappa & Mohenjo-Daro)
- 2.1.3 Mesopotamia civilization
- 2.1.4 Explain the salient features of the following famous
  - a. Ziggurat of Ur (c. 2100 BCE)
  - b. Hanging Gardens of Babylon (c. 6th Century BCE)
- 2.1.5 Egyptian civilization
- 2.1.6 Explain the salient features of the following famous building
  - a. The Great Pyramid of Giza (c. 2580–2560 BCE)
  - b. The Great Sphinx of Giza (c. 2500 BCE)

3. UNDERSTAND GREEK ARCHITECTURE

3.1 Introduction of Greek Civilization
3.2 Describe salient features of Greek Architecture
3.3 Explain orders of Greek Architecture
- 3.3.1 Doric
- 3.3.2 Ionic
- 3.3.3 Corinthian orders

3.4 Explain the salient features of the following famous buildings
- 3.4.1 The Parthenon Athens
- 3.4.2 The Greek Theatre

4. UNDERSTAND THE ROMAN ARCHITECTURE

4.1 Introduction to Roman Civilization
4.2 Describe the salient features of Roman Architecture
4.3 Explain the orders of Roman Architecture
4.4 Explain main features of the following famous buildings
- 4.4.1 Roman Colosseum
- 4.4.2 Pantheon Rome

5. UNDERSTAND BYZANTINE AND GOTHIC ARCHITECTURE

5.1 Introduction to Middle Ages Architecture
5.2 Describe the salient features of the following civilizations

5.2.1 Byzantine Architecture
5.2.2 Gothic Architecture
5.3 Explain the salient features of the following famous buildings
5.3.1 Hagia Sophia Constantinople
5.3.2 Cathedral-Notre Dame, Paris

6. UNDERSTAND RENAISSANCE ARCHITECTURE

6.1 Introduction to Renaissance Architecture
6.2 Describe the Key Architectural Salient features of the following famous buildings:
6.2.1 S. Lorenzo, Florence
6.2.2 Peter, Rome

7. UNDERSTAND THE MUSLIM ARCHITECTURE

7.1 Describe the Salient Features of Early Muslim Architecture
7.2 Explain salient features of Muslim Architecture in Sub-Continent
7.3 Explain the Architectural features and materials of the following Iconic Structures:
7.3.1 Lahore Fort and Shalimar Garden/Punjab
7.3.2 Buddhist Ruins of Takht-i-Bahi /Khyber Pakhtunkhwa
7.3.3 Mohenjo-Daro /Sindh

8. UNDERSTAND MODERNISM AND POST-MODERNISM

8.1 Introduction to Modern Architecture
8.2 Describe the salient features of Modern Architecture
8.3 Explain the contribution of the following Architects:
8.3.1 Le Corbusier
8.3.2 Mies van der Rohe
8.3.3 Frank Llyod Wright
8.4 Describe the Emergence of Post-Modern Architecture
8.5 Explain the salient features of Post-Modern Architecture

ARCHT-274 SURVEYING AND LEVELLING

	T	P	C
Total Contact Hours: 256			
Theory: 64 Hours	2	6	4
Practical: 192 Hours			

LEARNING OUTCOMES

The students will be able to:

- Understand the basic principles of surveying and Levelling
- Understand the application of surveying and Levelling instruments in Architectural practices

COURSE CONTENTS

1. SURVEYING (06 Hours)

1.1 Introduction of Surveying
1.2 Division of surveying (Geodetic, Plane)
1.3 Classes of Surveying (Preliminary, Control, and Layout Surveying)
1.4 Types of Surveying (Based on function and instrument)
1.5 Principles of Surveying
1.6 Scales (Units of measurement)

2. DISTANCE MEASUREMENT TECHNIQUES AND INSTRUMENTS (06 Hours)

2.1 Taping
2.2 Chaining
2.3 Ranging
2.4 Offsets
2.5 Plane Table
2.6 Vernier
2.7 Electronic Distance Measurement (EDM)

3. COMPASS SURVEY (06 Hours)

3.1 Introduction
3.2 Types
3.3 Equipment
3.4 Method
3.5 Types of traversing

4. LEVELLING (12 Hours)

4.1 Introduction to levelling
4.2 Introduction to Level
4.3 Instruments for levelling
4.4 Types of levels
4.5 Adjustment of level
4.6 Types of levelling
4.7 Method of levelling

5. THEODOLITE (14 Hours)

5.1 Introduction
5.2 Parts
5.3 Types
5.4 Definition of terms
5.5 Adjustment
5.6 Function
5.7 Measuring
5.8 Traversing
5.9 Errors
5.10 Plotting

6. TOTAL STATION (16 Hours)

6.1 Introduction, types, main parts, and accessories of Total Station
6.2 Functions and Modes of a Total Station
6.3 Setting out parameters: Tilt correction and preparation for operations
6.4 Measurements of distances, angles, bearings, and co-ordinates
6.5 Measurement of the area using recorded data
6.6 Putting data in the respective software and its mapping

7. GLOBAL POSITIONING SYSTEM (GPS) (04 Hours)

7.1 Introduction to GPS and its Types
7.2 Functions and Modes of GPS
7.3 Setting parameters

RECOMMENDED BOOKS

1. Husain, S. K., & Nagaraj, M. S. (1981). *Textbook of surveying*. S. Chand.
2. Kanetkar, T. P. (1786). Surveying & Levelling (Vol-1 & II). Poona Vidhyarthi Griha Prakashan.
3. Rogar, A. (1980). A Textbook of Surveying & Levelling, Khana Publishers.

ARCHT-274 SURVEYING AND LEVELLING

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND THE SURVEYING**
   - 1.1 Define surveying
   - 1.2 State division of surveying
   - 1.3 State classes of survey (Preliminary survey, control survey, layout survey)
   - 1.4 State classification of surveying based on function of survey and type of instrument used, including Chain and Compass Surveying, Control surveying, Land surveying, Topographic Surveying, Engineering Surveys, and Cadastral Surveys.
   - 1.5 Determine the principle of surveying
   - 1.6 Explain different types of scale
2. **UNDERSTAND THE DISTANCE MEASUREMENT TECHNIQUES AND INSTRUMENT**
   - 2.1 Explain the principles, methods, and sources of error in taping for distance measurement.
   - 2.2 Describe the types of chains used in surveying and their applications in distance measurement.
   - 2.3 Explain the concept of ranging and differentiate between direct and indirect ranging methods.
   - 2.4 Define offsets and distinguish between perpendicular and oblique offsets in surveying.
   - 2.5 Describe the principles, equipment, and methods used in plane table surveying.
   - 2.6 Explain the working principle of a Vernier scale and its application in precise measurements
   - 2.7 Describe the principles, types, and advantages of Electronic Distance Measurement (EDM) instruments
3. **UNDERSTAND THE COMPASS SURVEY**
   - 3.1 Explain the fundamental principles, importance, and applications of compass surveying.
   - 3.2 Describe the different types of compasses used in surveying and their specific applications.
   - 3.3 Identify and explain the functions of various equipment used in compass surveying.
   - 3.4 Explain the procedure for conducting a compass survey, including field observations and error adjustments.
   - 3.5 Describe the different types of traversing in compass surveying and their respective advantages and limitations.
4. **UNDERSTAND THE LEVELLING**
   - 4.1 Define levelling
   - 4.2 Define level
   - 4.3 Explain how to operate auto set level, tripod, plum bob and staves
   - 4.4 State various types of levels
     - 4.4.1 Describe the use of auto level
     - 4.4.2 Explain the use of laser level

4.4.3 Explain the use of digital level

4.5 Explain the method of reduction of level by

4.5.1 Height of instrument method

4.5.2 Rise and fall method

4.6 State the types of levelling (fly reciprocal, check)

4.7 State the methods of levelling

5. UNDERSTAND THEODOLITE

5.1 Define theodolite, micro-optic theodolite, Vernier theodolite and digital theodolite

5.2 Explain theodolite parts

5.3 State its types

5.4 Describe terms use in theodolite

5.5 Explain the adjustment of theodolite

5.6 Explain the function of theodolite

5.7 Explain the measuring angle of theodolite

5.8 Explain the traversing of theodolite

5.9 Explain the Errors occurred during Traverse

5.10 Prepare the sheet

6. UNDERSTAND THE TOTAL STATION AND ITS OPERATION

6.1 Identify the total station, its parts, functions, and modes

6.2 Identify and describe the accessories of the total station and their operation

6.3 Describe the parameters, setting of the total station, and its operation

6.4 Explain the methods of measurement of distances, angles, bearings, and co-ordinates by total station

6.4.1 Explain the measurement of vertical angles and tilt correction

6.4.2 Preparation and setting of horizontal and vertical angle Repetition angle measurement

6.4.3 Setting out percentage grade and stack-out

6.4.4 Explain offset measurement

6.4.5 Setting and calculation co-ordinate value of occupied station, setting height of instrument & height of reflector

6.4.6 Define remote elevation measurement, and missing line measurement

6.4.7 Explain measurement of area, point to point measurement

6.4.8 Describe how data collected

6.4.9 Explain data searching in memory manager mode

6.4.10 Explain down loading data from total station

6.5 Putting data in the respective software and mapping thereof

7. GLOBAL POSITIONING SYSTEM (GPS)

7.1 Identify the parts of GPS and describe its types

7.2 Describe the functions and modes of GPS

7.3 Describe the parameters of GPS

ARCHT-274 SURVEYING AND LEVELLING

LIST OF PRACTICAL

1.	Ranging lines by different methods	(06 Hours)
2.	Setting out the right angle with the help of different instruments.	(06 Hours)
3.	Calculation of F.B., B.B., R.B. and W.C.B. included angle, etc.	(12 Hours)
4.	Practice in the use of taking a reading on staff	(03 Hours)
5.	Temporary adjustment of auto level, digital level, and Laser Level	(12 Hours)
6.	Finding RL. Height of instrument	(09 Hours)
7.	Taking longitudinal section and cross-section (½ K.M long route)	(24 Hours)
8.	Taking the level of contour survey of an area	(18 Hours)
9.	Practice on theodolite and prepare a drawing sheet	(42Hours)
10.	Practice on Total Station and prepare the drawing sheet	(48 Hours)
11.	Practice on GPS to find out the co-ordinates of given points	(12 Hours)

CURRICULUM
DAE 3rd YEAR
ARCHITECTURE
TECHNOLOGY

سال سوئم

حصہ اول اسلامیات

تدریس مقاصد

قرآن حکیم:

عمومی مقاصد: منتخب سورتوں اور آیات کی روشنی میں اسلام کے بنیادی مقاصد اور عبادات جان سکے

خصوصی مقاصد: طالب علم اس قابل ہو جائے گا کہ۔

سورۃ الفاتحہ، آیت لکرسی، سورۃ بقرہ کی آخری آیات ازمن الرسول سے اور سورۃ اخلاق کا ترجمہ وتشریح کر سکے

طالب علم درج ذیل کا مفہوم بیان کر سکے

() رب العالمین صرف اللہ تعالیٰ ہے

() اللہ رحم کرنے والا ہے

() قیامت کے دن بادشاہی اللہ کی ہوگی

() عبادات اور استعانت کا حقدار صرف اللہ ہے

() طالب علم درج ذیل کا مفہوم بیان کر سکے

() اللہ پاک ہر عیب سے پاک ہے

() اللہ کے اسمائے حسنہ حق اور قیوم ہیں

() تمام انبیاء پر ایمان لانا ضروری ہے

() رسول، ملائکہ، کتب، سماویہ، پر ایمان لانا فرض ہے

() اطاعت حقیقی صرف اللہ کے لیے ہے

() اسلامی احکامات پر عمل کرنا امسانی بساط میں ہے

() کفر کو اللہ کی مدد کے بغیر شکست نہیں دی جا سکتی

() اللہ ایک ہے

() اللہ کسی کا محتاج نہیں نہ اسکا کوئی شریک ہے

منتخب احادیث:

عمومی مقصد: احادیث کی روشنی میں اسلامی تعلیمات پر عمل پیرا ہو سکے

خصوصی مقاصد:

() احادیث کا ترجمہ بیان کر سکے

() احادیث کی تشریح کر سکے

() معاشرتی اور انفرادی زندگی میں احادیث سے رہنمائی حاصل کر سکے

حقوق وفرائض:

عمومی مقاصد:

() اسلامی معاشرے کا ایک اچھا فرد بن سکے

خصوصی مقاصد:

() والدین کے حقوق وفرائض بیان کر سکے

() ہمسائیوں کے حقوق بیان کر سکے

() بچوں کے حقوق بیان کر سکے

() عورتوں کے حقوق کی پاسداری کر سکے

() بزرگ شہریوں کے حقوق کا خیال رکھ سکے

() مخنث حضرات کے حقوق جان سکے اور ان کے حقوق کی پاسداری کر کے انہیں معاشرے کا ایک مفید فرد بنایا جا سکے

() اسلام میں حقوق وفرائض کی آگاہی کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کر سکے

اسلامی اقدار:

عمومی مقاصد:

() طالب علم جان سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہونا ہے

خصوصی مقاصد:

() اخلاق کے معنی ومفہوم کو بیان کر سکے

() اسلام میں حسن واخلاق کی اہمیت بیان کر سکے

() قرآن وسنت کی روشنی میں صبر واستقلال کی اہمیت بیان کر سکے

() ایفائے عہد کی اہمیت بیان کر سکے

() اخوت کے معنی ومفہوم بیان کر سکے

() اخوت اسلامی کی اہمیت بیان کر سکے

نصاب (سال سوئم)

GEN 301

مطالعہ پاکستان

ٹی	پی	سی
1	0	1

کل وقت 12 گھنٹے

حصہ دوئم

موضوعات:

() قیام پاکستان
() باؤنڈری کمیشن
() ریڈکلف ایوارڈ
() تقسیم بنگال
() تقسیم پنجاب
() مسئلہ مہاجرین
() ریاست کا الحاق
() ریاست جموں کشمیر
() نہری پانی کا تنازعہ
() قرارداد پاکستان
() علماء کے بائیس نکات
() 1956-1962-اور 1973 کے دساتیر کی اسلامی/انسانی حقوق کی دفعات (8 تا 28)۔
() اقلیتوں کے حقوق۔ دیگر محروم طبقات کے حقوق
() پاکستان کا محل وقوع اور اسکی جغرافیائی اہمیت۔ GSP+ کا تعارف اور عملی طریقہ کار
() قدرتی وسائل (تیل، گیس، کوئلہ)

مطالعہ پاکستان (حصہ دوئم)

قیام پاکستان

تدریس مقاصد:

عمومی مقاصد:

() قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے

خصوصی مقاصد:

() باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے

() ریڈکلف اور اس کے ایوارڈ کے بارے بیان کر سکے

() بنگال اور کلکتہ کی تقسیم کی وجوہات بیان کر سکے

() پنجاب کی تقسیم کی تفصیل بیان کر سکے

() مہاجرین کی آمد سے جو مسائل پیدا ہوئے انہیں بیان کر سکے

() ریاستوں کے الحاق کے بارے میں تفصیل بیان کر سکے

() ریاست جموں کشمیر کے بارے میں بیان کر سکے

() نہری پانی کے تنازعہ کو بیان کر سکے

() قرارداد مقاصد کی تفصیلات بیان کر سکے

() 22 علماء کے متفقہ اسلامی نکات بیان کر سکے

() 1973 کے آئین میں انسانی حقوق کی دفعات (28-8)۔اقلیتوں کے حقوق اور دیگر محروم طبقات کے حقوق کے بارے میں جان سکے

() قیام پاکستان کے بعد نفاذ اسلام کی کوششوں کو بیان کر سکے

() پاکستان کے محل وقوع اور اس کی جغرافیائی اہمیت بیان کر سکے اور GSP+ کے تعارف اور عملی طریقہ کار بیان کر سکے

() پاکستان میں قدرتی وسائل (تیل، گیس، کوئلہ) کے بارے میں بیان کر سکے

غیر مسلم طلباء کے لیے

GEN301

نصاب اخلاقیات

سال سوئم

ٹی	پی	سی
1	0	1

کل وقت 20 گھنٹے

موضوعات:

() احساس ذمہ داری

() مثبت ذہن

() عدل وانصاف

() قومی خدمت کا جذبہ

() ذکر ونظر کی پاکیزگی

() احترام آدمیت

() شائستگی

() عفوودرگذر

() بردباری

() خودانحصاری

() اثر ونفوذ

() جامعیت

() اپنی ذات کی معرفت (بذریعہ ہم عمر طلباء، اساتذہ، اہم شخصیات)

() بچوں کے حقوق

() عورتوں کے حقوق

() بزرگ شہریوں کے حقوق

() مخنث حضرات کے حقوق

غیر مسلم طلباء کے لیے

نصاب اخلاقیات (سال سوئم)

تدریس مقاصد:

عمومی مقاصد:

() ملکی ترقی کے لیے اعلیٰ اوصاف کے ساتھ بہتر طور پر ملک وملت کی خدمت کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو سکے کہ

() موضوعات کا مطلب بیان کر سکے

() عملی زندگی سے مثالوں کی نشاندہی کر سکے

() موضوعات کی اہمیت بیان کر سکے

() اپنی شخصیت اور معاشرے پر موضوعات کے مطابق اثرات پیدا کرنے کے طریقے بیان کر سکے

() مثبت ذہن کے ساتھ کام کر سکے

() عدل وانصاف سے ادارہ میں، دفتر میں بہتر ماحول پیدا کر سکے

() ماحول کو اخلاقی طور پر پاکیزہ بنائے

() کارکنوں کی بہتر طور پر دل جوئی کر سکے

() کارکردگی میں اضافہ کر سکے

() باہمی احترام کی برکات سے استفادہ کر سکے

() بچوں کے حقوق بیان کر سکے

() عورتوں کے حقوق کی پاسداری کر سکے

() بزرگ شہریوں کے حقوق کا خیال رکھ سکے

() مخنث حضرات کے حقوق جان سکے اور ان کے حقوق کی پاسداری کر کے انہیں معاشرے کا ایک مفید فرد بنایا جا سکے

ARCHT- 312 ENVIRONMENTAL STUDIES-II

	T	P	C
Total Contact Hours: 64 Hours			
Theory: 64	2	0	2
Practical: 0			

LEARNING OUTCOMES:

The students will be able to: -

- Understand the negative effects of the environment and methods for the rectification of these hazards for the production of a healthy and friendly environment.
- Understand the application of water sewerage techniques for small-scale buildings.

COURSE CONTENTS

1. ACOUSTICS (10 Hours)

1.1 Introduction
1.2 Physical properties of sound-absorbing materials
1.3 Types of sound absorbing material
1.4 Methods of sound insulation

2. FIRE PREVENTION AND PROTECTION (10 Hours)

2.1 Introduction
2.2 Importance of fire safety in buildings
2.3 Types of Fires
2.4 Causes and effects of fire
2.5 Preventive and protective measures of fire safety in the design of buildings
2.6 Types of fire-resisting materials
2.7 Fire Protection systems in buildings

3. SEWERAGE (20 Hours)

3.1 Introduction
3.2 Technical terms
- 3.2.1 Sewage and its types
- 3.2.2 Sewer and its types
- 3.2.3 Infiltration
- 3.2.4 Inflow
- 3.2.5 Ex-filtration
- 3.2.6 Invert

3.3 Systems of sewage
3.4 Slopes
3.5 Connection to public sewers
3.6 Pipes (Kinds and Users)
3.7 Sewage Treatment
3.8 Treatment Tanks
3.9 Soakage Pit
3.10 Chlorination

4. HEATING, VENTILATION AND AIR CONDITIONING (12 Hours)

4.1 Introduction to:

- 4.1.1 Heating
- 4.1.2 Cooling
- 4.1.3 Ventilation
- 4.1.4 Air conditioning, its scope and applications
- 4.1.5 Human comfort
- 4.1.6 Piping, valves, ducts, fans and insulation
- 4.1.7 Heating and cooling loads

5. ELECTRIFICATION (12 Hours)

5.1 Introduction to:

- 5.1.1 Electrification
- 5.1.2 Cables, circuits, and their types
- 5.1.3 Insulation and its Types
- 5.1.4 Parts in conduit layout
- 5.1.5 Phases of Power
- 5.1.6 Earthing System

RECOMMENDED BOOKS

1. Steel, E. W., & McGhee, T. J. (1960). *Water supply and sewerage*. McGraw-Hill Book Company. New York, 5th edition (05: 06: 07 A STE), 1979, 679.
2. Olgyay, V. (1963). *Design with climate: Bioclimatic approach to architectural regionalism.* McGraw-Hill Education.
3. Pita, E. G. (2002). *Air conditioning principles and systems* (4th ed.). Prentice Hall.

ARCHT-312 ENVIRONMENTAL STUDIES-II

INSTRUCTIONAL OBJECTIVES

1. **ACOUSTICS**
   - 1.1 Define acoustics
   - 1.2 Definition of technical terms. (Sound, Intensity of sound, Frequency of sound, Reverberation)
   - 1.3 Describe the qualities of sound-absorbing materials
   - 1.4 Explain types of sound-absorbing material
   - 1.5 Explain methods of sound insulation in buildings
2. **FIRE PREVENTION & PROTECTION**
   - 2.1 Explain fire protection in buildings
   - 2.2 Explain the types of fires
   - 2.3 Explain the causes and effects of fire
   - 2.4 Describe Preventive and Protective measures in the design of buildings
   - 2.5 Explain types of fire-resisting materials
   - 2.6 Explain Fire protective systems in buildings
3. **SEWERAGE SYSTEM**
   - 3.1 Define sewerage system
   - 3.2 Definition of some important terminologies
     - 3.2.1 Sewage and its types
     - 3.2.2 Sewer and its types
     - 3.2.3 Infiltration
     - 3.2.4 Inflow
     - 3.2.5 Ex-filtration
     - 3.2.6 Invert
   - 3.3 Explain systems of sewerage
   - 3.4 Explain slopes in sewerage design
   - 3.5 Explain connection to public sewers
   - 3.6 Explain Pipes (Kinds and Users)
   - 3.7 Explain the importance of sewage treatment
   - 3.8 Explain various types of treatment tanks
   - 3.9 Explain Soakage Pit
   - 3.10 Explain chlorination
4. **HEATING, VENTILATION AND AIR CONDITIONING**
   - 4.1 Define heating in buildings
   - 4.2 Explain various methods of heating systems used in buildings
   - 4.3 Define cooling in buildings
   - 4.4 Explain various methods of cooling systems used in buildings
   - 4.5 Explain ventilation and its types in buildings
   - 4.6 Explain air conditioning, its scope and application
   - 4.7 Explain the components of air conditioning systems
   - 4.8 Explain human comfort
   - 4.9 Explain piping, valves, ducts, fans, and insulation used in HVAC

4.10 Define heating and cooling loads

5. ELECTRIFICATION

5.1 Explain the electrification in buildings
5.2 Explain cables, circuits, and their types
5.3 Explain insulation and its types used in electrification
5.4 Explain different parts of the conduit layout
5.5 Explain phases of power
5.6 Explain the Earthing system in buildings

ARCHT-323 ARCHITECTURAL DRAWING & DESIGN-II

		T	P	C
Total Contact Hours: 288				
Theory:	0	0	9	3
Practical:	288			

LEARNING OUTCOMES

The students will be able to: -

- Develop students' proficiency in preparing accurate and detailed architectural working drawings
- Familiarize students with industry standards, symbols, and conventions used in working drawings

LIST OF PRACTICALS

1. To prepare working drawings of a single-storey house including the design of units such as bathrooms, kitchens, bedrooms, and living spaces **(90 Hours)**
2. To prepare working drawings of a double-storey house including developing floor plans, elevations, sections, and structural details and incorporating site planning, material specifications, and finishing details (**90 Hours)**
3. To prepare working drawings of a multi-story Commercial/Semi-Commercial building focusing on advanced structural components, facade treatments and MEP (Mechanical, Electrical, and Plumbing) integration, Including fire safety and security measures, accessibility standards, and compliance with Local Building control agencies' BUILDING BYE-LAWS (**108 hours)**

RECOMMENDED BOOKS

1. De Chiara, J., & Callender, J. H. (Eds.). (1990). *Time-saver standards for building types* (3rd ed.). McGraw-Hill.
2. Townsend, G., & Dalzell, J. R. (1952). *How to plan a house.* American Technical Society.
3. Ramsey, C. G., & Sleeper, H. R. (2008). *Architectural graphics standards* (11th ed.). Wiley.

ARCH-332 MODEL MAKING

	T	P	C
Total Contact hours: 192			
Theory: 0	0	6	2
Practical: 192			

LEARNING OUTCOMES

The students will be able:

- To know about the volumes and forms of the buildings.
- To learn the skill of model making of different buildings, including landscaping and the physical environment.

LIST OF PRACTICALS

1. Prepare block Models of different 3D shapes in cardboard/ Box board and composition of shapes (24 Hours)
2. Prepare a detailed model of a double-storey House with landscaping (60 Hours)
3. Prepare a detailed model of a Multi-storey building (48 Hours)
4. Prepare a detailed model of a building having arches, domes, vaults, minarets, etc. (such as a Masjid, Temple, Church, etc.) (60 Hours)

RECOMMENDED BOOKS

1. Busch, A. (1991). *The art of architectural model*. Whitney Library of Design.
2. Ratensky, A. (1983). *Drawing and model making*. Watson-Guptill.
3. Dunn, N. (2014). *Architectural Model Making* (2nd ed.). Laurence King Publishing.

ARCHT-343 SPECIFICATIONS AND ESTIMATION

		T	C	P
Total Contact Hours: 160				
Theory:	64	2	3	3
Practical:	96			

LEARNING OUTCOMES:

The students will be able to: -

- Familiarize with specifications and complete estimates of single and double-storey buildings and byelaws

COURSE CONTENTS

1. BUILDING SPECIFICATIONS (04 Hours)

1.1. Introduction
1.2. Types of specification
1.3. General Specification on 1st class building
1.4. Detail Specification of Brick and P.C.C. work
1.5. Use of reference specification

2. BILL OF QUANTITIES (15 Hours)

3.1 Earthwork in the excavation of the foundation
3.2 Instructions on working out quantities of various types of walls i.e. T, L, U, D, and O
3.3 P.C.C in foundation
3.4 Brickwork in Foundation
3.5 Brickwork in the plinth level
3.6 DPC in walls
3.7 Brickwork in superstructure
3.8 Calculate the concrete work in R.C.C. members

3. SPOT ITEMS (03 Hours)

3.1. Existing buildings that required renovation and repair

4. MATERIAL STATEMENT (03 Hours)

4.1. Define material statement
4.2. Prepare materials statement

5. MARKET RATE SCHEDULE (05 Hours)

5.1. Define market rate schedule
5.2. Application of MRS

6. SCHEDULE OF BARS (06 Hours)

6.1. Define the schedule of bars
6.2. Prepare a schedule of bars of different structural members i.e. lintel, beam, and Slab

7. ESTIMATION (06 Hours)

7.1. Define estimation
7.2. Types of estimation
7.3. Technical terms used in estimation

8. ROUGH COST ESTIMATE OF A SMALL STRUCTURE (04 Hours)

8.1. Define rough cost estimate
8.2. Prepare a rough cost estimate for a single-storey building

9. DETAILED ESTIMATE (06 Hours)

9.1. Define detailed estimate
9.2. Types of detailed estimate
9.3. Prepare a detailed estimate of a single-story building

10. RATE ANALYSIS (12 Hours)

10.1. Introduction
10.2. Purpose of rate analysis
10.3. Prepare rate analysis of different items of work for a small structure such as Brick masonry, P.C.C., R.C.C., and Cement Plaster

RECOMMENDED BOOKS

1. Dutta, B. N. (1998). *Estimation & costing in civil engineering: Theory & practice.* UBS Publishers' Distributors Ltd.
2. Khanna, P. N. (2008). *Indian practical civil engineer's handbook.* Engineers Publishers

National Institute of Science and Technical Education (NISTE). (1987). *Estimation & costing.* NISTE, Islamabad

ARCHT-343 SPECIFICATIONS AND ESTIMATION

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND THE BUILDING SPECIFICATIONS**
   - 1.1. Define specifications
   - 1.2. State types of specifications
   - 1.3. General Specification on 1st class building
   - 1.4. Detail Specification of Brick and P.C.C. work
   - 1.5. State use of reference specifications
2. **ESTIMATING THE QUANTITIES OF BUILDING MATERIALS**
   - 2.1. Earthwork in the excavation of the foundation
   - 2.2. Instructions on working out quantities of various types of walls i.e. T, L, U, D and O
   - 2.3. P.C.C in foundation
   - 2.4. P.C.C in foundation
   - 2.5. Brickwork in foundation
   - 2.6. Brickwork on the plinth level
   - 2.7. DPC in walls
   - 2.8. Brickwork in superstructure
   - 2.9. Calculate the concrete work in R.C.C. members
3. **UNDERSTAND THE SPOT ITEMS**
   - 3.1. Explain the spot item
   - 3.2. Calculation of spot item
   - 3.3. Existing building that required renovation and repair
4. **UNDERSTAND THE MAKING MATERIAL STATEMENT**
   - 4.1. Explain material statement
   - 4.2. Prepare materials statement
5. **MARKET RATE SCHEDULE**
   - 5.1. Define market rate schedule
   - 5.2. Application of MRS
6. **UNDERSTAND THE SCHEDULE OF BARS**
   - 6.1. Explain the schedule of bars
   - 6.2. Prepare the schedule of bars of different structural members i.e. lintel, beam, and Slab
7. **UNDERSTAND THE ESTIMATION**
   - 7.1. Explain estimation
   - 7.2. Explain the types of estimation
   - 7.3. Explain technical terms used in estimation
8. **THE ROUGH COST OF ESTIMATE OF A SMALL STRUCTURE**
   - 8.1. Define a rough cost estimate
   - 8.2. Prepare a rough cost estimate for a single-storey building
9. **UNDERSTAND THE DETAILED ESTIMATE OF DOUBLE STOREY BUILDING**

9.1. Define detailed estimate
9.2. Types of detailed estimate
9.3. Prepare a detailed estimate of a single-storey building

10. UNDERSTAND THE RATE ANALYSIS

10.1. Define rate analysis
10.2. Explain the purpose of rate analysis
10.3. Rate analysis of different items of work such as Brick masonry, P.C.C., R.C.C. and Cement Plaster
- 10.3.1. Excavation
- 10.3.2. Foundation Concrete
- 10.3.3. B.B.W in Foundation and Plinth
- 10.3.4. B.B.W in Sub and Super structures
- 10.3.5. D.P.C.
- 10.3.6. Cement plaster
- 10.3.7. Cement pointing
- 10.3.8. Whitewashing
- 10.3.9. Paint
- 10.3.10. Joinery work
- 10.3.11. Septic tank

ARCHT-343 **SPECIFICATION AND ESTIMATION**

LIST OF PRACTICALS

1. Describe the specification of building materials/items of work (03 Hours)
2. Calculate the materials/items of work for different shapes (09 Hours)
3. Prepare a material statement of different items of work (06 Hours)
4. Measurement of items of work in different units (06 Hours)
5. Prepare a schedule of bars of one-way slab (09 Hours)
6. Prepare a schedule of bars of two-way slab (09 Hours)
7. Calculate the steel and schedule of the bar of the column and lintel (12 Hours)
8. Prepare a rough estimate of a single-storey building from the given drawing (06 Hours)
9. Prepare a detailed estimate of a single-storey building from the given drawing (06 Hours)
10. Prepare a detailed estimate of the septic tank from the given drawing (06 Hours)
11. Prepare a detailed estimate of plumbing from the given drawing (06 Hours)
12. Prepare a detailed estimate of the water supply and sewerage scheme from the given scheme (18 Hours)

ARCHT-353 BUILDING MATERIALS AND CONSTRUCTION-III

Total Contact hours: 160		T	P C
Theory:	64	2	3 3
Practical:	96		

LEARNING OUTCOMES:

The students will be able to:

- Become familiar with Various Construction Techniques for Buildings

COURSE CONTENTS

1. FORMWORK **(08 Hours)**

1.1. Define formwork, its types, and quality control
1.2. Materials used for formwork
1.3. Removal of formwork-and its impact on concrete

2. PRE-CAST CONSTRUCTION AND PRESTRESSING **(12 Hours)**

2.1. Definition of Pre-cast construction
2.2. Advantages and limitations of Pre-casting
2.3. Connections of pre-cast members
2.4. Introduction and Types of Pre-stressing
2.5. Techniques of pre-stressing

3. STEEL STRUCTURES **(08 Hours)**

3.1. Introduction to Steel Structures
3.2. Types of steel structures
3.3. Advantages and disadvantages of steel structures
3.4. Types of joints in steel structures
3.5. Connection methods for steel members

4. TERMITE PROOFING (**08 Hours)**

4.1. Define termite proofing
4.2. Purpose of termite proofing
4.3. Types of termite proofing
4.4. General principles of termite proofing
4.5. Methods of termite proofing

5. FALSE CEILING **(10 Hours)**

5.1. Introduction to False Ceiling
5.2. Purpose and benefits of false ceilings
5.3. Material used in false ceilings (Gypsum, PVC, Metal, Wood, etc.)
5.4. Construction techniques for false ceilings
5.5. UPVC wall paneling and its integration with false ceilings
5.6. Lighting and ventilation considerations in false ceilings

6. DEFECTS IN BUILDINGS **(10 Hours)**

6.1. Settlement in buildings

6.2. Defects due to moisture movements
6.3. Cracks and their sealing

7. IMPACT OF EARTHQUAKE ON BUILDINGS (08 Hours)

7.1. Definition of an Earthquake
7.2. Technical terms related to earthquake
7.3. Scales used to measure earthquakes
7.4. Earthquake zones in Pakistan
7.5. Construction principles for earthquake-resistant structures
7.6. Building configuration for earthquake-resistant structures

RECOMMENDED BOOKS

1. Kulkarni, G. J. (1957). *A textbook of building construction*. Ahmedabad Book Depot.
2. Rangwala, S. C. (2010). *Building construction* (28th ed.). Charotar Publishing House.
3. Charleson, A. (2008). *Seismic design for architects: Outwitting the quake*. Routledge.

ARCHT-353 BUILDING MATERIALS AND CONSTRUCTION -III

INSTRUCTIONAL OBJECTIVES

1. FORMWORK

1.1 Define formwork, explain its types and quality control
1.2 Explain the materials of formwork
1.3 Explain the removal of formwork and its impact on concrete

2. PRE-CAST CONSTRUCTION AND PRESTRESSING

2.1 Definition of Pre-cast construction and pre-stressing
2.2 Advantages and Limitations of Pre-casting
2.3 Connections of pre-cast members
  2.3.1 Column to foundation connection
  2.3.2 Column-to-column connection
  2.3.3 Beam and column connection
2.4 Define and explain pre-stressing
2.5 Explain the types of pre-stressing
2.6 Explain the techniques of pre-stressing

3. STEEL STRUCTURE

3.1 Introduction to Steel Structure
3.2 Describe different types of steel structures
3.3 Advantages and disadvantages of steel structures
3.4 Describe different types of joints in steel structures
3.5 Connection methods for steel members

4. TERMITE PROOFING

4.1 Define and explain termite proofing
4.2 Purpose of termite proofing
4.3 Classification/types of termite proofing
4.4 Describe the general principles of termite proofing
4.5 Methods of termite proofing

5. FALSE CEILING

5.1 Explain false ceiling
5.2 Describe the purpose and benefits of false ceilings
5.3 Explain the materials used in the false ceiling. (Gypsum, PVC, Metal, Wood, etc.)
5.4 State the construction techniques for false ceilings.
5.5 UPVC wall paneling and its integration with false ceilings
5.6 Lighting and ventilation considerations in false ceilings

6. DEFECTS IN BUILDINGS

6.1 Describe settlement in buildings
6.2 Explain defects in buildings due to moisture
6.3 Explain Cracks and their sealing

7. EARTHQUAKE AND BUILDINGS

7.1 Definition of an-Earthquake
7.2 Describe the technical terms related to earthquakes

7.3 Origin of earthquakes
7.4 Describe Seismic waves and their types
7.5 Scales used to measure earthquakes
7.6 Earthquake Zones in Pakistan
7.7 Construction principles for earthquake-resistant structures
7.8 Building Configuration for earthquake-resistant Structures

ARCHT-353 BUILDING MATERIALS AND CONSTRUCTION -III

LIST OF PRACTICALS

1. Visit the site of an under-construction building for formwork and prepare a report (12 Hours)
2. To conduct slump test and compression test in the construction lab (09 Hours)
3. Visit a Manufacturing company to study the manufacturing and installation of pre-cast members (09Hours)
4. Visit a Manufacturing company to observe the pre-stressed concrete members' process (09 Hours)
5. visit a large steel structure to observe different steel members in the roof and staircase and prepare a report (12 hours)
6. Visit a construction site while installing a false ceiling and prepare a report (12 Hours)
7. visit a building to study and document structural defects (12 Hours)
8. Visit an under-construction site (house) to gain awareness and practical knowledge of plumbing and electrical work, and prepare a report (12 Hours)
9. To study the expansion joints in your institute’s Building and prepare a report (09 Hours)

ARCHT-362 CONSTRUCTION MANAGEMENT AND SAFETY PRACTICES

	T	P	C
Total Contact Hours: 64			
Theory: 64	2	0	2
Practical: 0			

LEARNING OUTCOMES

This course will enable the students to: -

- Develop an understanding of the various types of projects within the construction industry, and how they are conceived and managed
- Understand the different stages involved in managing various projects, the complications involved, and how their different solutions can be achieved
- Study various hazards/accidents that can happen at construction sites

COURSE CONTENTS

1. CONSTRUCTION PROJECT MANAGEMENT (04 Hours)

1.1 Definition of Project Management
1.2 Functions of Project Management
1.3 Definition of Construction Management
1.4 Types of projects in construction
1.5 Objectives and functions of construction management

2 CONSTRUCTION CONTRACTS (10 Hours)

2.1 Definition of construction contract
2.2 Differentiate between construction contract and work order
2.3 Types of Construction Contracts
2.4. Merits and demerits of various construction contracts

3. TENDER DOCUMENTS AND CONTRACT CONDITIONS (24 Hours)

3.1 Definition of Tender
3.2 Pre-requisites for tendering
3.3 Methods of Inviting Tender
3.4 Method for the preparation of tender notice
3.5 Draft of tender notice
3.6 Tender Documents
3.7 Definition of PC-I Document
3.8 General and special conditions of contract
3.9 Terminologies in contract document
- 3.8.1 Earnest Money
- 3.8.2 Security Deposit
- 3.8.3 Award of Work
- 3.8.4 Possession of site
- 3.8.5 Penalty
- 3.8.6 Arbitration and Arbitrator
- 3.8.7 Liquidated and Un-liquidated Damages
- 3.8.8 Mobilization Advance
- 3.8.9 Retention Money

4. SCHEDULING OF CONSTRUCTION PROJECTS (08 Hours)

4.1 Definition of scheduling
4.2 Preparation of Material, Equipment, and Labor Schedules
4.3 Terminologies in Construction Scheduling
4.4.1 Network
4.4.2 Activity
4.4.3 Event
4.4.4 Dummy Activity
4.4.5 Earliest Start and Finish Time
4.4.6 Latest Start and Finish Time
4.4.7 Bar Chart
4.4.8 Critical Path
4.4.9 Float
4.4.10 Total Project Time
4.4.11 Duration
4.4.12 Arrow

5. OCCUPATIONAL HEALTH AND SAFETY (06 Hours)

5.1 Definition of Occupational Health Safety and ISO
5.2 Definition of Safety
5.3 Importance of Safety
5.4 Methods of promoting safety concepts
5.5 Personal Protective Equipment (PPE)
5.5 Define Compensation Act

6. CAUSES & PREVENTION OF ACCIDENTS AT CONSTRUCTION (12 Hours)

6.1 Definition of Accidents
6.2 Causes of accidents at construction site
6.3 Safety precautions while working with a ladder
6.4 Safety precautions while working with formwork
6.5 Safety precautions to be taken while excavating in the trench
6.6 Safety precautions while working with scaffolding
6.7 Safety precautions during installation and maintenance of sewer line
6.8 Safety practice while using concrete mixer
6.9 Safety measures while demolishing existing buildings
6.10 Definition of Direct and Indirect costs of accidents

RECOMMENDED BOOKS

1. Duncan, W. (1996). *A guide to project management* (3rd ed.). Project Management Institute.
2. Kerzner, H., & Saladis, F. P. (2009). *Project management and PMP/CAPM exam workbook* (Study guide ed.). John Wiley & Sons Inc.
3. Benjamin O. Ali (2001). *Fundamental principles of occupational health and safety*. International Labour Organization.

ARCHT-362 CONSTRUCTION MANAGEMENT AND SAFETY PRACTICES

INSTRUCTIONAL OBJECTIVES

1. CONSTRUCTION PROJECT MANAGEMENT

1.1 Define Project Management
1.2 Explain the functions of Project Management
1.3 Define Construction Management
1.4 Explain types of projects in construction
1.5 Explain objectives and functions of construction management

2. CONSTRUCTION CONTRACTS

2.1 Define contract
2.2 Differentiate between contract and work order
2.3 Explain types of construction contracts
2.4 Explain the merits and demerits of various construction contracts

3. TENDER DOCUMENTS & CONTRACT CONDITIONS

3.1 Define Tender
3.2 Explain pre-requisites for tendering
3.3 Explain methods of inviting tender
3.4 Explain important points for the preparation of tender notice
3.5 Draft of tender notice
3.6 Explain Tender Documents
3.7 Define PC-I document.
3.8 Explain the general and special conditions of the contract
3.9 Define important terminologies involved in a contract document
3.9.1. Earnest Money
3.9.2 Security Deposit
3.9.3 Award of Work
3.9.4 Possession of site
3.9.5 Penalty
3.9.6 Arbitration and Arbitrator
3.9.7. Liquidated and Un-liquidated Damages
3.9.8. Mobilization Advance
3.9.9. Retention Money

4. SCHEDULING OF CONSTRUCTION PROJECTS

4.1 Define schedule
4.2 Explain preparation of Material, Equipment and Labor schedules
4.3 Define important terminologies involve in scheduling
4.3.1 Network
4.3.2 Activity
4.3.3 Event
4.3.4 Dummy activity
4.3.5 Earliest Start and Finish Time

4.3.6 Latest Start and Finish Time
4.3.7 Bar Chart
4.3.8 Critical Path
4.3.9 Float
4.3.10 Total Project Time
4.3.11 Duration
4.3.12 Arrow

5. OCCUPATIONAL HEALTH AND SAFETY

5.1 Define OH and S, health, and ISO
5.2 Define Safety
5.3 Explain the importance of Safety
5.4 Explain methods of promoting safety concepts
5.5 Explain personal protective equipment (PPE)
5.5 Define Compensation Act

6. CAUSES & PREVENTION OF ACCIDENTS AT CONSTRUCTION SITES

6.1. Define Accidents
6.2 Explain the causes of accidents at a construction site
6.3 Explain safety precautions while working with a ladder
6.4 Explain safety precautions while working with using formwork
6.5 Explain safety precautions to be taken while excavating in the trench
6.6 Explain safety precautions while working with scaffolding
6.7 Explain safety precautions during installation and maintenance of sewer line
6.8 Explain safety practices while using concrete mixer
6.9 Explain safety measures while demolishing existing buildings
6.10 Define Direct and Indirect costs of accidents

ARCHT-373 COMPUTER-AIDED DRAFTING AND PRESENTATION-III

Total Contact Hours: 288 T P C
Theory: 0 0 9 3
Practical: 288

LEARNING OUTCOME

The students will be able to: -

1. Know about rendering AutoCAD files in Adobe Photoshop, to make architectural presentations, brochures and postures
2. Develop skills in various aspects of Autodesk Revit

LIST OF PRACTICALS

1. Adobe Photoshop (72 Hours)

1.1. Practice of main screen of Adobe Photoshop (title bar, menu bar, options bar, image window, toolbox, layer palette, channels palette , filters, color palette, statue bar) (09 Hours)
1.2. Practice digital images and graphics, file size, and file format, resolution, color mode, file compression (09 Hours)
1.3. Practice creating a new canvas (present size, width, height, resolution, mode, content), and tools in the tool palette using option bars (09 Hours)
1.4. Practice selection tools, painting and drawing tools, retouching tools, text type tools, zoom tools/hand tools/eye droper tools/notes tools, and color handling tools (09 Hours)
1.5. Practice of overview, importing images and printing files and website imagery (09 Hours)
1.6. Practice of rendering of Architectural drawings using Photoshop tools (09 Hours)
1.7. Final project (18 Hours)

2. Sketchup (72 Hours)

2.1. Practice of Interface, Introduction of the Ribbon, Tabs and Command Bars, Getting to know the 3 Axis planes, Exploration of Lines and 2D shapes from the Commands Ribbon, Introduction of the 3D surfaces through Extrude (09 Hours)
2.2. Practice in Complex Modeling, handling a variety of 3D forms, Grouping/ Ungrouping, Developing Curvilinear forms, Inserting 3D models, Scaling, and Placement in the 3D scene (09 Hours)
2.3. Practice Adding Materials, adding various types of Materials in V-ray with normal transparency, Handling Glass or other materials with transparency, Working on Emissive quality Materials, Mapping of Material textures, Study of Materials from real-time characteristics to their imitation in Sketch up (09 Hours)
2.4. Practice Getting Started with the Lights, Understanding the general 3D environment to know the requirement of Light as per the project type and scale, Adding the Interior

Lighting of various types, Shifting the natural light in Sketch-Up world for Exterior Renders (09 Hours)

2.5. Practice of Camera Settings, Placement of Cameras, Setting the Frames in Exteriors, Setting the Frames in Interiors (09 Hours)

2.6. Practice of Real-time Rendering with V-Ray, Setting the Environment for Exterior Renders, Setting the Environment for Interior Settings, Rendering of the project given (09 Hours)

2.7. Final project (18 hours)

3. Autodesk Revit (144 Hours)

3.1. Overview of Building Information Modeling (BIM), Practice of Revit Interface and Navigation Workspaces, menus, and toolbars, Project Browser and Properties Panel, Units and templates, understanding families, components, and categories, Saving and exporting files, Linking CAD and Revit files (12 hours)

3.2. Practice creating Architectural Elements: Walls, Floors, Ceilings, Roofs, Doors, and Windows, editing walls, extending, trimming, changing materials and properties, Setting up levels and grids, Placing dimensions and annotations, Creating wall openings, Adding skylights and stair voids (18 hours)

3.3. Practice of Curtain Walls and Facades, Stairs, Railings, and Ramps, Columns, Beams, and Structural Elements (18 hours)

3.4. Practice System Families, creating custom Component Families, and modifying existing families by adjusting dimensions and material (18 hours)

3.5. Practice creating a Site Plan, Modeling Landscape Elements, Building Pads and Slopes (18 hours)

3.6. Practice of Detailing and Annotation Tools, Creating Views and Sheets, Schedules and BOQs (Bill of Quantities) (18 hours)

3.7. Practice of Rendering in Revit, Applying Materials and Textures, Lighting and Shadow Settings (18 hours)

3.8. Final Project of Autodesk Revit (24 hours)

RECOMMENDED BOOKS

1. Onstott, S. (2008). *Enhancing CAD drawings with Photoshop* [Kindle version]. Sybex.
2. Trimble Inc. (2020). *SketchUp 2020 user guide*. Trimble Inc.
3. Kirby, L., Krygiel, E., & Kim, M. (2017). *Mastering Autodesk Revit 2018*. John Wiley & Sons.

MGM-381 ENTREPRENEURSHIP

TOTAL CONTACT HOURS: 32 T P C
Theory: 32 1 0 1
Practical: 0

LEARNING OUTCOMES

The student will be able to understand the basics of entrepreneurship in relation to the architectural industry:

- Understand the fundamentals of small business enterprise
- Apply techniques for generating business ideas and assessing opportunities
- Understand the basic procedures for establishing a small business
- Identify essential financial record-keeping practices
- Develop a simplified business plan
- Apply entrepreneurship concepts in architectural planning and design

COURSE CONTENTS

1. INTRODUCTION TO ENTREPRENEURSHIP (04 Hours)

1.1. Concept and Importance of Entrepreneurship
1.2. Key Terminologies
1.3. Types of Business: Social vs. Commercial
1.4. Motivation for Entrepreneurship: Benefits & Challenges

2. BUSINESS IDEA GENERATION (04 Hours)

2.1 Creativity and Innovation in Business
2.2 Sources of Business Ideas
2.3 Assessing Business Opportunities

3. ENTREPRENEURIAL CHARACTERISTICS (06 Hours)

3.1 Key Traits of Successful Entrepreneurs
3.2 Leadership and Decision-Making Skills
3.3 Principles of Business Negotiation

4. BASICS OF BUSINESS ESTABLISHMENT (06 Hours)

4.1 Market Overview: Demand, Competition, and Site Selection
4.2 Business Structures: Proprietorship and Small Enterprises
4.3 Basic Costing Concepts

5. ENTERPRISE MANAGEMENT (06 Hours)

5.1 Hiring and Managing Employees
5.2 Sales and Marketing Fundamentals
5.3 Financial Record Keeping Basics

6. BUSINESS PLANNING (06 Hours)

6.1 Purpose and Components of a Business Plan
6.2 Feasibility Analysis
6.3 Challenges in Small Business Startups

RECOMMENDED BOOKS

1. Dewhurst, J. (1996). Small business and entrepreneurship. London: Macmillan.
2. Drucker, P. & Maciariello, J. (2014). Innovation and entrepreneurship. Routledge.
3. Singh, P.N. (1986). Developing entrepreneurship for economic growth. Vikas.

MGM-381 **ENTERPRENEURSHIP**

INSTRUCTIONAL OBJECTIVES

1. **UNDERSTAND THE CONCEPT AND ELEMENTS OF ENTREPRENEURSHIP**
   - 1.1 Define and explain entrepreneurship.
   - 1.2 Differentiate business types.
   - 1.3 Recognize entrepreneurial motivation factors.
2. **IDENTIFY AND ASSESS BUSINESS OPPORTUNITIES**
   - 2.1 Understand creativity in business.
   - 2.2 Learn methods for business idea generation.
   - 2.3 Assess business feasibility.
3. **RECOGNIZE KEY ENTREPRENEURIAL TRAITS**
   - 3.1 Identify essential leadership and decision-making skills.
   - 3.2 Apply negotiation techniques in business.
4. **UNDERSTAND BASIC PROCEDURES FOR BUSINESS ESTABLISHMENT**
   - 4.1 Market assessment and site selection.
   - 4.2 Basic legal structures and financial needs.
5. **UNDERSTAND ENTERPRISE MANAGEMENT TECHNIQUES**
   - 5.1 Hiring procedures and staff management.
   - 5.2 Basic marketing and financial management.
6. **DEVELOP A SIMPLIFIED BUSINESS PLAN**
   - 6.1 Explain the need for a business plan.
   - 6.2 Conduct a basic feasibility study.
   - 6.3 Recognize potential startup challenges.

EMPLOYABILITY OF PASS-OUTS WITH MARKET DESIGNATIONS AND VERTICAL PROGRESSION

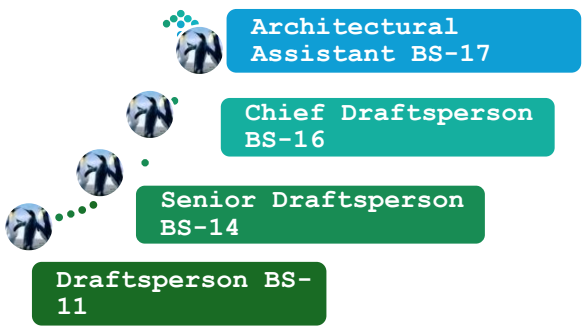
The students holding DAE qualifications in Architecture Technology can seek employment in firms/companies / industry dealing in any of the following Areas / Sectors:

- Architectural Firms in both Public and Private Sectors
- Construction Industries
- Educational Institutes
- Freelancing Platforms

Enterprises' Expectations for DAE Pass-outs of Architecture

- Architectural Design and Drawing Skills
- Knowledge of Building Construction
- Knowledge of Building Materials and Fabrication
- Free Hand Sketching and Rendering Skills
- Knowledge of Building Economics and Safety Practices
- Knowledge of Detailed Architectural Drawings
- Model Making Skills
- Knowledge of Architectural Heritage
- Estimation and Specifications Skills
- Knowledge of Structural Mechanics and Reinforced Cement Concrete Design
- Software like MS Office, AutoCAD, 3D Max, Adobe Photoshop, Sketchup, Auto Desk Revit Skills
- Knowledge of Basic Surveying and Levelling
- Knowledge of Supervision at Construction Sites
- Knowledge of Earthquake Proof Buildings
- Knowledge of Report Writing

Starting with Supervisory position as Draft Person, Model Maker, and Site Supervisor etc., the vertical mobility for these qualification holders in Public sector is shown below:



- The DAE (Architecture) pass outs may also get job opportunity of teacher / instructor in TVET sector as Junior Instructor/Lab Technician with vertical mobility up to Chief Instructor.
- They can work as an Architectural Assistant, Draftsperson, Quantity Surveyor, Site Supervisor etc.
- They can also pursue entrepreneurship, earning significant respect for their contributions while playing a vital role in the construction industry.

ARCHITECTURE TECHNOLOGY

MINIMUM QUALIFICATION FOR TEACHER/INSTRUCTOR/JR. INSTRUCTOR

Post	Qualification	Experience	Membership	Weightage
Jr. Instructor/ Lab. Technician	DAE in Architecture Technology	04 Years	NA	NA
Instructor	**(A)** 1- Bachelor in Architecture (B. Arch.) 2- BSc. Architectural Engineering	02 Years	1- PCATP 2- PEC	1- 70% 2- 30%
	(B) 1- Master in Architecture (M. Arch.) 2- MSc. Building Engineering	NIL	1- PCATP 2- PEC	1- 70% 2- 30%

FOR SUBJECTS PERTAINING TO HUMANITIES / RELATED STUDIES /MANAGEMENT

- BS / M.A (16 years or higher) degree in English / Islamiat / Pak Studies with 2 years of teaching experience
- BS / M.Sc. (16 years or higher) degree in Mathematics / Physics / Chemistry with 2-years of teaching experience
- BBA / MBA (16 years or higher) degree with 2-years of teaching experience

MINIMUM QUALIFICATION FOR "IT SUPPORT STAFF" (/NON-TEACHING)

Post	Qualification	Experience	Job Responsibility
Lab. Technician	DAE in CIT/I.C.S	04 Years	Installing and configuring computer hardware, software, systems, networks, printers and scanners. Monitoring and maintaining computer systems and networks