



# Revised D.A.E - CIT Curriculum ( 2016)

**DAE in COMPUTER INFORMATION TECHNOLOGY (CIT)**  
**SCHEME OF STUDIES**

<b>FIRST YEAR</b>			<b>T</b>	<b>P</b>	<b>C</b>
Gen	111	Islamiat & Pakistan Studies	1	0	1
Eng	112	English	2	0	2
Math	123	Applied Mathematics-I	3	0	3
Phy.	132	Applied Physics	1	3	2
Ch.	132	Applied Chemistry	1	3	2
OHSE	111	Occupational Health, Safety & environment	1	0	1
CIT	112	Computer Application Software	0	6	2
CIT	113	Introduction to Computer Programming	2	3	3
CIT	121	General Engineering Workshop	0	3	1
CIT	134	Electronics-I	3	3	4
<b>T o t a l</b>			<b>14</b>	<b>21</b>	<b>21</b>
<b>SECOND YEAR</b>					
Gen	211	Islamiat & Pak Studies	1	0	1
Math	233	Applied Mathematics-II	3	0	3
Mgm	211	Business Communication	1	0	1
CIT	212	Object-Oriented Programming with JAVA	1	3	2
CIT	223	Computer Networks	2	3	3
CIT	235	Micro-Processor Architecture	3	6	5
CIT	244	Electronics-II	3	3	4
CIT	263	Relational Data-Base Management System	2	3	3
<b>T o t a l</b>			<b>16</b>	<b>18</b>	<b>22</b>
<b>THIRD YEAR</b>					
Gen	311	Islamiat & Pak Studies	1	0	1
Eng	311	Technical Report Writing	1	0	1
Mgt	331	Management	1	0	1
CIT	303	Web Development with JAVA	1	6	3
CIT	324	Network Administration	2	6	4
CIT	333	Operating System	2	3	3
CIT	344	Graphic Designing	2	6	4
CIT	352	PC System and Peripherals Repair	1	3	2
CIT	362	Project	0	6	2
<b>T o t a l</b>			<b>11</b>	<b>30</b>	<b>21</b>

اسلامیات / مطالعہ پاکستان

ٹی پی سی  
1 0 1  
کل وقت: 20 گھنٹے

GEN III

حصہ اول اسلامیات

حصہ دوم مطالعہ پاکستان

موضوعات حصہ اول اسلامیات

سہل اول

کتاب و سنت

(ا) قرآن مجید

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

- 1.1 تنالوا البر حتی تنفقوا مما تحبون
- 1.2 واعتصموا بحبل اللہ جمیعاً ولا تفرقوا
- 1.3 ولا یجر منکم شأن قوم علی ان لا تعدلوا
- 1.4 ان اللہ یمرکم ان تودوا ما نأت الی اہلہا
- 1.5 ان اللہ یمر بالعدل والاحسان
- 1.6 ان الصلوٰۃ تنہی عن الفحشاء والمنکر
- 1.7 لقد کان لکم فی رسول اللہ سۃ حسنہ
- 1.8 ان اکرمکم عند اللہ اتقاکم
- 1.9 وما آتاکم الرسول فخرزوا وما نہی عنہوا نتهوا
- 1.10 ولوفوا بالعہد
- 1.11 وما شروہن بالمعروف
- 1.12 یمحق اللہ الربو ویربب الصمدقات
- 1.13 واصبر علی ما اصابک
- 1.14 وقولوا لا سیدنا
- 1.15 ان الدین عند اللہ السلام

(ب) سفت

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

- 1- اعمال اعمال بالنیات
- 2- امانت لا تم مکارم الاخلاق
- 3- لا یومر احدکم حق یحب الاخیرہ ما یحب لنفسه
- 4- المسلم من سلم المسلمون من سبہ المسمون من لسانہ ویدہ
- 5- فی امنت باللہ سلم استقم
- 6- حیرکم خیرکم لا الہ
- 7- سباب المسلم فسوق وقتالہ کفر
- 8- المؤمن اخ المؤمن
- 9- کل المسلم عسی المسلم حیر لہ یمعہ و مالہ و فرقہ
- 10- ایتہ المنطق ثلاث اذا حدیث کذب و قاتل و امن خان و اتوا فنادی خلف

#### دین اسلام

- 2.1 اسلام کے بنیادی مقصد کی وضاحت اور انسان کی اخروی و دنیوی زندگی پر ان کے اثرات

1- توحید

2- رسالت

3- آخرت

4- ملائکہ

5- اسطیغاث

7.2 عبادات

- 1- نماز 2- روزہ 3- حج 4- زکوٰۃ

مندرجہ بالا عبادات کی اہمیت و فضیلت، حکمتیں اور انسان کی اخروی و معاشرتی زندگی پر ان کے اثرات

## مذہبی مقاصد

### ۱۔ قرآن مجید

- عمومی مقصد: طالب علم یہ سمجھنے کے قابل ہو کہ اسلام کی تعلیمت کا اصل سرپشتہ قرآن مجید ہے  
 خصوصی مقصد: طالب علم اس قابل ہو جائے گا کہ
- ۱۰ قرآن مجید کی تحریف کر سکے
  - ۱۱ قرآن مجید کے نزول کی صورت بیان کر سکے
  - ۱۲ قرآن مجید کی آئی و مدنی سورتوں کی پہچان کر سکے
  - ۱۳ منتخب آیات کا ترجمہ و تشریح کر سکے
  - ۱۴ عمومی مقصد: یہ سمجھنے کے قابل ہو جائے گا کہ منتخب قرآنی آیات کے ذریعے اسلامی اقدار کا مفہوم کیا ہے
  - ۱۵ قرآنی آیات کا ترجمہ و تشریح کر سکے
  - ۱۶ قرآنی تعلیمت کی روشنی میں اپنی اور معاشرتی اصلاح کر سکے

### ۲۔ سنت

- عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت کو اچھی طرح سمجھنے کے قابل ہو جائے گا  
 خصوصی مقصد:
- ۱۰ سنت کی تحریف بیان کر سکے
  - ۱۱ سنت کی اہمیت و ضرورت کی وضاحت کر سکے
  - ۱۲ سنت کی روشنی میں مسوودہ پر عمل کر سکے
  - ۱۳ منتخب احادیث پر عمل

- عمومی مقصد: احادیث کی روشنی میں اخلاقی اقدار سے سمجھ حاصل کر سکے  
 خصوصی مقصد: احادیث کا ترجمہ و تشریح کر سکے  
 رسول اللہ ﷺ کے مسوودہ سنہ کا، میرا، کا مفہوم سمجھ سکے

دین اسلام

عمومی مقاصد: دین اسلامی کے بنیادی مقاصد اور عہدات کے بارے میں جان سکے اور بیان کر سکے  
خصوصی مقاصد

لفظ دین اسلام کے لغوی اور اصطلاحی معنی بیان کر سکے

اسلام کے بنیوی مقاصد کی اہمیت بیان کر سکے

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

عہدات کے لفظی و اصطلاحی معنی بیان کر سکے

عقیدے اور عہدات کا فرق بیان کر سکے

عہدات (نماز، روزہ، حج، زکوٰۃ) کے فوری، احکامات اور ہنسلفی زندگی پر ان کی اثرات بیان کر سکے

اسلامی مقاصد و عہدات کے مطابق اپنی زندگی ڈھل کر ایک اچھا مسلمان بن سکے

## انجیر مسلم طلباء کے لئے

GEN III

نصاب اختلافیات سائنس  
حصہ دوم ملاحظہ پاکستان

### موضوعات

ن ج ن  
1 0 1  
کل وقت 20 گھنٹے

اختلافیات کی تعریف اور اہمیت  
اختلافیات کا معیار (تائون، عقل، الحی کب)  
سندرجہ اہل الخلق کی وضاحت

- ☆ وقت اور ارشاد
- ☆ وقت داری
- ☆ نظم و ضبط
- ☆ راست گوئی
- ☆ صبر و استقامت
- ☆ حوصلہ مندگی
- ☆ وقت کی پابندی
- ☆ سفلگی
- ☆ اعتدال
- ☆ باہمی احترام
- ☆ مصلحت

نصاب اخلاقیات (سہ ماہی)

### تعمیری مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے کل ترقی میں کل ترقی قدر حاصل کر سکے

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

۱۵ موضوعات کا مطلب بیان کر سکے

۱۶ عملی زندگی سے مثالوں کی نشاندہی کر سکے

۱۷ اپنی شخصیت اور معاشرے پر موضوعات کے مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے

۱۸ رمانت داری کی اہمیت بیان کر سکے

۱۹ وفا داری کی اہمیت بیان کر سکے

۲۰ لکھ و ضبط کی فلاحیت بیان کر سکے

۲۱ صدق بیان کی ضرورت بیان کر سکے

۲۲ حوصلہ مندی کے فوائد بیان کر سکے

۲۳ رقت کی پابندی کے فوائد بیان کر سکے

۲۴ صفائی اور باہمی اختیار سے حسن کلر کی کو بیان کر سکے

۲۵ مصلحت کے فوائد بیان کر سکے



نصابہ: سہل لائ (Gen III)

کل وقت 12 گھنٹے

مذاہب پاکستان

حصہ دوم

موضوعات

- ۱۔ حق تعالیٰ: مسلمان قوم میں آزادی فکر کی تاریخ، مسلمانوں میں سیاسی آزادی کی اہمیت اور ضرورت۔ ذاتی و جمعی غلامی کے تعلقات
- ۲۔ نظریہ پاکستان  
قیام پاکستان کی اساس (دین اسلام) قیام پاکستان کی غرض، غرضت نظریہ پاکستان کی وضاحت۔ نظریہ پاکستان اور مردم آقبل اور قائد اعظم کے ارشادات کی مدد سے اس میں
- ۳۔ نظریہ پاکستان کا تاریخی پسو  
محمد بن قاسم کی فتو، مجدد ملقب مولیٰ اور شاہ ولی اللہ کی تبلیغی خدمات سید احمد شہید کی تحریک مجاہدین
- ۴۔ قیامی تحریکیں  
علی گڑھ - تحریک اصلاحیہ (لیڈر - مدرستہ الاسلام - سندھ) اسلامیہ کانگریس (لیڈر) انجمن حمایت اسلام (لیڈر)

مطالعہ پاکستان (حصہ دوم)

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

خصوصی "اسلام" میں آزادی اظہار رائے کی اہمیت بیان کر سکے

ذاتی غلامی کے قومی سطح پر نقصانات کے بیان کر سکے

ذاتی غلامی قومی سطح پر نقصانات بیان کر سکے

نظریہ پاکستان

عمومی مقصد:

نظریہ پاکستان (دوین 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 قائد اعظم کے فرمودات کی روشنی میں نظریہ پاکستان بیان کر سکے

نظریہ پاکستان کا تاریخی پس منظر

عمومی مقصد

نظریہ پاکستان کے تاریخی پس منظر سے واقفیت حاصل کر سکے

خصوصی مقاصد:

محمد بن قاسم کے بارے میں بیان کر سکے

- ۶۷۔ محمد بن قاسم کے ہندوستان پر حملہ کی وجہ بیان کر سکے
- ۶۸۔ محمد بن قاسم کے ہندوستان پر حملہ کے اثرات بیان کر سکے
- ۶۹۔ بیان کر سکے کہ ہندوستان میں ہندو مسلم دو قومی نظریہ کا نکلنا آغاز کیا ہے
- ۷۰۔ محمد لطف طائی کی علمی خدمات بیان کر سکے
- ۷۱۔ شلہ دلی اللہ کی علمی خدمات بیان کر سکے
- ۷۲۔ محمد لطف طائی اور شلہ دلی اللہ نے جو تبلیغ دین اور مسلمانوں میں سیاسی شعور پیدا کیا اسے بیان کر سکے

### علمی تحریکیں

- ۷۳۔ علمی مقصد
- ۷۴۔ ہر علمی تحریک کی علمی تحریکوں سے پہلی حاصل ہو سکے
- ۷۵۔ قصود میں مقصد:
- ۷۶۔ علمی مرکز - دیوبند - ندوۃ العلماء مدرستہ الاسلام، اسلامیہ کالج - انجمن حمایت اسلام نے تعلیم کے ذریعہ سیاسی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے
- ۷۷۔ آزادی ہند کے سلسلہ میں تحریک محمدین کی خدمات بیان کر سکے

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## Eng-112 ENGLISH

### Total contact hours

Theory	64	T	P	C
Practical	0	2	0	2

**AIMS** 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 hours

1.1 First eight essays of Intermediate English Book-II

#### 2 CLOZE TEST 4 hours

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 word 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"

#### 3 GRAMMAR 26 hours

- 3.1 Sentence Structure.
- 3.2 Tenses.
- 3.3 Parts of speech.
- 3.4 Punctuation.
- 3.5 Change of Narration.
- 3.6 One word for several
- 3.7 Words often confused

#### 4. COMPOSITION 8 hours

- 4.1 Letters/Messages
- 4.2 Job application letter
- 4.3 For character certificate/for grant of scholarship
- 4.4 Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles
- 4.5 Essay writing
- 4.6 Technical Education, Science and Our life, Computers, Environmental Pollution, Duties of a Student.

#### 5. TRANSLATION 10 hours

- 5.1 Translation from Urdu into English.  
For Foreign Students: A paragraph or a dialogue.

#### RECOMMENDED BOOKS

- 1. Intermediate English Book-II.
- 2. An English Grammar and Composition of Intermediate Level.
- 3. A Hand Book of English Students By Gatherer.

**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. APPLY 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.

**Pre-requisite:** Must have completed a course of Elective Mathematics at Matric level.

**AIMS:** After completing the course the students will be able to

1. Solve problems of Algebra, Trigonometry, vectors, Mensuration, 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 Hours**

- 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.      BINOMIAL THEOREM      6 Hours**

- 2.1 Factorials
- 2.2 Binomial Expression
- 2.3 Binomial Co-efficient
- 2.4 Statement
- 2.5 The General Term
- 2.6 The Binomial Series
- 2.7 Problems.

### **3.      PARTIAL FRACTIONS      6 Hours**

- 3.1 Introduction
- 3.2 Linear Distinct Factors Case I
- 3.3 Linear Repeated Factors      Case II
- 3.4 Quadratic Distinct Factors      Case III
- 3.5 Quadratic Repeated Factors      Case IV
- 3.6 Problems

### **4.      FUNDAMENTALS OF TRIGONOMETRY      6 Hours**

- 4.1 Angles
- 4.2 Quadrants
- 4.3 Measurements of Angles
- 4.4 Relation between Sexagesimal & circular system
- 4.5 Relation between Length of a Circular Arc & the Radian Measure of its central Angle
- 4.6 Problems

### **5.      TRIGONOMETRIC FUNCTIONS AND RATIOS      6 Hours**

- 5.1 Trigonometric functions of any angle
- 5.2 Signs of trigonometric Functions

5.3	Trigonometric Ratios of particular Angles	
5.4	Fundamental Identities	
5.5	Problems	
<b>6.</b>	<b>GENERAL IDENTITIES</b>	<b>6 Hours</b>
6.1	The Fundamental Law	
6.2	Deductions	
6.3	Sum & Difference Formulae	
6.4	Double Angle Identities	
6.5	Half Angle Identities	
6.6	Conversion of sum or difference to products	
6.7	Problems	
<b>7.</b>	<b>SOLUTION OF TRIANGLES</b>	<b>6 Hours</b>
7.1	The law of Sines	
7.2	The law of Cosines	
7.3	Measurement of Heights & Distances	
7.4	Problems	
<b>8.</b>	<b>VECTORS AND PHASORS</b>	<b>12 Hours</b>
8.1	Scalars and Vectors	
8.2	The unit Vectors $i, j, k$	
8.3	Direction Cosines	
8.4	Dot Product	
8.5	Cross Product	
8.6	Analytic Expressions for dot and cross products	
8.7	Phasors	
8.8	Significance of $j$ Operator	
8.9	Different Forms	
8.10	Algebraic Operations	
8.11	Problems	
<b>9.</b>	<b>COMPLEX NUMBERS</b>	<b>9 Hours</b>
9.1	Introduction and Properties	
9.2	Basic Operations	
9.3	Conjugate	
9.4	Modulus	
9.5	Different Forms	
9.6	Problems	
<b>10.</b>	<b>BOOLEAN ALGEBRA AND GATE NETWORKS</b>	<b>15 Hours</b>
10.1	Concept and basic laws	
10.2	Sums of product and products of sums	
10.3	Binary, decimals and octals, presentation of decimal numbers in BCD	
10.4	Interconversion of numbers	
10.5	OR Gates and AND Gates	
10.6	Logical Expressions and their simplifications	
10.7	Demorgan's Theorams	
10.8	NAND Gates and NOR Gates	
10.9	Problems	

- 11. PLANE ANALYTIC GEOMETRY AND STRAIGHT LINE** **6 Hours**
- 11.1 Coordinate system
  - 11.2 Distance formula
  - 11.3 Ration Formulas
  - 11.4 Inclination and slope of line
  - 11.5 Slope Formula
  - 11.6 Problems
- 12. EQUATIONS OF THE STRAIGHT LINE** **6 Hours**
- 12.1 Some Important Forms
  - 12.2 General form
  - 12.3 Angle Formula
  - 12.4 Parallelism and Perpendicularity
  - 12.5 Problems
- 13. EQUATIONS OF THE CIRCLE** **6 Hours**
- 13.1 Standard and Central forms of equations
  - 13.2 General Form of Equation
  - 13.3 Radius and Coordinates of Center
  - 13.4 Problems

**RECOMMENDED BOOKS**

1. Ghulam Yasin Minhas, Technical Mathematics Vol I, Ilmi Kitab Khana, Lahore
2. Riaz Ali Khan, Polytechnic Mathematics Series Vol- I and Vol -II, Majeed Sons, Faisalabad.
3. Sana Ullah Bhatti, A Text Book of Algebra and Trigonometry, Punjab Text Book Board, Lahore
4. Sana Ullah Bhatti, A Text Book of Analytic Geometry and Calculus, Punjab Text Book Board, Lahore



**INSTRUCTIONAL OBJECTIVES**

- 1.      USE DIFFERENT METHODS FOR THE SOLUTION OF QUADRATIC EQUATION**
  - 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 the sum and product of the roots.
  - 1.7      Form a quadratic equation from the given roots.
  - 1.8      Solve problems involving quadratic equations.
  
- 2.      APPLY BINOMIAL THEOREM FOR THE EXPANSION OF BINOMIAL AND EXTRACTION OF ROOTS.**
  - 2.1      State binomial theorem for positive integral index.
  - 2.2      Explain binomial coefficients:  
           $(n,0), (n,1), \dots, (n,r), \dots, (n,n)$
  - 2.3      Derive expression for the general term.
  - 2.4      Calculate the specified terms.
  - 2.5      Expand a binomial of a given index.
  - 2.6      Extract the specified roots.
  - 2.7      Compute the approximate value to a given decimal place.
  - 2.8      Solve problems involving binomials.
  
- 3.      APPLY DIFFERENT METHODS FOR RESOLVING A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS**
  - 3.1      Define a partial fraction, a proper and an improper fraction.
  - 3.2      Explain all the four types of partial fractions.
  - 3.3      Set up equivalent partial fractions for each type.
  - 3.4      Explain the methods for finding constants involved.
  - 3.5      Resolve a single fraction into partial fractions.
  - 3.6      Solve problems involving all the four types.
  
- 4.      UNDERSTAND THE SYSTEMS OF MEASUREMENT OF ANGLES.**
  - 4.1      Define angles and the related terms.
  - 4.2      Illustrate the generation of an angle.
  - 4.3      Explain sexagesimal and circular systems for the measurement of angles.
  - 4.4      Derive the relationship between radian and degree.
  - 4.5      Convert radians to degrees and vice versa.
  - 4.6      Derive a formula for the circular measure of a central angle.
  - 4.7      Use this formula for solving problems.
  
- 5.      UNDERSTAND BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS.**
  - 5.1      Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.

- 5.2 Derive fundamental identities.
- 5.3 Find trigonometric ratios of particular angles.
- 5.4 Draw the graph of trigonometric functions.
- 5.5 Solve problems involving trigonometric functions.
- 6. USE TRIGONOMETRIC IDENTITIES IN SOLVING TECHNOLOGICAL PROBLEMS.**
  - 6.1 List fundamental identities.
  - 6.2 Prove the fundamental law.
  - 6.3 Deduce important results.
  - 6.4 Derive sum and difference formulas.
  - 6.5 Establish half angle, double and triple angle formulas.
  - 6.6 Convert sum or difference into product and vice versa.
  - 6.7 Solve problems.
- 7. USE CONCEPT, PROPERTIES AND LAWS OF TRIGONOMETRIC FUNCTIONS FOR SOLVING TRIANGLES.**
  - 7.1 Define angle of elevation and angle of depression.
  - 7.2 Prove the law of sines and the law of cosines.
  - 7.3 Explain elements of a triangle.
  - 7.4 Solve triangles and the problems involving heights and distances.
- 8. UNDERSTAND PRINCIPLES OF VECTORS AND PHASORS**
  - 8.1 Define unit vectors  $i, j, k$ .
  - 8.2 Express a vector in the component form.
  - 8.3 Explain magnitude, unit vector, direction cosines of a vector.
  - 8.4 Explain dot product and cross product of two vector.
  - 8.5 Deduce important results from dot and cross product.
  - 8.6 Define phasor and operator  $j$ .
  - 8.7 Explain different forms of phasors.
  - 8.8 Perform basic Algebraic operation on phasors.
  - 8.9 Solve problems on phasors.
- 9. USE PRINCIPLES OF COMPLEX NUMBERS IN SOLVING TECHNOLOGICAL PROBLEMS.**
  - 9.1 Define a complex number and its conjugate.
  - 9.2 State properties of complex numbers.
  - 9.3 Give different forms of complex numbers.
  - 9.4 Perform basic algebraic operations on complex numbers.
  - 9.5 Solve problem involving complex numbers.
- 10. SOLVE TECHNICAL PROBLEMS USING PRINCIPLES OF BOOLEAN ALGEBRA**
  - 10.1 Explain fundamental concepts of Boolean algebra
  - 10.2 Explain binary numbers, octal numbers, decimal numbers and their interconversion.
  - 10.3 Explain digital addition and multiplication and its applications to OR gates and AND Gates
  - 10.4 Illustrate complimentation and inversion
  - 10.5 Evaluate logical expression
  - 10.6 List basic Laws of Boolean Algebra
  - 10.7 Explain De-Morgan's theorem
  - 10.8 Explain basic duality of Boolean algebra

- 10.9 Derive Boolean expression
- 10.10 Explain combination of GATES
- 10.11 Illustrate sum of products and product of sum
- 10.12 Derive product of sum expression
- 10.13 Explain NAND Gates and NOR Gates
- 10.14 Use the map methods for simplifying expressions
- 10.15 Explain sub-cubes and covering

**11. UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY**

- 11.1 Explain the rectangular coordinate system.
- 11.2 Locate points in different quadrants.
- 11.3 Derive distance formula.
- 11.4 Describe the ratio formula
- 11.5 Derive slope formula
- 11.6 Solve problems using the above formulae.

**12. USE EQUATIONS OF STRAIGHT LINE IN SOLVING PROBLEMS.**

- 12.1 Define equation of a straight line.
- 12.2 Derive slope intercept and intercept forms of equations of a straight line.
- 12.3 Write general form of equations of a straight line.
- 12.4 Derive an expression for angle between two straight lines.
- 12.5 Derive conditions of perpendicularity and parallelism of two straight lines.
- 12.6 Solve problems using these equations/formulae.

**13. SOLVE TECHNOLOGICAL PROBLEMS USING EQUATIONS OF CIRCLE**

- 13.1 Define a circle.
- 13.2 Describe standard, central and general forms of the equation of a circle.
- 13.3 Convert general form to the central form of equation of a circle.
- 13.4 Deduce formula for radius and coordinates of the center of a circle.
- 13.5 Derive equation of the circle passing through three points.
- 13.6 Solve problems involving these equations.

## Phy-132: Applied Physics

### Total Contact Hours:

Theory: 32

Practical: 96

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>3</b>	<b>2</b>

### Aims:

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 course.

Course contents	Hours
<b>1. Measurements</b>	<b>02</b>
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	
<b>2. Scalars and Vectors</b>	<b>04</b>
2.1. Revision of head to tail rule	
2.2. Laws of parallelogram, triangle and polygon of forces	
2.3. Resolution of a vectors by rectangular components	
2.4. Multiplication of two vectors, dot product and cross product	
<b>3. Motion</b>	<b>04</b>
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	
<b>4. Torque, Equilibrium and rotational inertia</b>	<b>04</b>
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	
<b>5. Sound</b>	<b>06</b>
5.1. Longitudinal waves	
5.2. Intensity, loudness, pitch and quality of sound	
5.3. Units of intensity of level and frequency response of ear	
5.4. Interference of sound waves silence zones, beats	
5.5. Acoustics	
5.6. Doppler effect	
<b>6. Light</b>	<b>06</b>
6.1. Review laws of reflection and refraction	
6.2. Image formation by mirrors and lenses	
6.3. Optical instruments	
6.4. Waves theory of light	

6.5. Interference, diffraction, polarization of light waves	
6.6. Applications of polarization in sunglasses, optical activity and stress analysis	
<b>7. Optical Fiber</b>	<b>02</b>
7.1. Optical communication and problems	
7.2. Review total internal reflection and critical angle	
7.3. Structure of optical fiber	
7.4. Fiber material and manufacture	
7.5. Optical fiber – uses	
<b>8. Lasers</b>	<b>03</b>
8.1. Corpuscular theory of light	
8.2. Emission and absorption of light	
8.3. Stimulated absorption and emission of light	
8.4. Laser principles	
8.5. Structure and working of lasers	
8.6. Types of lasers with brief description	
8.7. Applications (Basic concepts)	
8.8. Material processing	
8.9. Laser welding	
8.10. Laser assisted machining	
8.11. Micro machining	
8.12. Drilling, scribing and marking	
8.13. Printing	
8.14. Lasers in medicine	
<b>9. Electromagnetic waves</b>	<b>03</b>
9.1. Magnetic field around a current carrying conductor	
9.2. Electric field induced around an changing magnetic flux	
9.3. Moving fields	
9.4. Types of electromagnetic waves	
9.5. Generation of Radio waves	
9.6. Spectrum of electromagnetic waves	
<b>10. Artificial Satellites</b>	<b>02</b>
10.1. Review law of gravitation	
10.2. Escape velocity	
10.3. Orbital velocity	
10.4. Geosynchronous and geostationary satellites	
10.5. Use of satellites in data communication	

### **Recommended Books:**

1. Tahir Hussain, Fundamentals of Physics Vol. – I and II
2. FaridKhawaja, Fundamental of Physics Vol. – I and II
3. Wells and Slusher, Schaum'sSerices Physics
4. Nelkon and Oyborn, Advanced Level Practical Physics
5. MehboobIllahi Malik and Inam-ulHaq, Practical physics
6. Wilson, Lasers – Principles and Applications
7. M. Aslam Khan and M. AkramSandhu, Experimental Physics Note Book

## **Phy-132      Instructional Objectives: Applied Physics**

- 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 problem.
  - 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. Understand concepts of sound**
  - 5.1 Describe longitudinal wave and its propagation.
  - 5.2 Explain the concepts: Intensity, loudness, pitch and quality of sound.
  - 5.3 Explain units of intensity of level and frequency response of ear.
  - 5.4 Explain phenomena of silence zones, beats.
  - 5.5 Explain acoustics of buildings.
  - 5.6 Explain Doppler's Effect giving mathematical expressions.
- 6. Use the concepts of geometrical optics to mirrors and lenses**
  - 6.1 Explain laws of reflection and refraction.
  - 6.2 Use mirror formula to solve problems.
  - 6.3 Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscope, telescopes, camera and sextant.
- 7. Understand wave theory of light**
  - 7.1 Explain wave theory of light.
  - 7.2 Explain phenomena of interference, diffraction, polarization of light waves.
  - 7.3 Describe uses of polarization given in the course contents.
- 8. Understand the structure, working and uses of optical fiber**
  - 8.1 Explain the structure of the optical fiber.
  - 8.2 Explain its principles of working.
  - 8.3 Describe use of optical fiber in industry and medicine.
- 9. Understand the structure, working and uses of lasers**
  - 9.1 Explain the stimulated emission of radiation.
  - 9.2 Explain the laser principle.

9.3 Describe the structure and working of lasers.

9.4 Distinguish between types of laser.

9.5 Describe the applications of lasers in the fields mentioned in the courses contents.

**10. Understand nature, types, generation and spectrum of electromagnetic waves**

10.1 Explain magnetic field due to current and electric field due to changing magnetic flux.

10.2 Explain moving fields.

10.3 Describe types of electromagnetic waves.

10.4 Explain generation of radio waves

10.5 Explain spectrum of electromagnetic waves.

**11. Understand types and uses of artificial satellites**

11.1 Explain escape velocity.

11.2 Explain orbital velocity.

11.3 Distinguish between geosynchronous and geostationary satellites.

11.4 Describe uses of artificial satellites in data communication.

1. Draw graphs representing the functions:
  - 1.1.  $Y=mx$  for  $m=0, 0.5, 1, 2$
  - 1.2.  $Y=x^2$
  - 1.3.  $Y=1/x$
2. Find the volume of a given solid cylinder using Vernier calipers.
3. Find the area of cross-section of the given wire using micrometer screw gauge.
4. Proven that force is directly proportional to (a) mass, (b) acceleration, using Fletcher's 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 centre 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.
16. Study of variation of frequency of stretched string with tension.
17. Study resonance of air column in resonance tube and find velocity of sound.
18. Find the frequency of the given tuning fork using resonance tube.
19. Find velocity of sound in rod by Kundt's tube.
20. Verify rectilinear propagation of light and study shadow formation.
21. Study effect of rotation of plane mirror on reflection.
22. Compare the refractive indices of given glass slabs.
23. Find focal length of concave mirror by locating centre of curvature.
24. Find focal length of concave mirror by object and image method.
25. Find focal length of concave mirror with converging lens.
26. Find refractive index of glass by apparent depth.
27. Find refractive index of glass by spectrometer.
28. Find focal length of converging lens by plan mirror.
29. Find focal length of converging lens by displacement method.
30. Find focal length of diverging lenses using converging lens.
31. Find focal length of diverging lens using concave mirror.
32. Find angular magnification of an astronomical telescope.
33. Find angular magnification of a simple microscope (magnifying glass).
34. Find angular magnification of a compound microscope.
35. Study working and structure of camera.
36. Study working and structure of sextant.
37. Compare the different scales of temperature and verify the conversion formula.
38. Determine the specific heat of lead shots.
39. Find the coefficient of linear expansion of a metallic rod.
40. Find the heat of fusion of ice.
41. Find the heat of vaporization.
42. Determine relative humidity using hygrometer.



## Ch-132      **APPLIED CHEMISTRY**

### **Total Contact Hours**

		T	P	C
Theory	32	1	3	2
Practical	96			

**Pre-requisite:** The student must have studied the subject of elective chemistry at Secondary school level.

**AIMS** 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. Becomes acquainted with the basic principles of chemistry as applied in the study of relevant Technology.
3. Knows the scientific methods for production, properties and use of materials of industrial & technological significance.
4. Gain skill for the efficient conduct of practicals in a chemistry lab.

### **1. INTRODUCTION      2 Hours**

- 1.1 The scope and significance of the subject.
- 1.2 Orientation with reference to Technology.
- 1.3 Terms used & units of measurements in the study of chemistry.

### **2. FUNDAMENTAL CONCEPTS OF CHEMISTRY      2 Hours**

- 2.1 Symbols, Valency, Radicals, formulas.
- 2.2 Chemical Reactions & their types.
- 2.3 Balancing of equations by ionic method.

### **3. ATOMIC STRUCTURE      2 Hours**

- 3.1 Sub-atomic particles.
- 3.2 Bohr's Atomic Model.
- 3.3 The periodic classification of elements and periodic law
- 3.4 General characteristics of a period and group.

### **4. CHEMICAL BOND      2 Hours**

- 4.1 Nature of chemical Bond.
- 4.2 Electrovalent bond with examples.
- 4.3 Covalent Bond(Polar and Non-polar, sigma & Pi Bonds with examples.
- 4.4 Co-ordinate Bond with examples.

### **5. SOLIDS AND LIQUIDS      3 Hours**

- 5.1 The liquid and Solids state.
- 5.2 The liquids and their general properties (Density, viscosity, surface tension capillary action etc).
- 5.3 Solids and their general properties.
- 5.4 Crystal structure of solids
- 5.5 Crystals of Si and Ge.

### **6. WATER      3 Hours**

- 6.1 Chemical nature and properties.
- 6.2 Impurities.
- 6.3 Hardness of water (types, causes & removal)
- 6.4 Scales of measuring hardness (Degress Clark, French, PPM, Mgm per litre).
- 6.5 Boiler feed water, scales and treatment.
- 6.6 Sea-water desalination, sewage treatment.
- 7. ACIDS, BASES AND SALTS 2 Hours**
  - 7.1 Definitions with examples.
  - 7.2 Properties, their strength, basicity & Acidity.
  - 7.3 Salts and their classification with examples.
  - 7.4 pH-value and scale.
- 8. OXIDATION & REDUCTION 2 Hours**
  - 8.1 The process with examples.
  - 8.2 Oxidizing and Reducing agents.
  - 8.3 Oxides and their classifications.
- 9. NUCLEAR CHEMISTRY 2 Hours**
  - 9.1 Introduction.
  - 9.2 Radioactivity (Alpha, beta and gamma rays).
  - 9.3 Half life process.
  - 9.4 Nuclear reaction & transformation of elements.
  - 9.5 Isotopes and their uses.
- 10. ALLOYS 2 Hours**
  - 10.1 Introduction with need.
  - 10.2 Preparation and properties.
  - 10.3 Some important alloys and their composition.
- 11. CORROSION 2 Hours**
  - 11.1 Introduction with causes.
  - 11.2 Types of corrosion.
  - 11.3 Rusting of Iron
  - 11.4 Protective measures against corrosion.
- 12. ELECTRO CHEMISTRY 2 Hours**
  - 12.1 Ionization and Arrhenius theory of Ionization.
  - 12.2 Electrolytes and Electrolysis.
  - 12.3 Faraday's Laws and numericals related to them.
  - 12.4 Application of Electrolysis (Electron, lathing etc).
  - 12.5 Electro Chemical cells.
- 13. ELECTRICAL INSULATING MATERIALS. 2 Hours**
  - 13.1 Introduction.
  - 13.2 Solid insulators with chemical nature.
  - 13.3 Liquid insulators with chemical nature.
  - 13.4 Gaseous insulators with chemical nature.
  - 13.5 Uses and their classification.

- 14. SEMI CONDUCTORS. 2 Hours**
- 14.1 Introduction
  - 14.2 Atomic structure of silicon and germanium.
  - 14.3 Bonding & Conductivity.
  - 14.4 Energy bands in a semiconductor.
- 15. ETCHING PROCESS. 2 Hours**
- 15.1 The process and its aims.
  - 15.2 Etching reagents.
  - 15.3 Applications of processors.

**RECOMMENDED BOOKS**

- 1. Intermediate Text-Books of chemistry I & II
- 2. ILMI Applied Science by SH. Ata Mohammed
- 3. Materials science by J.C.Anderson & Leaver.
- 4. Polytechnic Chemistry by G.N.Ready (ELBS & Nelson, Hong Kong).
- 5. Chemistry for engineers by Eric Gyngell.

**INSTRUCTIONAL OBJECTIVES**

- 1. UNDERSTAND THE SCOPE, SIGNIFICANCE AND ROLE OF THE SUBJECT.**
  - 1.1 Define chemistry and its terms.
  - 1.2 Define the units of measurements in the study of chemistry.
  - 1.3 Explain the importance of chemistry in various fields of specialization.
  - 1.4 Explain the role of chemistry in this technology.
- 2. UNDERSTAND LANGUAGE OF CHEMISTRY AND CHEMICAL REACTIONS.**
  - 2.1 Define symbol, valency, radical, formula with examples of each.
  - 2.2 Write chemical formula of common compounds.
  - 2.3 Define chemical reaction and equations.
  - 2.4 Describe types of chemical reactions with examples.
  - 2.5 Explain the method of balancing the equation by ionic method.
- 3. UNDERSTAND THE STRUCTURE OF ATOMS AND ARRANGEMENT OF SUB ATOMIC PARTICLES IN THE ARCHITECTURE OF ATOMS.**
  - 3.1 Define atom.
  - 3.2 Describe the fundamental sub atomic particles
  - 3.3 Distinguish between atomic no. mass no. and between isotope and isobars.
  - 3.4 Explain the arrangements of electrons in different shells and sub energy levels and understand bohr's atomic model.
  - 3.5 Explain the grouping and placing of elements in the periodic table especially Si & germanium.
  - 3.6 State the periodic law of elements.
  - 3.7 Explain the trend of properties of elements based on their position in the periodic table.
  - 3.8 Explain general characteristics of a period and a group.
- 4. UNDERSTAND THE NATURE OF CHEMICAL BONDS.**
  - 4.1 Define chemical Bond.
  - 4.2 State the nature of chemical bond.
  - 4.3 Differentiate between electrovalent and covalent bonding.
  - 4.4 Explain the formation of polar and non polar, sigma and pi-bond with examples.
  - 4.5 Describe the nature of coordinate bond with examples.
- 5. UNDERSTAND THE STATES OF MATTER AND DISTINGUISHES SOLIDS FROM GASES.**
  - 5.1 Describe the liquid and solid states of matter.
  - 5.2 State the general properties of liquid.
  - 5.3 State the general properties of solid.
  - 5.4 Explain the formation of crystals and their types.
  - 5.5 Describe the crystal structure of Si and Ge.
- 6. UNDERSTAND THE CHEMICAL NATURE OF WATER.**
  - 6.1 Describe the chemical nature of water with its formula.
  - 6.2 Describe the general impurities present in water.
  - 6.3 Explain the causes and methods to remove hardness of water.
  - 6.4 Express hardness in different units like mg/litre. p.p.m, degrees Clark and degrees

- French.
- 6.5 Describe the formation and nature of scales in boiler feed water.
- 6.6 Explain the method for the treatment of scales.
- 6.7 Explain the sewage treatment and desalination of sea water.
- 7. UNDERSTAND THE NATURE OF ACIDS, BASES AND SALTS.**
- 7.1 Define acids, bases and salts with examples.
- 7.2 State general properties of acids and bases.
- 7.3 Differentiate between acidity and basicity.
- 7.4 Define salts, give their classification with examples.
- 7.5 Explain pH value of solution and pH scale.
- 8. UNDERSTAND THE PROCESS OF OXIDATION AND REDUCTION.**
- 8.1 Define oxidation.
- 8.2 Illustrate the oxidation process with examples.
- 8.3 Define reduction.
- 8.4 Explain reduction process with examples.
- 8.5 Define oxidizing and reducing agents and give at least six examples of each.
- 8.6 Define oxides.
- 8.7 Classify the oxides and give examples.
- 9. UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY.**
- 9.1 Define nuclear chemistry and radio activity.
- 9.2 Differentiate between alpha, beta and gamma particles.
- 9.3 Explain half life process.
- 9.4 Explain at least six nuclear reactions resulting in the transformation of some elements.
- 9.5 State the uses of isotopes.
- 10. UNDERSTAND THE NATURE OF ALLOYS USED IN THE RESPECTIVE TECHNOLOGY.**
- 10.1 Define alloy.
- 10.2 Explain different methods for the preparation of alloys.
- 10.3 Explain important properties of alloys.
- 10.4 Explain the composition, properties and uses of alloys.
- 11. UNDERSTAND THE PROCESS OF CORROSION.**
- 11.1 Define corrosion.
- 11.2 Describe different types of corrosion.
- 11.3 State the causes of corrosion.
- 11.4 Explain the process of rusting of iron.
- 11.5 Describe methods to prevent/control corrosion.
- 12. UNDERSTAND THE APPLICATION OF ELECTROCHEMISTRY IN DIFFERENT FIELDS OF INDUSTRIES.**
- 12.1 Define ionization, electrolyte and electrolysis.
- 12.2 Describe Arrhenius theory of ionization.
- 12.3 State Faraday's laws of electrolysis.
- 12.4 Apply Faraday's laws of different fields of industry.
- 12.5 Solve numerical problem on Faraday's Laws.
- 12.6 Explain the construction and working of Daniel cell and lead accumulator.

- 13. KNOW THE USE OF INSULATING MATERIALS.**
- 13.1 Define insulator, conductor.
  - 13.2 Classify solid, liquid and gaseous insulators with their chemical nature.
  - 13.3 Describe their uses.
- 14. UNDERSTAND THE NATURE AND CHEMISTRY OF SEMI CONDUCTORS.**
- 14.1 Define semi -conductors.
  - 14.2 Draw the atomic structure of silicon and germanium.
  - 14.3 Describe the process of bonding and conductivity in conductors and semi-conductors.
  - 14.4 Explain energy bands in semi- conductors.
- 15. USE ETCHING PROCESS IN DIFFERENT FIELDS OF TECHNOLOGY.**
- 15.1 Define etching process and its aims.
  - 15.2 Enlist the chemicals/reagents used in the process.
  - 15.3 Explain the use of the process in the technology.

Course Code: **OHSE 111**

Course Title: **Occupational Health, Safety and Environment**

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>1</b>

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An introductory course on work-related health and safety issues. It aims to provide students with right attitude toward safety in work places. It covers the topics on different possible causes of safety hazards. It is pure theory course.

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### ***Course Objectives***

At the end of the course the students are expected to be able to

- Understand the issues affecting occupational health and safety.
- Apply concepts of environmental protection
- Practice safety measures in laboratory and workplaces
- Integrate health and safety consciousness in daily life

### ***COURSE OUTLINE***

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<b>Contents</b>	<b>Hours</b>
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### **COURSE CONTENTS**

#### **1. Identification and control of Hazards (10 Hours)**

- 1.1 Methods of identify hazards with in the work place.
  - 1.1.1 Statements
  - 1.1.2 Analysis of significant risks
  - 1.1.3 Prediction of results or outcomes of those risks
  - 1.1.4 Use of accident data
  - 1.1.5 Careful consideration of work methods
- 1.2 Consideration of the workplace and its potential for harm.
  - 1.2.1 Confined spaces
  - 1.2.2 Working at heights
  - 1.2.3 Electrical hazards
  - 1.2.4 Chemicals
  - 1.2.5 Noise
- 1.3 Hazards which become risks:
  - 1.3.1 Identification of minor or major risk
  - 1.3.2 Potential to cause harm
  - 1.3.3 Choosing appropriate control measures
  - 1.3.4 Electrical safety
    - 1.3.4.1 Cause of injury in electrical work
    - 1.3.4.2 Effects of electricity on the body
    - 1.3.4.3 Circuit overloading
  - 1.3.5 Mechanical safety
    - 1.3.5.1 Cause of injury in mechanical work
    - 1.3.5.2 Rotating equipment

- 1.3.5.3 Sharp edges
  - 1.4 Safety Devices
    - 1.4.1 Residual current device (RCD)
    - 1.4.2 Fuses
    - 1.4.3 Guards
    - 1.4.4 Sensors
- 2. **Risk assessment and identify control measures** (07 Hours)
  - 2.1 Risk assessments: five steps
    - 2.1.1 Principal hazards
    - 2.1.2 Who is likely to be injured/ harmed?
    - 2.1.3 Evaluate the risks and decide on adequacy of precautions
    - 2.1.4 Recording findings
    - 2.1.5 Review assessment
  - 2.2 Use of control measures:
    - 2.2.1 Use of recognized procedures
    - 2.2.2 Substances control
    - 2.2.3 Guarding
    - 2.2.4 Lifting assessments and manual handling assessments
    - 2.2.5 Regular inspection
    - 2.2.6 Use of Personal Protective Equipment (PPE)
    - 2.2.7 Training of personnel
    - 2.2.8 Other personal procedures for health, safety and welfare
- 3. **Methods used when reporting and recording accidents and incidents.** (05 Hours)
  - 3.1 Why employers keep records of serious accidents, incidents and emergencies
  - 3.2 Responsibilities of competent persons
  - 3.3 Cost of accidents
  - 3.4 Recording of trends such as major causes, fatal and serious injury
  - 3.5 Methods of classification
  - 3.6 Statistics
  - 3.7 Recording and reporting procedures
    - 3.7.1 Accident book, company procedures
    - 3.7.2 Procedures to deal with near miss or dangerous occurrences
- 4. **Workstation/ workshop designing.** (10 Hours)
  - 4.1 Setting arrangements of Computer Labs/ workshop
  - 4.2 Workstation setting
  - 4.3 Cleaning and maintenance procedure
  - 4.4 Electrostatic Discharge Precaution and Procedure
  - 4.5 Working Posture

## Reference Books.

Safety Practices and Procedures by NISTE  
 Health and Safety Executive — *A Guide to Risk Assessment Requirements: Common Provisions in Health and Safety Law* (HSE Books, 1996) ISBN 0717612112  
 Health and Safety Executive — *Management of Health and Safety at Work* (HSE Books, 2000) ISBN 0717624889



**INSTRUCTIONAL OBJECTIVES**

**1. Understand how to Identify and control of Hazards**

- 1.1 Understand methods of identify hazards with in the work place.
  - 1.1.1 Discuss the role of statements
  - 1.1.2 Describe the analysis of significant risks
  - 1.1.3 Discuss the prediction of results or outcomes of the risks
  - 1.1.4 Discuss the use of accident data
  - 1.1.5 Describe the careful consideration of work methods
- 1.2 Understand the consideration of the workplace and its potential for harm.
  - 1.2.1 Describe confined spaces
  - 1.2.2 Discuss working at heights
  - 1.2.3 Discuss Electrical hazards
  - 1.2.4 Discuss Chemicals related to hazards
  - 1.2.5 Discus role of noise.
- 1.3 Understand Hazards which become risks:
  - 1.3.1 Able to identification of minor or major risk
  - 1.3.2 Describe potential to cause harm
  - 1.3.3 Able to choosing appropriate control measures
  - 1.3.4 Understand Electrical safety
    - 1.3.4.1 Describe cause of injury in electrical work
    - 1.3.4.2 Describe effects of electricity on the body
    - 1.3.4.3 Describe circuit overloading
  - 1.3.5 Understand Mechanical safety
    - 1.3.5.1 Describe cause of injury in mechanical work
    - 1.3.5.2 Discuss the role of rotating equipment in hazards.
    - 1.3.5.3 Discuss the role of sharp edges in hazards.
- 1.4 Understand role of Safety Devices
  - 1.4.1 Understand the role of residual current device (RCD)
  - 1.4.2 Understand the role of fuses
  - 1.4.3 Understand the role of guards
  - 1.4.4 Understand the role of sensors

**2. Risk assessment and identify control measures**

- 2.1 Understand five steps Risk assessments
  - 2.1.1 principal hazards
  - 2.1.2 who is likely to be injured/harmed
  - 2.1.3 evaluate the risks and decide on adequacy of precautions
  - 2.1.4 recording findings
  - 2.1.5 review assessment
- 2.2 Understand the use of control measures
  - 2.2.1 Discuss use of recognized procedures
  - 2.2.2 Discuss substances control
  - 2.2.3 Discuss guarding
  - 2.2.4 Discuss lifting assessments and manual handling assessments
  - 2.2.5 Discuss regular inspection

- 2.2.6 Discuss use of Personal Protective Equipment (PPE)
- 2.2.7 Discuss training of personnel
- 2.2.8 Discuss other personal procedures for health, safety and welfare

**3. Understand the Methods used when reporting and recording accidents and incidents.**

- 3.1 Discuss why employers keep records of serious accidents, incidents and emergencies
- 3.2 Describe the responsibilities of competent persons
- 3.3 Discuss cost of accidents
- 3.4 Discuss recording of trends such as major causes, fatal and serious injury
- 3.5 Discuss methods of classification
- 3.6 Discuss statistics used in recording
- 3.7 Understand Recording and reporting procedures
  - 3.7.1 Describe accident book, company procedures
  - 3.7.2 Discuss the procedures to deal with near miss or dangerous occurrences

**4. Understanding Workstation/ workshop designing.**

- 4.1 Discuss setting arrangements of Computer Labs/ workshop
- 4.2 Describe Workstation setting
- 4.3 Explain cleaning and maintenance procedure
- 4.4 Describe Electrostatic Discharge Precaution and Procedure
- 4.5 Understand Working Posture

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An application-oriented course on basic use of computers. It aims to provide the students in their first year the experience of using the machine hands-on. The course covers the immediate application of computers in business and daily use. It covers the topics on how to use the computers and useful application programs in graphical user interface.

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### ***Course Objectives***

At the end of the course the students are expected to be able to

- Identify and describe the use and function of external parts of a microcomputer from an end-user point of view.
- Understand the basic operations and use of current operating system
- Run and use application programs
- Use the computer for daily business activities
- Use keyboard and mouse correctly and with ease
- Appreciate the usefulness of computer in work and daily activities

### ***COURSE OUTLINE***

<b>Practical Contents</b>	<b>Hours</b>
<b>1. Introduction to Computer: End-User Point of View</b>	<b>6</b>
1.1. Basic Design of Computer	
1.2. Hierarchy of Memory	
1.3. External View of Computer	
1.4. Input and Output Devices	
<b>2. Windows Operating System</b>	<b>12</b>
2.1. Computer Bootstrap	
2.2. Window Objects and Application Programs	
2.3. File System	
2.4. Windows Explorer and Windows Help	
<b>3. Word Processing</b>	<b>32</b>
3.1. Opening and Closing Word Processor Application Program	
3.2. Opening, Saving and Closing Document	
3.3. Editing and Navigating Documents	
3.4. Document Views and Printing Documents	
3.5. Formatting Document and Inserting Objects	
3.6. Enhancement and Tools and Tables	
<b>4. Spread Sheet</b>	<b>32</b>
4.1. Opening and Closing Spread Sheet Application Program	

4.2. Data Types	
4.3. Entering and Editing Data	
4.4. Worksheets and Workbooks	
4.5. Data Manipulation	
4.6. Printing Worksheet	
4.7. Formatting Cells	
4.8. Calculation Using Formula	
4.9. Function and Function Wizard	
<b>5. Presentation</b>	<b>32</b>
5.1. Opening and Closing Presentation Application Program	
5.2. Presentation Views	
5.3. Entering and Editing Presentation Objects	
5.4. Slides and Transition	
5.5. Animation	
<b>6. Non-Procedural Interactive Database</b>	<b>32</b>
6.1. Opening and Closing Interactive Database Program	
6.2. Creating Database Tables	
6.3. Setting Up Database Tables	
6.4. Creating Queries for Tables	
6.5. Creating Data Entry Forms for Tables	
6.6. Generating Reports from Tables	
<b>7. Internet</b>	<b>24</b>
7.1. Opening and Closing Internet Browser	
7.2. E-Mail	
7.3. Search Engine	
7.4. Surfing the WWW	
<b>8. Graphics and Image</b>	<b>14</b>
8.1. Opening and Closing Scanning Software	
8.2. Scanning pictures	
8.3. Editing Graphics	
8.4. Saving Graphics	
<b>9. Video</b>	<b>8</b>
9.1. Opening and Closing Video Software	
9.2. Playing video	
<b>Total Hours:</b>	<b>192</b>

## ***References***

- **Microsoft Office 6 in 1**, Peter Aiken, and others, Que Corporation
- **Teach Yourself Windows in 24 Hours**, Perry G., Sams Publishing
- **MS Office Unleashed**, Sams Publishing
- **Teach Yourself NETSCAPE Communicator**, Sams Publishing

## **CIT 112 – Computer Application Software**

### *LEARNING OBJECTIVES*

#### **1. Introduction to Computer: End-User Point of View**

- 1.1. Enumerate the main block components of computer
- 1.2. Describe the function of each component
- 1.3. Enumerate the components of hierarchy of memory
- 1.4. Identify the main external elements of computer
- 1.5. Describe the function of each external part of computer
- 1.6. Describe main input/output devices of computer
- 1.7. Name the keys of keyboard
- 1.8. Use keyboard and mouse correctly

#### **2. Windows Operating System**

- 2.1. Start a computer
- 2.2. List the steps computer takes to start
- 2.3. Identify the elements of Windows startup screen
- 2.4. Identify main parts of Windows window
- 2.5. Navigate Windows window
- 2.6. Launch application program from Windows
- 2.7. Describe the file system of Windows
- 2.8. Identify icons for files, folders and drives
- 2.9. Launch Windows Explorer
- 2.10. Navigate Windows Explorer
- 2.11. Identify icons, bars and elements of Explorer windows
- 2.12. Use Explorer to work on files and folders
- 2.13. Use Windows Help

#### **3. Word Processing**

- 3.1. Open (launch) and close Windows Word
- 3.2. Navigate Word window
- 3.3. Use menu bars and tool bars
- 3.4. Open document and operate it.
- 3.5. Edit and navigate document
- 3.6. Change views of document and print it
- 3.7. Format documents
- 3.8. Insert objects on Word document
- 3.9. Use Tools and enhancements of Word processor
- 3.10. Write formatted document in Word

#### **4. Spread Sheet**

- 4.1. Open (launch) and close Windows Excel
- 4.2. Navigate Excel window
- 4.3. Use menu bars and tool bars of Excel
- 4.4. Open Excel spreadsheet and work on it
- 4.5. Enter data in Excel spreadsheet
- 4.6. Edit, manipulate and navigate Excel spreadsheet
- 4.7. Format Excel cell

- 4.8. Print Excel workbook
- 4.9. Calculate cell values using formula
- 4.10. Use function and function wizard of Excel

## **5. Presentation**

- 5.1. Launch (Open) and close Windows PowerPoint
- 5.2. Display PowerPoint slides in different views
- 5.3. Enter, edit and manipulate objects in slide show
- 5.4. Enhance the slide presentation with transition and animation
- 5.5. Create presentation in PowerPoint
- 5.6. Present slide show in PowerPoint

## **6. Non-Procedural Interactive Database**

- 6.1. Open Windows Access
- 6.2. Create database and its tables
- 6.3. Define and setup properties of tables
- 6.4. Create and edit queries for tables
- 6.5. Create and edit forms for tables
- 6.6. Create and generate report for tables

## **7. Internet**

- 7.1. Launch Windows Explorer and close it
- 7.2. Launch Netscape Internet browser
- 7.3. Navigate Windows Explorer and Netscape and use their tools and icons
- 7.4. Compose, send and receive electronic mail (email)
- 7.5. Manage mails of email
- 7.6. Search information from Internet through Windows Explorer or Netscape Navigator
- 7.7. Manipulate the information searched from Internet (save, print or forward)
- 7.8. Surf the World Wide Web

## **8. Graphics and Image**

- 8.1. Open and close graphics software and scanners
- 8.2. Set up the graphics software and scanners
- 8.3. Scan, edit and save pictures
- 8.4. Use graphics software

## **9. Video**

- 9.1. Launch video software and close it
- 9.2. Setup video software
- 9.3. Use video software
- 9.4. Play video clips

## DAE in Computer Information Technology

Course Code: <b>CIT 113</b>	<b>T</b>	<b>P</b>	<b>C</b>
Course Title: <b>Introduction to Computer Programming</b>	<b>2</b>	<b>3</b>	<b>3</b>

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A general introduction to computing and first programming language course. It aims to introduce the students to computers and IT in general and provide the knowledge and skills to use high level programming language to solve problems. It covers general introduction to computers and IT and study of the celebrated C programming language. This has laboratory component to complement classroom discussion.

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### *Course Objectives*

At the end of the course the students are expected to be able to

- Understand the basic terminology and concepts of computer and Information Technology.
- Formulate logically problems and their solutions
- Use C programming language to solve problems
- Represent real-world information into computer data.
- Translate real-world problems into computer statement and solve them procedurally.
- Use input devices with ease and confidence
- Appreciate the clarity and conciseness of programming language and display patience in solving algorithmic problems

### *COURSE OUTLINE*

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<b>Contents</b>	<b>Hours</b>
<b>1. Introduction to Computers</b>	<b>2</b>
1.1. The History of Computers	
1.2. Computer Generations	
1.3. Hardware, Software, and Peopleware	
1.4. Programming Languages	
1.5. Categories of Programming Languages	
1.6. Machine Languages	
1.7. Symbolic or Assembly Language	
1.8. High-Level Languages	
1.9. Features of Programming Languages	
<b>2. The Programming Cycle</b>	<b>2</b>
2.1. Defining the Problem	
2.2. Planning and Coding Solution	
2.3. Checking and Debugging	

2.4. Importance of Readability and Documentation	
2.5. Flowcharting	
2.6. Flowchart Symbols	
2.7. Advantages and Disadvantages of Flowcharts	
<b>3. The C Integrated Development Environment (IDE)</b>	<b>2</b>
3.1. IDE Setup and Use of IDE	
3.2. Files used in C Program Developer	
3.3. The Structure of C Programs	
<b>4. C Building Blocks</b>	<b>2</b>
4.1. Variable	
4.2. Input/Output	
4.3. Operators	
<b>5. Conditional Control Construct: Decisions</b>	<b>6</b>
5.1. The if Statement	
5.2. The if-else Statement	
5.3. The else-if Statement	
5.4. The switch Statement	
5.5. The Conditional Operator	
<b>6. Iterative Control Construct: Loops</b>	<b>6</b>
6.1. The for Loop	
6.2. The while Loop	
6.3. The do while Loop	
<b>7. Functions</b>	<b>8</b>
7.1. Introduction	
7.2. Simple Functions and Value-Returning Functions	
7.3. Parameter Passing	
7.4. Using Multiple Functions and External Variable	
7.5. Preprocessor Directives	
7.6. Recursion	
<b>8. Arrays and Strings</b>	<b>6</b>
8.1. Introduction	
8.2. Single and Two-dimensional Arrays	
8.3. Strings	
<b>9. Pointers</b>	<b>10</b>
9.1. Introduction to Pointer	
9.2. Returning Data from Functions	
9.3. Pointers and Arrays	
9.4. Pointers and Strings	
9.5. Double Indirection: Pointers to Pointers	
<b>10. Structures and Unions</b>	<b>8</b>
10.1. Structures	
10.2. Unions	
10.3. Unions of Structures	



<b>11. Files</b>	<b>8</b>
11.1. Types of Disk I/O and Standard Input/Output	
11.2. Binary and Text Mode	
11.3. Record Input/Output and Random Access	
11.4. Error conditions and Redirection	
<b>12. Larger Programs</b>	<b>8</b>
12.1. Making Stand-alone Executable	
12.2. Separate Compilation and Conditional Compilations	
12.3. Memory Models	

***Total Hours: 64***

### ***References***

- Turbo C Programming for the PC and Turbo C++, Rev. Ed., Rober Lafore, The Waite's Group, Inc.
- C++ How to Program, 2Ed., Deitel and Deitel, Prentice-Hall
- Guide to C Programming, Jack Purdum, Ziff-Davis Press
- Mastering Turbo C, Stan Kelly-Bootle, Sybex Computer Books Inc.

## **CIT -113 – Introduction to Computer Programming**

### *LIST OF PRACTICALS*

2. Installation and Setup of C Compiler
3. Navigation of Integrated Development Environment
4. Use of Program Editor
5. Cycle of Writing C Program
6. Program: Input/Output
7. Program: Mathematical Operations
8. Program: Mathematical Operations with Conditional Statements
9. Program: Mathematical Operations with Iterations
10. Program: Functions
11. Program: Passing Parameters to Functions
12. Program: Recursion
13. Program: Emulation of String Functions
14. Program: One Dimensional Array
15. Program: Two Dimensional Array
16. Program: Structure and Records
17. Program: Pointers and Link List
18. Program: File Handling
19. Programming Project

## **CIT 113 – Introduction to Computer Programming**

### *LEARNING OBJECTIVES*

#### **1. Introduction with the Computers and Programming Languages**

- 1.1. Discuss computer development
- 1.2. Describe computer generations
- 1.3. Describe electronic data processing
- 1.4. Explain the terms: hardware , software, and peopleware
- 1.5. Explain advantages of EDP
- 1.6. Discuss programming languages
- 1.7. Explain categories of programming languages
- 1.8. Describe machine language
- 1.9. Describe symbolic or assembly language
- 1.10. Describe high-level languages
- 1.11. Explain features of programming languages

#### **2. Programming Cycle**

- 2.1. Describe the programming cycle
- 2.2. Explain importance of readability and documentation
- 2.3. Describe Flowcharts
- 2.4. Cite advantages and disadvantages of flowcharting
- 2.5. Draw flowchart of procedures

#### **3. The C Integrated Development Environment (IDE)**

- 3.1. Demonstrate setting up the IDE
- 3.2. Explain files used in c program developer
- 3.3. Explain the use of IDE
- 3.4. Explain the structure of c programs

#### **4. C Building Blocks**

- 4.1. Define variable
- 4.2. Explain Input/Output
- 4.3. Enumerate operator symbols in C
- 4.4. Explain the use these operators

#### **5. Conditional Control Construct: Decisions**

- 5.1. Demonstrate use of the if Statement
- 5.2. Demonstrate use of the if-else Statement
- 5.3. Demonstrate use of the else-if Statement
- 5.4. Demonstrate use of the switch Statement
- 5.5. Write C functions using conditional statements

#### **6. Iterative Control Construct: Loops**

- 6.1. Demonstrate use of the for Loop
- 6.2. Demonstrate use of the while Loop
- 6.3. Demonstrate use of the do while Loop
- 6.4. Write C functions using iterations

## **7. Functions**

- 7.1. Explain Functions
- 7.2. Explain Simple Functions
- 7.3. Explain Value-Returning Functions
- 7.4. Perform Parameter Passing
- 7.5. Demonstrate use of Multiple Functions
- 7.6. Describe External Variable
- 7.7. Explain Preprocessor Directives

## **8. Arrays and Strings**

- 8.1. Describe Array Data Types
- 8.2. Demonstrate use of Single and Two-dimensional Arrays
- 8.3. Explain Strings

## **9. Pointers**

- 9.1. Explain Pointers
- 9.2. Describe how to Return Data from Functions
- 9.3. Explain Pointers and Arrays
- 9.4. Explain Pointers and Strings
- 9.5. Demonstrate use of Double Indirection: Pointers to Pointers

## **10. Structures and Unions**

- 10.1. Demonstrate use of Structures
- 10.2. Demonstrate use of Unions
- 10.3. Demonstrate use of Unions of Structures

## **11. Files**

- 11.1. Explain Types of Disk I/O
- 11.2. Explain Standard Input/Output
- 11.3. Explain Binary and Text Mode Files
- 11.4. Program Record Input/Output
- 11.5. Explain Random Access Files
- 11.6. Explain Error Handling in File I/O
- 11.7. Explain Redirection

## **12. Larger Programs**

- 12.1. Make Stand-alone Executables
- 12.2. Perform Separate Compilation
- 12.3. Perform Conditional Compilations
- 12.4. Explain Memory Models

Course Code: **CIT 121**  
Course Title: **General Engineering Workshop**

**T**      **P**      **C**  
**0**      **3**      **1**

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An introductory laboratory course of the practice and techniques on electrical and electronics circuits. It aims to provide students with hands-on experience in using tools and techniques in working with electrical and electronics circuits. The course includes exercises in soldering, PCB fabrication, and basic wiring techniques. The course is all practicals.

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### ***Course Objectives***

At the end of the course the students are expected to be able to

- Understand correct methods and techniques of using appropriate tools and instrument for fabrication and assembly of electrical and electronics devices and circuits.
- Use these tools proficiently and apply these correct methods and techniques for electric wiring and soldering.
- Fabricate and assemble electrical and electronics devices accurately, efficiently and with confidence
- Demonstrate patience and care in using tools and equipment

### ***CONTENTS (Practical)***

<b>Practical Contents</b>	<b>Hours</b>
<b>1. Soldering</b>	<b>15</b>
1.1. Use of Basic Tools	
1.2. Use of Soldering and De-soldering Tools	
1.3. Soldering Techniques	
<b>2. PCB Design</b>	<b>36</b>
2.1. PCB Designing	
2.2. Selection of PCB	
2.3. Cutting Sheets	
2.4. Transfer of Circuit	
2.5. Chemical Etching Process	
2.6. Identification and Codes	
2.7. Mounting and Soldering Components	
2.8. PCB Tests	
<b>3. Basic Wiring</b>	<b>15</b>
3.1. Introduction to Electrical Wiring	
3.2. Wiring Standard and Symbols	
3.3. Types and Sizes of Wiring Cables	
3.4. Wiring System	
3.5. Wiring	

3.6. Wiring Accessories

3.7. Earthing

**4. Simple Wiring Circuits** **15**

4.1. Single Lamp Circuit

4.2. Stair Case Wiring Circuit

4.3. Lamps in Parallel

4.4. Telephone Wiring

4.5. Color Codes

**5. Use of Computer repair tools and equipments** **15**

5.1 Screw Driver

5.2 Nut driver

5.3 Torx Driver

5.4 Plier

5.5 Wire Cutter

5.6 Wire Stripper

5.7 Chip Extractor

5.8 Chip Inserter

5.9 Straps, Zipties and Tie-down

5.10 ESD Component Protection and Storage.

***Total Hours: 96***

***References***

- **Electrical Wiring, Estimating and Costing**, S.L. Uppal, Khanna Publishers
- **Handbook of Printed Circuit Manufacturing**, R. Clark, Van Nostrand Reinhold Company
- **Industrial Control Wiring**, Bob Mercer, Newnes, Butterworth-Heineman, Ltd.
- **A+: Core Module Study Guide**, David Groth, Sybex Inc.
- **How to Read and Interpret Schematic Diagram**, J. R. Johnson, Hayden Book Company
- **Basic Electricity: A Text-Lab Manual**, P. Zbar & G. Rockmaker, McGraw-Hill

Course Code: **CIT- 134**  
Course Title: **Electronics – I**

<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>3</b>	<b>4</b>

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The electrical and electronics foundation course on theory and practice in electromagnetism, electrical networks and electronic devices. This is designed to provide students with necessary knowledge to understand the applied physical principles in basic electronics. It covers the standard topics in electromagnetism and electronics such as AC/DC, circuits, transformers and semiconductors, among others. This is accompanied by laboratory course to strengthen the classroom discussion.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Understand qualitatively and quantitatively basic concepts and principles of electromagnetism, linear circuits and basic electronics.
- State and explain the operating principles applied to electrical and electronic devices. Apply the concepts and principles to solve related practical technological problems.
- Relate electronic and electrical concepts and principles to other discipline of study
- Observe accurately and manipulate electrical measuring instruments effectively and efficiently with confidence
- Display motivation in solving complex problems and appreciate the impact of this field of knowledge in technology

### *COURSE OUTLINE*

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<b>Contents</b>	<b>Hours</b>
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### **COURSE CONTENTS.**

#### **(Part-A)**

- |           |   |                   |
|-----------|---|-------------------|
| <b>1.</b> | <b>BASIC PRINCIPLE OF ELECTRICITY</b>                                     | <b>(4 Hours)</b>  |
| 1.1       | Electron Theory   |                   |
| 1.1.1     | Structure of atom, K, L and M shell, energy levels and valence electrons. |                   |
| 1.1.2     | Energy bands with reference to conductors, insulators and semiconductor.  |                   |
| 1.2       | Electrical Quantities   |                   |
| 1.2.1     | Potential, current and resistance.  |                   |
| 1.2.2     | Units of potential, current and resistance.                               |                   |
| 1.2.3     | Conventional and electron current   |                   |
| <b>2.</b> | <b>DC FUNDAMENTALS.</b>   | <b>(14 Hours)</b> |
| 2.1       | Ohm's Law   |                   |
| 2.1.1     | Definition of Ohm's law.  |                   |
| 2.1.2     | Problems on Ohm's Law.  |                   |
| 2.2.      | Laws of Resistance  |                   |
| 2.2.1     | Specific Resistance, conductance and conductivity.                        |                   |

- 2.2.2 Effect of temperature on resistance and temp. Coefficient of resistance.
- 2.2.3 Problems on  $R = \rho \times L/A$  and  $R_t = R_o (1 + \alpha t)$
- 2.2.4 Resistance in series, parallel and series-parallel
- 2.2.5 Calculations on combination of resistance and cells in series, parallel and series-parallel combinations.
- 2.2.6 Power and Energy their units and calculations.
- 2.2.7 Power dissipation in resistors.
- 2.3 Kirchhoff's Laws
  - 2.3.1 Introduction of Kirchhoff's Laws.
  - 2.3.2 Calculation using KVL and KCL by loop and node methods.
- 2.4 Resistors
  - 2.4.1 Resistor construction and types.
  - 2.4.2 Application of resistors.
  - 2.4.3 Resistors color coding , Power rating.
  - 2.4.4 Resistor, troubles.
- 2.5 Batteries
  - 2.5.1 Types of DC sources.
  - 2.5.2 Types of cells, Primary and secondary cells (Mercury, silver oxide, Nickel-cadmium, etc.)
  - 2.5.3 Lead acid batteries.
  - 2.5.4. Solar cell.
  - 2.5.5 Internal resistance of a cell.
  - 2.5.6 Application of cell as constant voltage and constant current source.

### 3. **ELECTROSTATICS.** **(10 Hours)**

- 3.1 Principle of electrostatic, positive and negative charges.
- 3.2 Laws of electrostatic.
- 3.3 Electrostatic induction and field strength.
- 3.4 Properties of electric lines of force and comparison with magnetic lines.
- 3.5. Dielectric, dielectric strength and its importance permittivity and break down voltage.
- 3.6 Capacitance and capacitors. Capacitance of parallel plate capacitor.
- 3.7 Types and uses of capacitors.
- 3.8 Equivalent capacitance for series, parallel and series parallel combination of capacitors.
- 3.9 Energy stored in capacitors.
- 3.10 Colour code, tolerance and rating of capacitors.
- 3.11 Troubles in capacitors.

### 4. **MAGNETISM AND ELECTROMAGNETISM.** **(10 Hours)**

- 4.1 Magnetism.
  - 4.1.1 Introduction to magnetism, magnetic line of force, flux, flux-density, permeability, Reluctance and their units.
  - 4.1.2 Properties of magnetic lines of force.
  - 4.1.3 Types of magnets.
  - 4.1.4 Magnetic properties of materials (ferro-, para- and dia-magnetic) magnetic induction.
- 4.2 Electromagnetism.
  - 4.2.1 Electromagnetism, M.M.F. (AT) field intensity ( $H = AT/L$ ) ampere turns/meter.
  - 4.2.2 Electromagnetic induction.
  - 4.2.3 Force between two magnetic fields and motor action.
  - 4.2.4 Faraday's Law of Electromagnetic induction ( $R = Nd\Phi/dt$ )
  - 4.2.5 Lenz's Law.



## 5. AC FUNDAMENTALS.

(10 Hours)

### 5.1 The simple AC generator.

- 5.1.1 Sine wave, cycle, wavelength, period, frequency and units.
- 5.1.2 AC sine wave form and its characteristics. (Instantaneous, peak, average, rms or effective values and their inter relation).
- 5.1.3 Audio and Radio frequencies, wavelengths and periods frequency spectrum.
- 5.1.4 Types of alternating wave forms (sinusoidal and non-sinusoidal waves). Fundamental wave and harmonics.

### 5.2 AC Circuits

- 5.2.1 AC through pure resistance, Phasor quantities.
- 5.2.2 Phase angle, in-phase, out of phase waves and phase lag & lead and power factor.
- 5.2.3 Calculation of V, I and W for resistive circuits through inductance.
- 5.2.4 Self inductance, and self induced voltage.
- 5.2.5 Inductive reactance ( $X_L = 2\pi fL$ ) Phase relation between V & I.
- 5.2.6 Phasor diagram and power for pure inductor.
- 5.2.7 AC through R-L series circuit.
- 5.2.8 Phasor diagram and power in a R-L series circuit.
- 5.2.9 Time constant,  $\tau = L/R$ , and its effect.
- 5.2.10 Impedance, Impedance triangle.
- 5.2.11 AC through R-L parallel circuit.
- 5.2.12 Inductive reactance in series, parallel and series-parallel combination.
- 5.2.13 Skin effect, AF and RF chokes.
- 5.2.14 Troubles in chokes.
- 5.2.15 AC through pure capacitor. Phase relation between V & I and power.
- 5.2.16 Capacitive reactance
- 5.2.17 AC through R-C series circuit.
- 5.2.18 Time constant RC and its effect.
- 5.2.19 Impedance, Impedance triangle.
- 5.2.20 AC through R-C parallel circuit.
- 5.2.21 Capacitive reactance in series, parallel, and series parallel combination.
- 5.2.22 AC through RLC series circuit, phase relation and power calculation.
- 5.2.23 AC through RLC parallel circuit phase relation and power calculation.
- 5.2.24 Simple calculations for RLC circuits.
- 5.2.25 Concepts of real Power ( $VI \cos\Phi$ ) and apparent power (VA), power factor. simple calculations.

### (Part-B)

## 6. TRANSFORMER

(6 Hours)

- 6.1 Principle of transformer, mutual inductance, coefficient of mutual inductance.
- 6.2 Turn ratio and e.m.f. equation
- 6.3 Construction, types of transformers, core materials.
- 6.4 Application of transformers in electronics.
- 6.5 Auto-transformers, principle, advantages, disadvantages and applications.
- 6.6 Transformer losses.
  - 6.6.1 Core loss.
  - 6.6.2 Hysteresis loss.

## 7. RESONANCE.

(8 Hours)

- 7.1 Condition of resonance and resonant circuit.

- 7.2 Relation between  $f$ ,  $L$  and  $C$  at resonance.
- 7.3 Series resonant circuit. Impedance of series resonant circuit.
- 7.4 Current, voltage and impedance characteristic of series resonant circuit.
- 7.5 Parallel resonant circuit and its impedance
- 7.6 Characteristics of impedance, current and voltage of a parallel resonant circuit
- 7.7 Series and parallel resonance curve comparison and Bandwidth.
- 7.8 Use of resonance circuit.
  
- 8. FILTER & COUPLING CIRCUITS (8 Hours)**
  - 8.1 Purpose and action of a filter circuit.
  - 8.2 Principle of filter action.
  - 8.3 Types of filter circuit LPF, HPF, K filter and  $m$  drive filter.
  - 8.4 Band Pass filter (BPF) Band Stop filter (BSF)
  - 8.5 Power supply filter.
  - 8.6 Purpose and action of coupling circuit.
  
- 9. DIODES AND APPLICATIONS. (12 Hours)**
  - 9.1 Semiconductors
    - 9.1.1 Semiconductor Doping
    - 9.1.2 Intrinsic & Extrinsic Semiconductors
  - 9.2 Biasing the PN junction.
    - 9.2.1 Depletion region, Junction barrier potential
    - 9.2.2 Forward and reverse bias.
  - 9.3 Rectifier Diode.
    - 9.3.1 Half wave and full wave (Bridge) rectifier.
    - 9.3.2 Ripple factor, surge current.
    - 9.3.3 Rectifier filter:  $L$ ,  $PI$  and  $T$  filters.
  - 9.6 Diode as a switch.
  
- 10. NUMBER SYSTEM. (Review) (04 Hours)**
  - 10.1 Conversion
    - 10.1.1 Binary to Decimal.
    - 10.1.2 Decimal to Binary.
    - 10.1.3 Hexadecimal to Binary.
    - 10.1.4 Binary to Hexadecimal.
    - 10.1.5 Hexadecimal to Decimal.
    - 10.1.6 Decimal to Hexadecimal.
  
- 11. LOGIC GATES. (10 Hours)**
  - 11.1 Logic Gates.
    - 11.1.1 Symbols, Circuits and functions of OR, AND, NOT, NAND, NOR Gates.
    - 11.1.2 Truth Table and Boolean expression of each above mentioned Gates.
    - 11.1.3 Creating Multiple Input Gates.
  - 11.2 Duality of Logic Functions.
    - 11.2.1 Using NOR Gates to emulate all Logic Functions.
    - 11.2.2 Using NAND Gates to Emulate all Logic Functions.
  - 11.3 The Exclusive OR and Exclusive NOR Functions.
    - 11.3.1 Symbols, Circuits and functions of XOR, XNOR Gates.
    - 11.3.2 Truth Table and Boolean expression of both above mentioned Gates.

### **TEXT / REFERENCE BOOKS.**

1. Bird J O — *Electrical and Electronic Principles and Technology, Second Edition* (Newnes, 2004) ISBN 0750665505
2. Bird J O — *Electrical Circuit Theory and Technology* (Newnes, 2004) ISBN 0750657847
3. Grob, Bernard, *Basic Electronics*, Eight Edition.
4. TL Floyd "Electronics Devices" 8<sup>th</sup> ed. Prentice Hall, ISBN 0131140809
5. Floyd "Digital Fundamentals"

**INSTRUCTIONAL OBJECTIVES****1. BASIC PRINCIPLE OF ELECTRICITY.**

- 1.1 Understand electron theory.
  - 1.1.1 Describe the structure of atom.
  - 1.1.2 Describe the K, L, and M shells.
  - 1.1.3 Describe energy level.
  - 1.1.4 Describe valence electron.
  - 1.1.5 Explain energy bands with reference to conductors, insulators & semiconductors.
- 1.2 Understand Electrical Quantities
  - 1.2.1 Describe potential, current & resistance
  - 1.2.2 Describe units of potential, current & resistance
  - 1.2.3 Differentiate between conventional current and electron current.

**2. DC FUNDAMENTALS.**

- 2.1 Understand Ohm's Law.
  - 2.1.1 Define ohm's law
  - 2.2.2 Solve problems on Ohm's law
- 2.2 Understand Laws of Resistance
  - 2.2.1 Define specific resistance
  - 2.2.2 Define conductor
  - 2.2.3 Define conductivity
  - 2.2.4 Explain the effect of temperature on resistance
  - 2.2.5 Explain coefficient of resistance
  - 2.2.6 Solve problems on  $R = \rho \times L/A$  and  $R_t = R_o (1+xt)$ .
  - 2.2.7 Describe the resistance in series
  - 2.2.8 Describe the resistance in parallel
  - 2.2.9 Describe the resistance in series-parallel
  - 2.2.10 Calculate the combination of resistances and cells,  $R_t$ , I & V.
  - 2.2.11 Define power and energy
  - 2.2.12 Describe units of power and energy
  - 2.2.13 Explain the power dissipation in resistors
- 2.3 Understand Kirchhoffs' Laws
  - 2.3.1 Define Kirchhoff's laws
  - 2.3.2 Solve problems using Kirchhoff voltage law
  - 2.3.3 Solve problems using kirchhoff current law
- 2.4 Understand Resistors
  - 2.4.1 Define resistance and resistor
  - 2.4.2 List types of resistors
  - 2.4.3 Enlist use of resistors
  - 2.4.4 Describe resistor color codes
  - 2.4.5 Describe power rating of resistor
- 2.5 Understand Batteries

- 2.5.1 Name types of D.C source
- 2.5.2 Describe types of cells (Mercury, Silver oxide, Nickel cadmium)
- 2.5.3 Describe lead acid battery
- 2.5.4 Describe solar cells
- 2.5.5 Explain the internal resistance of cell
- 2.5.6 Use cells in series and parallel of voltage and constant source of current

### **3. ELECTROSTATICS.**

- 3.1 Understanding Electrostatics
  - 3.1.1 Describe principle of electrostatic charges
  - 3.1.2 Explain the effect of negative & positive charges
  - 3.1.3 Describe the laws of electrostatics
  - 3.1.4 Describe electrostatic induction & field strength
  - 3.1.5 Explain properties of electric lines of force
  - 3.1.6 Compare between electric lines of force and magnetic lines of force
  - 3.1.7 Describe dielectric & dielectric strength/dielectric constant
  - 3.1.8 Describe the importance of dielectric & dielectric strength
  - 3.1.9 Describe capacitor and capacitance
  - 3.1.10 Describe breakdown voltage
  - 3.1.11 Describe the capacitance of parallel plate capacitor
  - 3.1.12 Describe types of capacitors
  - 3.1.13 Describe the use of capacitors
  - 3.1.14 Calculate the total capacitance in series in parallel and series-parallel combination
  - 3.1.15 Explain the energy stored in capacitor
  - 3.1.16 Describe the colour coding, tolerance and voltage rating of capacitors
  - 3.1.17 Describe the troubles in capacitors

### **4. MAGNETISM & ELECTROMAGNETISM**

- 4.1 Understand magnetism
  - 4.1.1 Describe lines of force, flux, flux density, permeability, reactance & their units
  - 4.1.2 Explain properties of magnetic lines of force
  - 4.1.3 Describe types of magnets
  - 4.1.4 Explain magnetic properties of materials
  - 4.1.5 Define and list ferromagnetic, paramagnetic and diamagnetic materials.
  - 4.1.6 Describe magnetic induction.
- 4.2 To understand electromagnetism
  - 4.2.1 Describe electromagnetism
  - 4.2.2 Describe magneto-motive force
  - 4.2.3 Describe field intensity ( $H=AT/L$ )
  - 4.2.4 Describe magnetic hysteresis
  - 4.2.5 Explain electromagnetic induction
  - 4.2.6 Explain magnetic field around a current carrying conductor
  - 4.2.7 Define inductor
  - 4.2.8 Explain force between two magnetic fields and motor action
  - 4.2.9 Define Faraday's law of electromagnetic induction ( $e = Nd\Phi/dt$ )
  - 4.2.16 Define Lenz's Law

### **5. AC FUNDAMENTALS.**

- 5.1 Understand A.C Waveform
  - 5.1.1 Describe sine wave (cycle, wave length, period, frequency and their units)
  - 5.1.2 Draw AC sine waveform (sinusoidal, square, saw tooth)
  - 5.1.3 Describe Instantaneous value, peak value, average value, r.m.s. value, effective value and their inter-relation
  - 5.1.4 Describe Audio & Radio frequencies and their wavelengths
  - 5.1.5 Draw the electromagnetic wave spectrum
  - 5.1.6 Define harmonic and fundamental wave.
- 5.2 Understand AC circuits
  - 5.2.1 Describe AC through resistors
  - 5.2.2 Describe phase angle, in phase & out of phase waves
  - 5.2.3 Describe phase lag, lead & power factor
  - 5.2.4 Calculate voltage, current & power(v,i,w) for resistive circuit
  - 5.2.5 Describe AC through inductance using waveforms and phasor diagram
  - 5.2.6 Define self inductance & self induced voltage
  - 5.2.7 Explain inductive reactance ( $X_L = 2\pi fL$ ), phase relation between voltage & current
  - 5.2.8 Draw its phaser diagram
  - 5.2.9 Calculate power for pure inductor
  - 5.2.10 Explain AC through R-L series circuit
  - 5.2.11 Draw phaser diagram for R-L series circuit
  - 5.2.12 Calculate power factor for R-L series circuit
  - 5.2.13 Calculate time constant for L/R
  - 5.2.14 Define impedance
  - 5.2.15 Draw impedance triangle
  - 5.2.16 Explain AC through R-L parallel circuit
  - 5.2.17 Calculate inductive reactance for series, parallel and series-parallel inductor
  - 5.2.18 Describe skin effect
  - 5.2.19 Describe audio frequency chokes
  - 5.2.20 Describe radio frequency chokes
  - 5.2.21 Explain ac through pure capacitor
  - 5.2.22 Explain phase relation between voltage, current & power for AC through capacitors
  - 5.2.23 Calculate capacitive reactance ( $\frac{1}{2} \pi f C$ )
  - 5.2.24 Explain AC through R-C series circuit
  - 5.2.25 Explain time constant for R-C series circuit
  - 5.2.26 Explain AC through R-C parallel circuit
  - 5.2.27 Calculate capacitive reactance for capacitor in series, in parallel and series parallel combination
  - 5.2.28 Explain AC through RLC series circuit
  - 5.2.29 Explain phase relation
  - 5.2.30 Calculate power for RLC series circuit
  - 5.2.31 Explain real power ( $VI \cos \Phi$ ), apparent power (VI)
  - 5.2.32 Calculate power factor

## 6. TRANSFORMER.

- 6.1 Understand the transformers
  - 6.1.1 Explain the principle of transformer
  - 6.1.2 Define mutual induction

- 6.1.3 Define coefficient of mutual induction
- 6.1.4 Describe turn ratio of transformer
- 6.1.5 Describe construction of transformer
- 6.1.6 Enlist the types of transformer
- 6.1.7 Enlist core material of transformer
- 6.1.8 Describe auto transformer
- 6.1.9 List the applications of transformer in electronics:
  - i) step down transformer,
  - ii) impedance matching
  - iii) coupling
- 6.1.10 Explain transformer losses.
- 6.1.11 Explain hysteresis loss and core loss.

## **7. UNDERSTAND RESONANCE**

- 7.1 Explain resonance
- 7.2 Explain the relation between frequency, inductance & capacitance at resonant
- 7.3 Draw the series resonant circuit
- 7.4 Explain series resonant circuit
- 7.5 Draw the characteristics of series resonant circuit
- 7.6 Calculate current, voltage and impedance of series resonant circuit
- 7.7 Draw the diagram of parallel resonant circuit
- 7.8 Explain the parallel resonant circuit
- 7.9 Draw the characteristics of parallel resonant circuit
- 7.10 Compare series and parallel resonant circuit
- 7.11 Describe the band width of a resonant circuit
- 7.12 Enlist the use of resonant circuit.

## **8. UNDERSTAND FILTERS & COUPLING CIRCUITS**

- 8.1 Explain purpose & action of a filter circuit
- 8.2 Enlist the types of filter circuits
- 8.3 Explain low pass filter high pass filter, K-filter & m-derived filters
- 8.4 Explain band pass filter & band stop filter
- 8.5 Explain action & purpose of a coupling circuit

## **9. SEMICONDUCTOR DIODES.**

- 9.1 Understand principles, characteristics and application of various types of semiconductor diodes.
  - 9.1.2 Explain semiconductor doping
  - 9.1.3 List donor and acceptor materials for silicon & germanium
  - 9.1.4 Define majority carries and minority charge carriers.
  - 9.1.5 Explain the effect of temperature & light on the resistance of
    - (a) intrinsic semiconductor and
    - (b) Extrinsic semiconductor
- 9.2 PN Junction Theory:
  - 9.2.1 Draw a PN Junction
  - 9.2.2 Define the terms depletion layer capacitance & diffusion capacitance.
  - 9.2.3 Sketch the voltage-current characteristics curve for a PN junction.
  - 9.2.4 Describe  $R_F$ ,  $R_R$  and  $I_s$  from the diode characteristics curve.
  - 9.2.5 List the typical values of barrier potentials for silicon and germanium diode.
- 9.3 Understand PN Diode Applications
  - 9.3.1 List the uses of PN diode.

- 9.3.2 Explain half and full wave rectifier using circuit diagram.
- 9.3.3 Define Ripple factor, surge current.
- 9.3.4 Explain function of rectifier (L, PI, T) filters
- 9.3.5 Explain its uses as voltage multiplier (doubler).
- 9.3.6 Explain the working of a voltage doubler circuit.
- 9.3.7 List the applications of voltage multiplier circuit.
- 9.3.8 Explain the operation of a diode as a switch.

## **10. NUMBER SYSTEM.**

- 10.1 Convert one number system to another system
  - 10.1.1 Convert Binary numbers into Decimal numbers.
  - 10.1.2 Convert Decimal numbers into Binary numbers.
  - 10.1.3 Convert Hexadecimal numbers into Binary numbers.
  - 10.1.4 Convert Binary numbers into Hexadecimal numbers.
  - 10.1.5 Convert Hexadecimal numbers into Decimal numbers.
  - 10.1.6 Convert Decimal numbers into Hexadecimal numbers.

## **11. LOGIC GATES.**

- 11.1 Explain Logic Gates.
  - 11.1.1 Draw Symbols of OR gate.
  - 11.1.2 Draw Circuit of two input OR gate.
  - 11.1.3 Discuss function of OR gate.
  - 11.1.4 Describe Truth Table of OR gate.
  - 11.1.5 Describe Boolean expression for OR gate.
  - 11.1.6 Repeat instructional objectives no. 11.1.1 to 11.1.5 for AND gate.
  - 11.1.7 Repeat instructional objectives no. 11.1.1 to 11.1.5 for NOT circuit.
  - 11.1.8 Repeat instructional objectives no. 11.1.1 to 11.1.5 for NOR gate.
  - 11.1.9 Repeat instructional objectives no. 11.1.1 to 11.1.5 for NAND gate.
  - 11.1.10 Create Multiple Input Gates.
- 11.2 Describe duality of Logic Functions.
  - 11.2.1 Use NOR Gates to emulate all Logic Functions.
  - 11.2.2 Use NAND Gates to emulate all Logic Functions.
- 11.3 Understand Exclusive OR and Exclusive NOR Functions.
  - 11.3.1 Draw Symbols of XOR gate.
  - 11.3.2 Draw Circuit of two input XOR gate.
  - 11.3.3 Discuss function of XOR gate.
  - 11.3.4 Describe Truth Table of XOR gate.
  - 11.3.5 Describe Boolean expression for XOR gate.
  - 11.3.6 Repeat instructional objectives no. 11.1.1 to 11.1.5 for XNOR gate.



1. Study of Ammeter, Voltmeter and Multimeter.
2. a) Measurement of current, voltage and resistance.  
b) Verification of Ohm's Law by:  
Keeping the voltage constant.  
Keeping the resistance constant.
3. a) Verify the laws of series and parallel combination of resistances by  
i) Ohmmeter method.  
ii) Voltmeter-Ammeter method.
4. Determine temperature coefficient of resistance.
5. Verify Kirchhoffs' laws.
6. a) Measurement of power by:  
i) Voltmeter/Ammeter method.  
ii) Wattmeter.  
b) Measurement of Energy by:  
i) Wattmeter and clock method.  
ii) Energy meter.
7. a) Practice of resistor colour coding.
8. Combine cells in series and parallel and verify the net voltage.
9. a) Study of lead acid battery, practice and use of hydrometer and electrolyte preparation.  
b) Practice charging of a lead acid battery.
10. Study of various types of capacitors and their colour coding.
11. Verify laws of combination of capacitors.
12. Observe capacitor charging and discharging.
13. Study of sine wave on an oscilloscope and determine its peak, peak to peak, r.m.s. and average values of current and voltage.
14. Determine of wave length, time period and frequency of a given AC signal by oscilloscope.
15. Study the behavior of inductance and capacitance with AC and DC supplies.
16. a) Study of various type of transformers used in electronics field.  
b) Study of single-phase transformer and determine its transformation ratio.
17. Practice of core assembly and winding of the core type transformers.
18. Draw the forward & reverse characteristics of a P.N. junction diode.
19. Assemble a half wave diode rectifier circuit and observe its input and out put waveforms.
20. Assemble a full wave diode rectifier circuit with center tap transformer and observe its input and out put waveforms.
21. Assemble a full wave bridge rectifier circuit and observe its input and out put waveforms.
22. Demonstrate the working of diode as a switch with LED as a load.
23. Assemble two inputs OR gate with the help of discrete components and verify its logic operation.
24. Assemble two inputs AND gate with the help of discrete components and verify its logic operation.
- 24-26. Verify its operation. NOT, OR and AND IC Gates.
27. Verify the operation of NAND gate.
28. Verify the operation of NOR gate.
- 29-30. Use NOR and NAND gates to emulate all logic functions.
31. Assemble XOR gate and verify its operation.
32. Assemble XNOR gate and verify its operation.

اسلامیات / مطالعہ پاکستان

GEN 211

مذہب (اسلام) دوئم

حصہ اول اسلامیات

حصہ دوم مطالعہ پاکستان

موضوعات

ٹ ۱ ۱  
۱ ۰ ۱  
کل وقت 20 گھنٹے

- ۱۔ سورۃ المؤمنین آیت تا یادہ آیات کا مع ترجمہ
- ۲۔ دس منتخب مملکت مع ترجمہ و تفسیر
- ۳۔ خیبر کیم من تعسیم القرآن و عللہ
- ۴۔ لا ایمان لمن لا ایمانہ لہ ولا دین لمن لا یمدہ
- ۵۔ ویاکم واطن لن اظن اکرب الحدیث
- ۶۔ من احدث فی امرنا بقاء لیس متہ فہو رد
- ۷۔ من حمل علیہ السلاح فلیس منا
- ۸۔ لہو کافل البیتیم فی الجنۃ
- ۹۔ لا ضرر ولا ضرار فی السلام
- ۱۰۔ کلکم راع وکلکم راع وکلکم مسؤول عن رعیتہ
- ۱۱۔ میرۃ طیبہ
- ۱۲۔ مکی زندگی۔ والارشہ بعثتہ ہجرت
- ۱۳۔ غلی زندگیا۔ موافقت۔ مشق مدرسہ۔ (۲ کمرہ اسباب و نتائج)
- ۱۴۔ حضور ﷺ بحیثیت
- ۱۵۔ خطبہ جمعہ ۱۱/۱
- ۱۶۔ محرم کل، سرپر کو خاندان
- ۱۷۔ اسلامی معاشرہ
- ۱۸۔ کیم تعلیم اور اس کے مقاصد۔ عدس و انصاف۔ امر بالمعروف۔ فی من المنکر
- ۱۹۔ جہاد۔ کسب طایل۔ سچہ الایمیت (فضیلت)
- ۲۰۔ انسانی ریاست کی تعریف۔ انسانی ریاست کی خصوصیات۔ انسانی حکومت کے فرائض۔ اسلامی طرز حکومت

## اسلامیات

### تدریس مقاصد

عمومی مقاصد بطالعلم یہ جان سکے کہ آیات قرآنی کی روشنی میں مومن کے اوصاف کیا ہیں  
قرآن مجید  
فصوصی مقاصد:

- ☆ قرآنی آیات کا ترجمہ بیان کر سکے
- ☆ قرآنی آیات کی تشریح کر سکے
- ☆ 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 نبویہ
- ☆ عمومی مقصد احادیث کی روشنی میں اسلامی اخلاقی اقدار (انفرادی و اجتماعی) سے آگاہ ہو سکے
- ☆ فصوصی مقاصد:
- ☆ احادیث کا ترجمہ بیان کر سکے
- ☆ احادیث کی تشریح کر سکے
- ☆ احادیث کی روشنی میں اسلام کی اخلاقی اقدار کی وضاحت کر سکے
- ☆ فقہ احادیث کی دی گئی تعلیمات کے مطابق اپنی زندگی گزار سکے
- ☆ سیرت طیبہ
- ☆ عمومی مقصد: حضور ﷺ کی سیرت طیبہ کے بارے میں جان سکے
- ☆ فصوصی مقاصد:
- ☆ حضور ﷺ کی ابتدائی زندگی اختصار کے ساتھ بیان کر سکے
- ☆ حضور ﷺ کی ہجرت کا واقعہ بیان کر سکے
- ☆ حضور ﷺ کی مدنی زندگی اختصار سے بیان کر سکے
- ☆ حضور ﷺ کی بطور معلم خصوصیات بیان کر سکے

☆	حضور ﷺ کی بطور سربراہ خاندان بیان کر سکے
	اسلامی معاشرہ
	عمومی مقصد: اسلامی معاشرہ کی خصوصیات سے آگاہی حاصل کر سکے
	خصوصی مقاصد:
☆	اسلامی معاشرہ کا معنی و مفہوم بیان کر سکے
☆	اسلامی معاشرہ کی امتیازی خصوصیات بیان کر سکے
☆	اسلامی معاشرہ میں عدل و احسان کی اہمیت بیان کر سکے
☆	تبلیغ کے لغوی معنی بیان کر سکے
☆	تبلیغ کی اہمیت و ضرورت بیان کر سکے
☆	جہلو کے لفظی و اصطلاحی معنی بیان کر سکے
☆	جہلو کی اہمیت بیان کر سکے
☆	جہلو اور قتل میں فرق بیان کر سکے
☆	جہلو کی مختلف اقسام بیان کر سکے
☆	اقلام مسجد کا تعارف کر سکے

نصاب مطالعہ پاکستان

نی بی سی  
1 0 1  
کل وقت: 12 گھنٹے

سہ ماہی  
حصہ دوم

موضوعات

☆	یہ قومی نظریہ
☆	تحریک پاکستان
☆	انڈین کانگریس
☆	مسلم لیگ
☆	تقسیم بنگال
☆	میشن کمشنر
☆	تحریک خلافت
☆	سندھ تحریک
☆	قبولہ برادری
☆	سورج پورٹ
☆	قائم العظمیٰ کے چودہ نکات
☆	خطبہ آلہ آباد
☆	انتخابات 1938 اور انشیل ہزار
☆	قانون دلو پاکستان

قصد دوم  
سفاہ پاکستان

### تدریس مقاصد

تحریک پاکستان

عمومی مقصد: قیام پاکستان کے سبب و محرکات کو بیان کر سکے  
خصوصی مقاصد:

- ☆ قومیت کے مفہوم کو بیان کر سکے
- ☆ دو قومی نظریہ کی تعریف و توضیح کر سکے
- ☆ دو قومی نظریہ اہمیت بیان کر سکے
- ☆ ہندوستان مسلمانوں کی محرومیوں کو بیان کر سکے
- ☆ قومی تشخص کو بھل رکھنے سے لئے مسلمان ہند کی مساعی بیان کر سکے
- ☆ آزادی ہند اور قیام پاکستان علامہ اقبال اور قائد اعظم کی مساعی بیان کر سکے
- ☆ قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لئے مسلم عوام کی کوششوں کو بیان کر سکے
- ☆ مسلم لیگ کے قیام پاکستان کے لئے جدوجہد بیان کر سکے

(غیر مسلم طلباء کے لئے)

نی لیا سی  
1 0 1  
کل وقت: 20 منٹ

نصاب اختلاقیات  
سال دوم

### موضوعات

معاشرتی قدرات، اہلکار، مسلمان، قوم، قوی سطح، شری سطح، صنعتی اربابوں کی سطح، ضروریات، درجہ

- ☆ حقوق و فرائض
- ☆ قوت پرورش
- ☆ قوت ارادی
- ☆ لگن و جذبہ
- ☆ وسیع النظری
- ☆ بے غرضی
- ☆ مسئلہ دوستی
- ☆ حفاظتی شعور
- ☆ پاس آزدی
- ☆ کامل نگہی
- ☆ تعمیرات کو قبول کرنا
- ☆ خود شناسی

نسب اخلاقیات

جلد دوم

### تدریس مقاصد

عمومی مقاصد :

طالب علم: اخلاقیات کی اہمیت و ضرورت سے سمجھ ہو سکے اور بیان کر سکے

خصوصی مقاصد: طالب علم اس قبل ہو کہ

موضوعات کا مطلب بیان کر سکے

عملی زندگی سے مثالوں کی نشاندہی کر سکے

اپنی شخصیت اور حاشیہ پر موضوعات کے متعلق مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے

اعلیٰ اخلاقی قد ار میں سے

توبہ برداشت۔ قوت ارادی۔ مکتب جذبہ۔ وسیع النظری۔ بے غرض۔ انسانی دوستی خالص۔ شعور۔ پس تراوی۔

کمال اعلیٰ اور ذرا شناسی کی اہمیت بیان کر سکے

اخلاقیات سے متصف ہو کر قومی خدمت بہتر طور پر انجام دے سکے

## MATHS-233 Applied Mathematics-II

Total Contact Hrs:	T	P	C
Theory:	3	0	3
Practical:			

### Aims & Objectives:

After completing the course the students will be able to:

Solve the problems of calculus and analytical Geometry.

### Course Contents:

1. **FUNCTIONS & LIMITS.** 6 Hours
  - 1.1 Constants and variables
  - 1.2 Functions & their types
  - 1.3 The concept of limit
  - 1.4 Limit of a function
  - 1.5 Fundamental theorems on limit
  - 1.6 Some important limits
  - 1.7 Continuous function
  - 1.8 Problems
2. **DIFFERENTIATION.** 06 Hours
  - 2.1 Increments
  - 2.2 Geometrical interpret
  - 2.3 Differentiation ab –initio by first principle.
  - 2.4 Geometrical interpretation of differential coeff.
  - 2.5 Differentiation coefficient of  $X^n$  and  $(a+b)^n$
  - 2.6 Problems.
3. **DIFFERENTIATION OF ALGEBRAIC FUNCTIONS** 9 Hours
  - 3.1 Explicit Functions
  - 3.2 Implicit Functions
  - 3.3 Parametric Forms
  - 3.4 Problems
4. **DIFFERENTIATION OF TRIGONOMETRIC FUNCTIONS** 6 Hours
  - 4.1 Differential Coefficient of  $\sin x$ ,  $\cos x$ ,  $\tan x$  from first principle.
  - 4.2 Differential Coefficient of  $\operatorname{cosec} x$ ,  $\sec x$ ,  $\cot x$ .
  - 4.3 Differential Coefficient of Inverse Trigonometric Functions
  - 4.4 Problems
5. **DIFFERENTIATION OF LOGARITHMIC & EXPONENTIAL FUNCTION 15 Hours**
  - 5.1 Differentiation of  $\ln x$
  - 5.2 Differentiation of  $\log a^x$
  - 5.3 Differentiation of  $a^x$
  - 5.4 Differentiation of  $e^x$
  - 5.5 Problems



<b>6.</b>	<b>RATE OF CHANGE OF VARIABLES.</b>	<b>6 Hours</b>
6.1	Increasing and decreasing functions	
6.2	Maxima and Minima	
6.3	Criteria for maximum & minimum values	
6.4	Methods of finding maximum & minimum	
6.5	Rate measure	
6.6	Slope of a line	
6.7	Velocity and acceleration	
6.8	Problems	
<b>7.</b>	<b>INTEGRATION (SIMPLE BASIC RULES)</b>	<b>9 Hours</b>
7.1	Concept	
7.2	Fundamental Formulae	
7.3	Important Rules	
7.4	Problems	
<b>8.</b>	<b>METHODS OF INTEGRATION</b>	<b>9 Hours</b>
8.1	Integration by substitution	
8.2	Integration by parts	
8.3	Problems	
<b>9.</b>	<b>DEFINITE INTEGRALS.</b>	<b>6 Hours</b>
9.1	Properties	
9.2	Application to area	
9.3	Problems.	
<b>10.</b>	<b>DIFFERENTIAL EQUATION.</b>	<b>6 Hours</b>
10.1	Introduction	
10.2	Order and Degree	
10.3	First Order Differential Equation of 1 <sup>st</sup> Degree	
10.4	Solution of Problems	
10.5	Problems	
<b>11.</b>	<b>LAPLACE TRANSFORMATION.</b>	<b>9 Hours</b>
11.1	Laplace Transformations	
11.2	Inverse Laplace Transformations	
11.3	Problems	
<b>12.</b>	<b>FOURIER SERIES</b>	<b>9 Hours</b>
12.1	Introduction	
12.2	Periodic Functions	
12.3	Even and Odd Functions	
12.4	Problems	
<b>13.</b>	<b>STATISTICS</b>	<b>6 Hours</b>
13.1	Concept of mean, median and mode	
13.2	Standard Deviation	
13.3	Laws of probability	
13.4	Problems	

## **RECOMMENDED BOOKS**

1. Thomas Finny, Calculus and Analytic Geometry
2. Ghulam Yasin Minhas, Technical Mathematics Vol – I & II, Ilmi Kitab Khana, Lahore
3. Riaz Ali Khan, Polytechnic Mathematic Series Vol I & II, Majeed Sons, Faisalabad.
4. Sana Ullah Bhatti, Calculus and Analytic Geometry, Punjab Text Book Board, Lahore.

Course Code: **Mgm -211**  
Course Title: **Business Communication**

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>1</b>

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Second course on English language focusing on business communication. It aims to develop communication skills as applied in business and commerce such as the writing and business correspondence. It covers oral communication and art of listening, interviewing, and report writing among others. It is a pure class discussion.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Understand the basic principles of good and effective business writing in commercial and industrial fields.
- Use the English language effectively for communication in business
- Apply knowledge and skill to write business communication with confidence and ease.
- Write legibly in handwriting and compose communication documents with correct formats.
- Appreciate the usefulness of written language

### **COURSE OUTLINE**

<b>Contents</b>	<b>Hours</b>
<b>1. Communication Process.</b>	<b>6</b>
1.1. Purposes of communication	
1.2. Communication process	
1.3. Distortions in communication	
1.4. Consolidation of communication	
1.5. Communication flow	
1.6. Communication for self development	
<b>2. Oral Communication Skills</b>	<b>6</b>
2.1. Significance of Speaking	
2.2. Verbal and Non-verbal Messages	
2.3. Strategic Steps of Speaking	
2.4. Characteristics of Effective Oral Messages	
2.5. Communication Trafficking	
2.6. Oral Presentation	
<b>3. Questioning Skills</b>	<b>3</b>
3.1. Nature and Types of Questions	
3.2. Characteristics of a Good Questions	
3.3. Questioning Strategy	
<b>4. Listening Skills</b>	<b>5</b>
4.1. Principles of Active Listening	

4.2. Skills of Active Listening	
4.3. Barriers to Listening	
4.4. Reasons of Poor Listening.	
4.5. Giving Feedback.	
<b>5. Interviewing Skills</b>	<b>3</b>
5.1. Significance of Interviews	
5.2. Characteristics of Interviews	
5.3. Activities in an Interviewing Situation	
5.4. Types of Interviews.	
5.5. Interviewing Strategy.	
<b>6. Report Writing</b>	<b>3</b>
6.1. Goals of Report Writing	
6.2. Report Format	
6.3. Types of Reports	
6.4. Report Writing Strategy.	
<b>7. Reading Comprehension</b>	<b>2</b>
7.1. Reading Problems	
7.2. Four Reading Skills	
<b>8. Group Communication</b>	<b>4</b>
8.1. Purposes of Conducting Meetings	
8.2. Planning a Meeting	
8.3. Types of Meetings	
8.4. Selection of a Group for Meeting	
8.5. Group Leadership Skills	
8.6. Running a Successful Meeting	
8.7. Active Participation Techniques	
<b>Total Hours:</b>	<b>32</b>

## ***References***

- **Effective Business Communication and Report Writing**, Sh. Ata-ur-Rehman.
- **Technical Reporting**, Ulman J.N. Could JR..

**LEARNING OBJECTIVES**

**1. Communication Process**

- 1.1. Understand the communication process
- 1.2. State the benefits of two way communication
- 1.3. Describe a model of communication process.
- 1.4. Explain the major communication methods used in organization
- 1.5. Identify the barriers to communication and methods of overcoming these barriers
- 1.6. Identify misconceptions about communication

**2. Oral Communication Skills**

- 2.1. Understand the process of oral communication
- 2.2. Identify speaking situations with other peoples.
- 2.3. Identify the strategy steps of speaking.
- 2.4. Identify the characteristics of effective speaking.
- 2.5. State the principles of one-way communication.
- 2.6. State the principles of two-way communication.
- 2.7. Identify the elements of oral presentation skills.
- 2.8. Determine the impact of non-verbal communication on oral communication.

**3. Questioning Skills**

- 3.1. Determine the uses of questioning skills and clarify information in the oral communication process
- 3.2. Identify different types of questions.
- 3.3. Determine the purpose of each type of question and its application.
- 3.4. Identify the hazards to be avoided when asking questions.
- 3.5. Demonstrate questioning skills.

**4. Listening Skills**

- 4.1. Demonstrate the use of active listening skill in the oral communication process
- 4.2. State the principles of active listening.
- 4.3. Identify skills of active listening.
- 4.4. Identify barriers to active listening.
- 4.5. State the benefits of active listening.
- 4.6. Demonstrate listening skills.
- 4.7. Explain the importance of giving and receiving feed back.

**5. Interview Skills**

- 5.1. Determine the appropriate interview type for the specific work-related situation and conduct a work-related interview.
- 5.2. State the significance of interviews.
- 5.3. State the characteristics of interviews.
- 5.4. Explain the activities in an interviewing situation.
- 5.5. Describe the types of interviews
- 5.6. Explain the interviewing strategy
- 5.7. Prepare instrument for a structured interview

## **6. Report Writing**

- 6.1. Prepare a report out-line, based on subject matter and audience
- 6.2. Identify the different types of reports
- 6.3. Determine when to use an informal or formal report presentation
- 6.4. Identify the stages of planning a report
- 6.5. Identify the parts of a report and choose the parts appropriate for each type of report
- 6.6. Draft a report outline

## **7. Reading Comprehension**

- 7.1. Demonstrate reading comprehension
- 7.2. Identify major reading problems
- 7.3. Identify basic reading skills.
- 7.4. State methods of previewing written material
- 7.5. Identify methods of concentration when reading.
- 7.6. Demonstrate reading comprehension.

## **8. Group Communication**

- 8.1. Understand the principles of group communications
- 8.2. State the purpose and characteristics of major types of meeting.
- 8.3. Explain responsibilities of a meeting/committee.
- 8.4. Identify problems likely to be faced at meeting and means to overcome these problems.
- 8.5. Distinguish between content and process at meetings.
- 8.6. Explain the key characteristics of a good group facilitator.

Course Code: **CIT 212**  
Course Title: Object Oriented Programming with JAVA

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>3</b>	<b>2</b>

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This course will give you basic understanding of Java programming language and object oriented programming principles. It intends to provide students with working skills and knowledge in writing programs using the java programming language. The course covers how to download and install Eclipse / NetBeans IDE, Object and classes, implement object oriented principles, generics and exception handling.

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### Course Objectives

At the end of the course the students are expected to be able to

- Explain the core part of java programming language
- Explain the Object Oriented Programming principles
- Formulate logically the problems and their solutions
- Apply Java programming language to solve problems

### COURSE OUTLINE

Contents	Hours
<b>1. Introduction to Java</b>	<b>2</b>
1.1. Java Virtual Machine	
1.2. Java Development Kit	
1.3. Java Runtime Environment	
1.4. Integrated Development Environment	
<b>2. Variable and Operators</b>	<b>2</b>
2.1. Understanding Variable	
2.2. Variable Types and Scope	
2.3. Operators	
2.4. Boxing and Unboxing	
<b>3. Classes and Objects</b>	<b>6</b>
3.1. What is a Class	
3.2. What is an Object	
3.3. Methods	
3.4. Constructors	
3.5. Access Modifier	
<b>4. Control Statements</b>	<b>4</b>
4.1. Introduction and Control Statement Types	
4.2. Conditional Statements	
4.3. Loops	
4.4. Break / Continue	

<b>5. Object Oriented Programming</b>	<b>8</b>
5.1. Inheritance	
5.2. Polymorphism	
5.3. Encapsulation	
<b>6. Interfaces</b>	<b>4</b>
6.1. Introduction	
6.2. Defining and Implementing Interfaces	
6.3. Advantages of using Interface	
<b>7. Generics</b>	<b>4</b>
7.1. What is Generic	
7.2. Generic Class	
7.3. Generic Method	
<b>8. Exception Handling</b>	<b>2</b>
8.1. Exceptions	
8.2. Try and Catch	
8.3. Finally	

**Total Hours: 32**

## ***References***

- **Java in a Nutshell** (6<sup>th</sup> Edition) by Benjamin J. Evans and David Flanagan
- **O'Reilly Java 8 Pocket Guide** by Robert Liguori and Patricia Liguori



## **CIT 212 – Object Oriented Programming with JAVA**

### **LIST OF PRACTICALS**

1. Installation of JDK
2. Installation of NetBean and Eclipse
3. Setup environment variable and Classpath
4. Program to Check Student is Pass or Fail
5. PIN Code Verification
6. Printing of Weekdays based on switch-case
7. Check whether a Character is 'Alphabet', 'Digit' or a 'Special Character'
8. Find the largest value in an Array
9. Printing series of natural numbers, even and odd numbers (GUI)
10. Check for Prime Number
11. A number guessing game
12. Basic Calculator
13. Changing Text Case from lower to upper and upper to lower
14. Reverse of a String
15. Creating a Java Class for Student Records to demonstrate classes, objects and Inheritance

## **CIT 212 – Object Oriented Programmingwith JAVA**

### **LEARNING OBJECTIVES**

#### **1. Introduction to Java**

- 1.1. Describe Java Virtual Machine
- 1.2. Describe Java Development Kit
- 1.3. Install NetBeans / Eclipse
- 1.4. Setup Environment Variable
- 1.5. Explain Java Program Structure
- 1.6. Explain Lifecycle of Java Program

#### **2. Variable and Operators**

- 2.1. Create Instance of a Variable
- 2.2. Use Preemptive data types
- 2.3. Apply Arithmetic Operators
- 2.4. Use Increment and Decrement Operators
- 2.5. Apply Comparison Operators
- 2.6. Apply Boolean Operators
- 2.7. Explain Boxing and Unboxing Conversions

#### **3. Control Statements**

- 3.1. Explain Control Statement Types
- 3.2. Describe Expression Statements
- 3.3. Explain Compound Statements
- 3.4. Apply If/Else statements
- 3.5. Apply Switch Statement
- 3.6. Use Loops (DO, WHILE, FOR, FOREACH)
- 3.7. Apply BREAK / CONTINUE statements

#### **4. Classes and Objects**

- 4.1. Define a Classes
- 4.2. Create an Object
- 4.3. Use an Object
- 4.4. Use Lambda Expression
- 4.5. Create a Class Property and Method
- 4.6. Create and Initializing Objects
- 4.7. Define Constructor
- 4.8. Use Constructors for classes
- 4.9. Pass Information to Methods and Constructors
- 4.10. Return Value from a Method
- 4.11. Control Access to a Member of a Class

#### **5. Object Oriented Programming**

- 5.1. Explain Subclass and Inheritance
- 5.2. Extend a Class
- 5.3. Override Superclass Methods

- 5.4. Invoke an overridden method
- 5.5. Hide Data and Encapsulation
- 5.6. Access control and Inheritance
- 5.7. Use Abstract Classes and Abstract Methods

## **6. Interfaces**

- 6.1. Defining an Interface
- 6.2. Extend Interfaces
- 6.3. Implement an Interface
- 6.4. Implement multiple interface
- 6.5. Differentiate between Interface and Abstract Class

## **7. Generics**

- 7.1. Define the term 'Generic'
- 7.2. Describe Generic Types and Parameters
- 7.3. Describe Generic Classes and Interfaces
- 7.4. Use Constructors with Generics
- 7.5. Apply Generic Method

## **8. Exception Handling**

- 8.1. Explain Exceptions
- 8.2. Throw Exceptions
- 8.3. Use Multi Catch Exception
- 8.4. Use Handling and Catching Exceptions
- 8.5. Print Information about Exceptions

Course Code: **CIT -223**  
Course Title: **Computer Networks**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

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Introductory course on data communication and computer networks. It aims to provide the students conceptual tools to understand the design and implementation of data communication as applied to computer networks. It discusses the layered model. It covers communication, media, WAN, LAN, Internetworking, protocols, network management and troubleshooting. This comes with practical component to complement classroom discussion.

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## **Course Objectives**

At the end of the course, the students are expected to be able to

- Understand basic concepts and principles of data communication as applied to computer networking
- Synthesize the different approaches of data communication in networking and assess their effectiveness in implementation
- Troubleshoot and diagnose network faults and correct them
- Assemble cabling system of a network
- Recognize the inherent problems in networking and appreciate the solutions of the problems

## *COURSE OUTLINE*

<b>Contents</b>	<b>Hours</b>
<b>1. Principles of Data Communication and Networking</b>	<b>8</b>
1.1. Development of Communication and Data Communication	
1.2. Overview of OSI and TCP/IP model	
1.3. Data Transmission	
1.3.1. Analog Transmission	
1.3.2. Digital Transmission	
1.3.3. Signal Impairment	
1.4. Transmission Media	
1.4.1. Types of Cables and Connectors	
1.4.2. Telephony and Wireless Communication	
<b>2. Data Link Control</b>	<b>4</b>
2.1. Addressing scheme (Mac addresses)	
2.2. Error detection and correction	
<b>3. Multiplexing</b>	<b>4</b>
3.1. Frequency-Division Multiplexing	
3.2. Time-Division Multiplexing	
<b>4. Local Area Network (LAN)</b>	<b>12</b>
4.1. LAN Architecture	
4.2. Topologies	
4.3. LAN Systems	
4.3.1. Ethernet and Fast Ethernet (CSMA/CD)	
4.3.2. Token Ring and FDDI	
<b>5. Connectivity Devices</b>	<b>4</b>
5.1. Modems	

- 5.2. Hubs and Repeaters
- 5.3. Bridges, Routers and Gateways

<b>6. Internetworking</b>	<b>20</b>
6.1. Principles of Internetworking	
6.2. Protocols	
6.2.1. OSI Model	
6.2.2. TCP/IP Suite	
6.3. Internet Protocol (IP) and	
6.4. Addressing scheme at NW layer (IP address classes)	
6.5. Routing Protocol	
6.6. Transport Protocols and Transport Services	
6.7. Addressing scheme at Transport layer (Port addresses)	
6.8. Application Layer protocols	
6.9. Addressing scheme at Application layer (DNS)	
<b>7. Network Administration and Management</b>	<b>8</b>
7.1. Types of Servers	
7.2. Managing Accounts	
7.3. Performance Monitoring	
<b>8. Network Troubleshooting</b>	<b>4</b>
8.1. Structured Cabling	
8.2. Network Testing Tools	
8.3. Fault Diagnosis: Troubleshooting Connectivity and Communication	

**Total Hours: 64**

### *References*

- **Networking Essentials**, Joe Casad and Dan Newland, Techmedia
- **Computer Networks, 2Ed**, Andrew S. Tanenbaum, Prentice Hall
- **Data and Computer Communications, 4Ed.**, William Stallings, MacMillan
- **Local Area Networks**, 2Ed, Peter Hodos
- **An introduction to Local Area Networks**, Greg Nunemacher
- **Networking Explained**, Gallo
- **Networking Essentials, 2Ed**, Microsoft Press

## **CIT 223 – Computer Networks**

### **LIST OF PRACTICALS**

1. Identifying various hardware components of a network
2. Studying network card
3. Splicing a coaxial cable
4. Terminating twisted pair cable
5. Terminating coaxial cable
6. Using Cable Testers
7. Configuring Mac address on Windows / Linux OS
8. Configuring IP addresses on Windows / Linux OS
9. Design of a Local Area NW of computers
10. Troubleshooting NW connectivity.
11. Installing and configuring a NW printer
12. Using Network Tools and Analyzers
13. Using Network Monitors

## **CIT 223 – Computer Networks**

### ***LEARNING OBJECTIVES***

#### ***1. Principles of Data Communication and Networking***

- 1.1. Discuss the development of communication
- 1.2. State the principles of data communication
- 1.3. Describe methods of data transmission
- 1.4. Differentiate analog signal from digital signal
- 1.5. Explain causes of transmission error
- 1.6. List transmission media
- 1.7. Describe each transmission media
- 1.8. State the advantage and disadvantage of each transmission media

#### ***2. Data Link Control***

- 2.1. Protocols at data link layer
- 2.2. Understand importance of Mac address
- 2.3. Describe methods of error detection and correction

#### ***3. Multiplexing***

- 3.1. Explain the need for multiplexing
- 3.2. Describe Frequency-division multiplexing
- 3.3. Describe Synchronous Time-division Multiplexing

#### ***4. Local Area Network (LAN)***

- 4.1. Describe LAN architecture
- 4.2. Identify different topologies of LAN
- 4.3. Describe different topologies of LAN
- 4.4. Illustrate different topologies
- 4.5. State the advantage and disadvantages of each topology
- 4.6. Describe different LAN systems like Ethernet
- 4.7. Explain the advantage and disadvantage of different LAN systems
- 4.8. Describe bridges

#### ***5. Connectivity Devices***

- 5.1. Explain the need for connectivity devices
- 5.2. State the operational principle of Modems
- 5.3. Describe Modem
- 5.4. Describe hubs and repeaters
- 5.5. Describe bridges, routers and gateways
- 5.6. Illustrate the relationships of this devices in networking

#### ***6. Internetworking***

- 6.1. Explain the principles in Internetworking
- 6.2. Explain the need for protocols in Internetworking
- 6.3. Describe each layer of OSI model of network
- 6.4. Differentiate connectionless and connection-oriented internetworking
- 6.5. Describe the Internet Protocol
- 6.6. Discuss the development of Internet Protocol
- 6.7. Describe routing protocols
- 6.8. Explain transport protocol
- 6.9. Describe Transmission Control Protocol (TCP)
- 6.10. Explain the advantage of TCP/IP from OSI

## **7. Network Administration and Management**

- 7.1. Describe different types of servers
- 7.2. Create and manage user accounts
- 7.3. Use software to conduct performance monitoring of network
- 7.4. Explain the data protection and security
- 7.5. Describe means to protect data and secure its integrity in network system.

## **8. Network Troubleshooting**

- 8.1. Describe structured cabling
- 8.2. Identify network testing tools
- 8.3. Use network testing tools to diagnose network fault
- 8.4. Perform network fault diagnoses
- 8.5. Troubleshoot network connectivity and communication faults



Course Code: **CIT 235**

Course Title: **Microprocessor Architecture**

<b><i>T</i></b>	<b><i>P</i></b>	<b><i>C</i></b>
<b>3</b>	<b>6</b>	<b>5</b>

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The core course on computer hardware dealing with the main components of personal computers. It intends to provide students with working knowledge of how the central processing unit (CPU) of microcomputers, the Intel microprocessor, operates and its instruction set. It discusses organization of computer, study of Intel 8088/8086 family of microprocessor, its instruction set and programming, interfacing and support devices. It comes with laboratory component to reinforce the theoretical classroom discussion.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Understand the concepts and design, organization and operational principles of microprocessor especially, Intel 8088/86 microprocessor.
- Use the instruction set of Intel 8088/86 to write assembly language program.
- Create hardware interface for Intel 8088/86 microprocessor
- Explain system timing and bus multiplexing
- Write amply documented and readable assembly program
- Appreciate the logic and simplicity of the organization of microprocessors

### **COURSE OUTLINE**

<b>Contents</b>	<b>Hours</b>
<b><u>(Part-A)</u></b>	
<b>1. Fundamental Concepts</b>	<b>5</b>
1.1. Historical background of microprocessor	
1.1.1 Evaluation of different processors	
1.2. Processor based personal computer	
1.3. Bus based microprocessor	
1.3.1 Address, Data and Control Buses	
1.4. Fundamental Control Bus	
1.5. Tristate Devices in Bus-based Systems	
1.6. Definition of Terms	
1.7. Microcomputer Block Diagram.	
1.8. Memory Devices	
1.9. I/O ports.	
1.10. Basic Operation of microprocessor	
1.11. Roles of Addressing and Control Signals	
<b>2. Introduction to Intel 8088/86 Microprocessor And Architecture</b>	<b>5</b>
2.1. Define basic terms	
2.2. Block Diagram of Intel 8088/86 Microprocessor	
2.3 Programming model of 8086/8088	

2.2.1 Function and working of each part of programming model	
2.3 Real mode memory addressing	
2.4 Protected mode memory addressing	
2.5 Memory Paging	
<b>3- Hardware specifications of 8086/8088</b>	<b>06</b>
3.1 Functional Pin Definitions for the 8088/86	
3.2 Clock generator (8284A)	
3.3 Power and Clocking Requirements of 8088/86	
3.4 Bus buffering and latching	
3.4.1 Bus Multiplexing and De-Multiplexing.	
3.4.2 Buffered system	
3.5 Bus Timing	
3.5.1 Read Timing and Write Timing	
3.6 READY and WAIT state	
3.7 Minimum Mode and Maximum Mode	
<b>4. Addressing Modes</b>	<b>10</b>
4.1 Data Addressing Modes	
4.2 Register Addressing Modes	
4.3 Immediate Addressing Modes	
4.4 Direct Addressing Modes	
4.5 Base-Plus-Index Addressing	
4.6 Register Relative Addressing	
4.7 Base Relative-Plus-Index Addressing	
4.8 Program Memory addressing Modes	
4.9 Stack Memory-Addressing Modes	
<b>5. Instruction set of 8086/88</b>	<b>22</b>
5.1 Move instruction	
5.2 Push/ POP instruction	
5.3 Load effective address LEA	
5.4 String data transfer	
5.4 Arithmetic Group	
5.5 BCD and ASCII arithmetic's.	
5.6 Logical Group	
5.7 Programming control instructions	
5.8 Controlling the flow of program	
5.9 Procedure	
5.10 CALL, RETURN	
<b><u>(Part-B)</u></b>	
<b>6. Intel 8088/86 System Timing and Bus Multiplexing</b>	<b>12</b>
6.1 Definition of terms	
6.2 8088/86 Machine Cycles	
6.3 Timing Diagram for Common 8088/86 Instructions.	
6.4 Purpose and implementation of the 8088/86 Wait, Halt and Hold states.	

<b>7- Interfacing to Intel 8088/86</b>	<b>20</b>
7.1 Define and explain the different terms of interfacing	
7.2 Absolute Address and Linear Address Decoding	
7.3 8- bit memory interface	
7.4 16-bit memory interface	
7.5 Basic I/O interface	
7.6 Priority Interrupt control unit in 8086/88 based system	
7.7 Programmable Peripheral Interface (PPI)	
7.8 Programmable interval timer (8254)	
7.8 Direct Memory Access (DMA)	
<b>8- INTERRUPTS</b>	<b>08</b>
8.1 Basic interrupt processing	
8.2 Purpose of Interrupts.	
8.4 Interrupt Instructions (BOUND, INTO, INT, INT-3, IRET)	
8.4 Operation of Interrupt Flag	
8.5 Programmable interrupt controller	
<b>9- 8-Bit Support Devices</b>	<b>08</b>
9.1 8088/86 Support device	
9.2 General Purpose Support device	
9.3 Programmable Support Device	
9.4 Operation and Programming of Intel 8255 Programmable Peripheral Interface.	
9.5 Function of Intel 8-bit Support Devices	

**Total Hours: 96**

## **References**

- The 8086/8088 microprocessor Barry B.Brey
- The 80x86 Family, Design, Programming and Interfacing, John Uffenbach
- MCS-88/86 User's Manual, Intel Corporation
- Microprocessor Architecture, Programming and Applications with the 8088/86/8080A, Ramesh, S. Gaonkar, MacMillan
- Intel Microprocessors: Hardware, Software, and Applications, Roy W. Goody, McGraw Hill

## **CIT 235 – Microprocessor Architecture**

### **LIST OF PRACTICAL**

1. Introduction to Flowcharting
2. Algorithm Design Using Flowcharts
3. Applications of ASCII Code.
4. Introduction what is Assembly Language?
  - Advantages of Assembly Language
  - Basic Features of PC Hardware
  - Binary Number System
  - Hexadecimal Number System
  - Binary Arithmetic
5. Familiarize environment setup
  - Local Environment Setup
  - Installing NASM/MASAM
6. Entry and Disassembly of Simple Programs.
  - Using Arithmetic Instructions e.g. ADD, SUB, MUL, DIV, etc
  - Using Logical instruction Instructions e.g. OR, AND NOT, etc.
7. Using Trainer and Instructions of Assembly language Control Traffic Light
8. Program BCD to Binary Conversion
9. Familiarize with the 8088/86 System Timing.
10. Interface Isolated Output Ports
  - Interfacing Keyboard, Mouse, Printer and scanner.
- 9- Using Microprocessor Trainer and Assembly Language Instructions develop following sensors
  - Temperature
  - Smoke
- 10- Use 8255A Programmable Peripheral Interface
- 11- Use 8155 Static RAM with I/O Ports and Timer.
- 12- Use 8755 EPROM with I/O Ports

## **Learning objectives**

### **1- Fundamental Concepts**

- 1.1- Describe Historical background of microprocessor
  - 1.1.1 Describe the Evaluation of different processors
  - 1.1.2 Compression between different processors
- 1.2 Describe Processor based personal computer
- 1.3 Describe Bus based microprocessor
  - 1.3.1 Describe and defined Address, Data and Control Buses
  - 1.3.2 Describe the functionality of Address, Data and Control Buses
- 1.4 Describe fundamental Control Bus
- 1.5 Describe and define the use of Tristate Devices in Bus-based Systems
- 1.6 Define the different basic terms as such
  - 1.6.1 ALU, Microprocessor, Microcomputer
  - 1.6.2 Storage , Input and Output Ports , Input /output Devices
  - 1.6.3 Software Programs, Hardware,
  - 1.6.4 Address decoding and microcontrollers,
  - 1.6.5 Number system, Types of different number systems
  - 1.6.6 Conversion of binary, octal and hexadecimal numbers, Data Formats.
- 1.7 Sketch and explain the Microcomputer Block Diagram.
- 1.8 Describe the basic purpose and types of memory devices
- 1.9 Describe the basic purpose and types of I/O ports
- 1.10 Describe Basic Operation of microprocessor
  - 1.10.1 How instruction fetch and execute
  - 1.10.2 Define and describe memory read cycle
  - 1.10.3 Define and describe memory write cycle
  - 1.10.4 Define and describe I/O read cycle
  - 1.10.5 Define and describe I/O write cycle
- 1.11 Describe Roles of Addressing and Control Signals

### **2. Introduction to Intel 8088/86 Microprocessor And Architecture**

- 2.1 Define and describe the basic terms
  - 2.1.1 Register Array
  - 2.1.2 General purpose registers
  - 2.1.3 Temporary registers
  - 2.1.4 Internal data bus
  - 2.1.5 External data bus
  - 2.1.6 Instruction decoder
  - 2.1.7 Accumulator
  - 2.1.8 Condition flags
  - 2.1.9 Addressing Registers
  - 2.1.10 programming counters
- 2.2 Sketch and Label Block Diagram of Intel 8088/86 Microprocessor
  - 2.2.1 Explain Functions of each block of 8086/88 Microprocessor
- 2.3 sketch and label Programming model of 8086/8088
  - 2.2.1 Explain Function and working of each part of programming model
- 2.4 Explain Real mode memory addressing
- 2.5 Explain protected mode memory addressing
- 2.6 Explain Memory Paging

### **3- Hardware specifications of 8086/8088**

- 3.1 Functional Pin Definitions for the 8088/86
  - 3.1.1 Draw the pin diagram of 8086/8088
  - 3.1.2 Explain the function of each pin
  - 3.1.3 Define and explain Minimum mode operation of 8086/88
  - 3.1.4 Define and explain Minimum mode operation of 8086/88
- 3.2 Clock generator (8284A)
  - 3.2.1 Sketch the pin diagram of Clock generator (8284A)
  - 3.2.2 Explain the function of Clock generator (8284A)
- 3.3 Describe the Power and Clocking Requirements of 8088/86
- 3.4 Describe Bus buffering and latching in 8086/88
  - 3.4.1 Why we need bus buffering and latching in microprocessor
  - 3.4.2 Explain 8086/88 data bus multiplexing
  - 3.4.3 Explain and show how data bus demultiplexed to create (16-bit) address and (8-bit) data bus
  - 3.4.4 Explain how control signals MEMR, MEMW and I/O can be produced from the 8086/88  
IO/M, RD and, WR/ control signals
- 3.5 Explain Bus Timing
  - 3.5.1 Explain why we need to know the different Bus Timings for 8086/88
  - 3.5.2 Sketch and explain the read timing diagram for 8086/8088
  - 3.5.3 Sketch and explain the write timing diagram for 8086/8088
- 3.6 Explain READY and WAIT state
- 3.7 Minimum Mode and Maximum Mode
  - 3.7.1 Operation of each mode

### **4. Addressing Modes**

- 4.1 Describe Data Addressing Modes
  - 4.1.1 Use the data-addressing modes to form assembly language statements.
  - 4.1.2 Explain the operation of data addressing mode
- 4.2 Register Addressing Modes
  - 4.2.1 Use the Register addressing modes to form assembly language statements.
  - 4.2.2 Explain the operation of Register addressing mode
- 4.3 Explain the operation of Immediate Addressing Modes
- 4.4 Explain the operation of Direct Addressing Modes
- 4.5 Explain the operation of Base-Plus-Index Addressing
- 4.6 Explain the operation of Register Relative Addressing
- 4.7 Explain the operation of Base Relative-Plus-Index Addressing
- 4.8 Explain the operation of Program Memory addressing Modes
- 4.9 Explain the operation of Stack Memory-Addressing Modes
  - 4.9.1 Describe the sequence of events that place data onto the stack or remove data from the stack.
  - 4.9.2 Detail the difference between addressing memory data using real mode and Protected mode operation

## **5. Instruction set of 8086/88**

- 5.1 Define and explain the format of Move instruction
- 5.3 Define and explain Push/ POP instruction
- 5.4 Define and explain Load effective address LEA
- 5.5 Define and explain String data transfer
- 5.6 Define and explain Arithmetic Group
  - 5.6.1 Addition, Subtraction, Comparison, Multiplication, Division
- 5.7 Describe BCD and ASCII arithmetic's.
- 5.8 Define and explain Arithmetic Group Logical Group
  - 5.8.1 AND, OR TEST, Bit TEST, NOT and NEG
- 5.9 Define and explain Arithmetic Group Shift and Rotate instructions
- 5.10 Define and explain Arithmetic Group Programming control instructions
  - 5.10.1 JUMP (Conditional and Unconditional)
- 5.11 Define and explain Arithmetic Group Controlling the flow of program
  - 5.11.1 While Loop, DO-While Loop
- 5.12 Define and explain Arithmetic Group Procedure
  - 5.12.1 CALL, RETURN

## **6. Intel 8088/86 System Timing and Bus Multiplexing**

- 6.1 Definition of the following terms
  - 6.1.1 T-State, Machine Cycle and Instruction Cycle Bus Cycle
  - 6.1.2 Opcode fetch, Memory read cycle, Memory write cycle, I/O Read cycle, and I/O Write cycle
- 6.2 Describe 8088/86 Machine Cycles
  - 6.2.1 Explain how 8086 instruction decode
  - 6.2.1 Explain how machine cycle encode for the required instruction cycle
- 6.3 Interpret Timing Diagram for Common 8088/86 Instructions.
- 6.4 describe the purpose and implementation of the 8088/86 Wait, Halt and Hold states.

## **7. Interfacing to Intel 8088/86**

- 7.1 Define and explain the different terms of interfacing
  - 7.1.1 Isolated I/O and Memory Mapped I/O
  - 7.1.2 Unconditional I/O, Unconditional and Polled I/O
  - 7.1.3 Describe Interrupt Service Routine and Interrupt Vector
  - 7.1.4 Describe Service Request Flag
  - 7.1.5 Describe Strobed Port
- 7.2 Explain Absolute Address and Linear Address Decoding
- 7.3 Describe 8- bit memory interface
- 7.4 Describe 16-bit memory interface
- 7.5 Describe Basic I/O interface
- 7.6 Describe Priority Interrupt control unit in 8086/88 based system
- 7.7 Explain Programmable Peripheral Interface (PPI)
- 7.8 Explain Programmable interval timer (8254)

## **8- INTERRUPTS**

- 8.1 Define and describe Basic interrupt processing
- 8.2 Describe Purpose of Interrupts.
- 8.4 Define and explain Interrupt Instructions (BOUND, INTO, INT.INT-3, IRET)
- 8.5 Define and explain the Operation of Interrupt Flag
- 8.6 Describe Programmable interrupt controller

**9- 8-Bit Support Devices**

- 9.1 Describe 8088/86 Support device
- 9.2 Describe General Purpose Support device
- 9.3 Describe Programmable Support Device
- 9.4 Explain the Operation and Programming of Intel 8255 Programmable Peripheral Interface.
- 9.5 Explain the Function of Intel 8-bit Support Devices



A major course in Computer Information Technology dealing with the electronics devices and circuits. It intends to complement the student's foundation knowledge of electronics. It covers diodes, transistors, amplification, power electronics and troubleshooting of analogue electronic devices. It intends to provide students with knowledge and skills to analyze digital circuits. It contains discussion on binary numbers, Boolean algebra, different digital IC families, flip-flop and latches, clock and triggers, registers, counters, and arithmetic circuits. This has laboratory component to strengthen the classroom theory.

This comes with a laboratory course.

### Course Objectives

At the end of the course the students are expected to be able to

- Understand basic concepts, principles and application of analogue electronics
- Apply operational principles of transistors for amplification.
- Use knowledge of electronics to maintain electronic devices
- Relate analogue electronics to digital electronics
- Observe and measure accurately using electrical and electronics instruments
- Demonstrate motivation in applying knowledge and skills in analogue electronics in daily life
- Understand the mathematical and logical foundations of digital circuit operational principles.
- Relate binary mathematics and boolean logic with digital circuit constructs
- Understand the construction, operation and use of different digital circuits (IC's)
- Apply digital circuit principles in building clocked and trigger circuits
- Calibrate, manipulate and use measuring instruments accurately and with ease
- Appreciate the relationship between the concepts of binary numbers, Boolean algebra and digital circuits

### COURSE OUTLINE

<b>Contents</b>		<b>Hours</b>
<b>COURSE CONTENTS.</b>		
<b><u>(Part-A)</u></b>		
<b>1.</b>	<b>BOOLEAN ALGEBRA.</b>	<b>(06 Hours)</b>
1.1	Boolean Expressions.	
1.1.1	Boolean Expressions and Truth Tables.	
1.1.2	Minterm Expressions, Sum of Products	
1.1.3	Maxterm Expressions, Product of Sums.	
1.1.4	Un-simplified Boolean Expression and Schematic Circuits	
1.2	Logic Simplifications.	
1.2.1	Boolean Simplification.	
1.2.2	DeMorgan's Theorems.	
1.2.3	Karnaugh Mapping	

- 2. BINARY ARITHMETIC CIRCUITS. (07 Hours)**
- 2.1 Binary Addition
    - 2.1.1 Half Adder Design
    - 2.1.2 Full Adder Design
    - 2.1.3 N bit Binary Adder Circuit
  - 2.2 Binary Arithmetic functions with complements
    - 2.2.1 2's and 1's Complement Notation, Addition and Subtraction.
    - 2.2.2 Binary Subtractor Circuit
    - 2.2.3 Binary Adder/ Subtractor Circuit.
- 3. COMBINATIONAL CIRCUIT DESIGN. (12 Hours)**
- 3.1 Paradigm for Combinational Logic Problems.
    - 3.1.1 Word Problem.
    - 3.1.2 Construct Truth Table
    - 3.1.3 Create a Logic Equation from a Truth Table
    - 3.1.4 Simplify the logic Equation
    - 3.1.5 Development of Combinational Logic Circuit
  - 3.2 Specific Application MSI Gates
    - 3.2.1 Level of Integration (SSI, MSI, LSI)
    - 3.2.2 Display Drivers
    - 3.2.3 Code Converters
      - 3.2.3.1 BCD to Decimal
      - 3.2.3.2 Decimal to BCD
      - 3.2.3.3 Binary to Hexadecimal
      - 3.2.3.4 BCD to seven segment decoder.
    - 3.2.4 Decoding Circuits
    - 3.2.5 Multiplexing Circuits
    - 3.2.6 Demultiplexing Circuits
- 4. SEQUENTIAL CIRCUITS. (10 Hours)**
- 4.1 Introduction to Sequential Logic.
    - 4.1.1 Latches
    - 4.1.2 RS Flip Flop
    - 4.1.3 Clocked RS Flip Flop
  - 4.2 JK Flip Flop
    - 4.2.1 Operation of JK Flip Flop
    - 4.2.2 Asynchronous Inputs
    - 4.2.3 Synchronous Inputs
  - 4.3 Triggers
    - 4.3.1 Positive-Edge Trigger
    - 4.3.2 Negative-Edge Trigger
    - 4.3.3 Positive-Level Trigger (Latch)
    - 4.3.4 Negative-Level Trigger (Latch)
  - 4.4 Other Flip Flops
    - 4.4.1 Master Slave Flip Flop
    - 4.4.2 D type Flip Flop
    - 4.4.3 T type Flip Flop
  - 4.5 Multivibrators.
    - 4.5.1 555 Timer
    - 4.5.2 555 Timer as Monostable Multivibrator (One Shot)
    - 4.5.3 555 Timer as Astable Multivibrator (Free Running)

- 5. SHIFT REGISTERS AND COUNTERS. (8 Hours)**
- 5.1 Shift Register
    - 5.1.1 Function of Shift register
    - 5.1.2 Types of Shift register
    - 5.1.3 Integrated Shift register
  - 5.2 Asynchronous Counters.
    - 5.2.1 Discrete Ripple Counter
    - 5.2.2 Discrete Modulus- N Ripple Counter
    - 5.2.3 Integrated Ripple Counter (7493)
  - 5.3 Synchronous Counter.
    - 5.3.1 Discrete Up Counter.
    - 5.3.2 Discrete Down Counter.
    - 5.3.3 Discrete Modulus-Synchronous Counter.
- 6. FAMILIES AND SPECIFICATIONS (05 Hours)**
- 6.1 Introduction of different Logic Families
    - 6.1.1 RTL
    - 6.1.2 DTL
    - 6.1.3 ECL
    - 6.1.4 TTL
    - 6.1.5 IIL
    - 6.1.6 MOS
    - 6.1.7 CMOS
    - 6.1.8 Interfacing Different Logic Families.
  - 6.2 Specification Sheets
    - 6.2.1 Electronic Sites
    - 6.2.2 Voltage Levels
    - 6.2.3 Current Levels
    - 6.2.4 Fan-out, Fan-in
    - 6.2.5 Switching Characteristics- Propagation Delay, Noise Margin, Power dissipation.
- (Part-B)**
- 7. Interfacing with Analog World (07 Hours)**
- 7.1 Digital to Analog Conversion.
    - 7.1.1 Introduction and needs
    - 7.1.2 Binary weighted DAC
    - 7.1.3 Ladder type DAC
  - 7.2 Analog to Digital Conversion.
    - 7.2.1 Introduction and needs ADC
    - 7.2.2 Simultaneous ADC
    - 7.2.3 Counter Type ADC
    - 7.2.4 Dual Slope ADC
    - 7.2.5 Successive Approximation ADC
- 8. Memory (06 Hours)**
- 8.1 Memory Technology
  - 8.2 General Memory Operation.
  - 8.3 Memory Considerations
  - 8.4 Types of Memories
    - 8.4.1 ROM

- 8.4.2 RAM
- 8.4.3 SRAM
- 8.4.4 DRAM
- 8.4.5 PLDs.
- 8.4.6 Magnetic and Optical Memories

**9. BIPOLAR JUNCTION & FIELD EFFECT TRANSISTORS (16 Hours)**

- 9.1 Transistor types and BJT construction
- 9.2 Basic Transistor operation, Forward, Reverse Bias. Transistor current.
- 9.3 Transistor Parameters and Ratings
- 9.4 Transistor as a voltage amplifier.
- 9.5 Transistor amplifier configuration, comparison and uses.
- 9.6 Transistor, modes of operation.
- 9.7 Transistor as a switch.
- 9.8 Transistor Clipper
- 9.9 Field Effect Transistor and its Biasing:
  - 9.9.1 Junction Field Effect Transistor (JFET).
  - 9.9.2 JFET Characteristics and parameter.
  - 9.9.3 JFET Biasing.
  - 9.9.4 Metal oxide Semiconductor FET (MOSFET) types.
  - 9.9.5 MOSFET Biasing.

**10. SPECIAL DEVICES. (18 Hours)**

- 10.1 Zener Diodes.
  - 10.1.1 Zener Diode as voltage Regulator, percentage of regulation.
  - 10.1.2 Zener limiting.
- 10.2 Optical Diodes
  - 10.2.1 Light Emitting Diode (LED)
  - 10.2.2 Liquid crystal Diode (LCD)
  - 10.2.3 Photo diode.
- 10.3 Other Diodes.
  - 10.3.1 Tunnel Diode, Negative resistance region.
  - 10.3.2 Tunnel Diode Oscillator.
  - 10.3.3 LASER Diode.
- 10.4 Silicon Controlled Rectifier (SCR)
- 10.5 Simple SCR Applications.
- 10.6 Diac and Triac
- 10.7 Unijunction Transistor (UJT)
- 10.8 Photo diode & Photo transistor
- 10.9 Light Activated SCR (LASCR)
- 10.10 Opto-coupler.

**TEXT / REFERENCE BOOKS:**

1. TL Floyd "Electronics Devices" 8<sup>th</sup> ed. Prentice Hall, ISBN 0131140809
2. Floyd "Digital Fundamentals"

## **INSTRUCTIONAL OBJECTIVES.**

### **1. BOOLEAN ALGEBRA.**

- 1.1 Use Boolean Expressions.
  - 1.1.1 Use Boolean Expressions and Truth Tables.
  - 1.1.2 Use Minterm Expressions, Sum of Products
  - 1.1.3 Use Maxterm Expressions, Product of Sums.
  - 1.1.4 Describe Un-simplified Boolean Expression & develop Schematic Circuits
- 1.2 Apply Logic Simplifications.
  - 1.2.1 Use Boolean Simplification.
  - 1.2.2 Use DeMorgan's Theorems.
  - 1.2.3 Use Karnaugh Mapping

### **2. BINARY ARITHMETIC CIRCUITS.**

- 2.1 Apply Binary Addition Concepts.
  - 2.1.1 Discuss Half Adder Circuit.
  - 2.1.2 Discuss Full Adder Circuit.
  - 2.1.3 Discuss N bit Binary Adder Circuit
- 2.2 Understand Binary Arithmetic functions with complements
  - 2.2.1 Apply 2's and 1's Complement Notation in Addition and Subtraction.
  - 2.2.2 Discuss Binary Subtractor Circuit
  - 2.2.3 Discuss Binary Adder/ Subtractor Circuit.

### **3. COMBINATIONAL CIRCUIT DESIGN.**

- 3.1 Discuss Paradigm for Combinational Logic Problems.
  - 3.1.1 Describe Word Problem.
  - 3.1.2 Construct Truth Table
  - 3.1.3 Create a Logic Equation from a Truth Table
  - 3.1.4 Simplify the logic Equation
  - 3.1.5 Develop Combinational Logic Circuits
- 3.2 Understand specific Application MSI Gates
  - 3.2.1 Differentiate Level of Integration (SSI, MSI, LSI)
  - 3.2.2 Discuss Display Drivers
  - 3.2.3 Discuss Code Converters
    - 3.2.3.1 Describe BCD to Decimal Converter.
    - 3.2.3.2 Describe Decimal to BCD Converter.
    - 3.2.3.3 Describe Binary to Hexadecimal Converter.
    - 3.2.3.4 Describe BCD to seven segment Decoder.
  - 3.2.4 Describe Decoding Circuits
  - 3.2.5 Describe Multiplexing Circuits
  - 3.2.6 Describe Demultiplexing Circuits

### **4. SEQUENTIAL CIRCUITS.**

- 4.1 Understand Sequential Logic.
  - 4.1.1 Describe Latches
  - 4.1.2 Describe RS Flip Flop
  - 4.1.3 Describe Clocked RS Flip Flop
- 4.2 Understand JK Flip Flop
  - 4.2.1 Describe Operation of JK Flip Flop
  - 4.2.2 Describe Asynchronous Inputs

- 4.2.3 Describe Synchronous Inputs
- 4.3 Understand Triggers
  - 4.3.1 Describe Positive-Edge Trigger
  - 4.3.2 Describe Negative-Edge Trigger
  - 4.3.3 Describe Positive-Level Trigger (Latch)
  - 4.3.4 Describe Negative-Level Trigger (Latch)
- 4.4 Discuss Flip Flops
  - 4.4.1 Describe Master Slave Flip Flop
  - 4.4.2 Describe D type Flip Flop
  - 4.4.3 Describe T type Flip Flop
- 4.5 Multivibrators.
  - 4.5.1 555 Timer
  - 4.5.2 555 Timer as Monostable Multivibrator (One Shot)
  - 4.5.3 555 Timer as Astable Multivibrator (Free Running)
- 5. SHIFT REGISTERS AND COUNTERS.**
  - 5.1 Shift Register
    - 5.1.1 Function of Shift register
    - 5.1.2 Types of Shift register
    - 5.1.3 Integrated Shift register
  - 5.2 Asynchronous Counters.
    - 5.2.1 Discrete Ripple Counter
    - 5.2.2 Discrete Modulus- N Ripple Counter
    - 5.2.3 Integrated Ripple Counter (7493)
  - 5.3 Synchronous Counter.
    - 5.3.1 Discrete Up Counter.
    - 5.3.2 Discrete Down Counter.
    - 5.3.3 Discrete Modulus-Synchronous Counter.
- 6. FAMILIES AND SPECIFICATIONS**
  - 6.1 Understand Logic Families
    - 6.1.1 Discuss RTL
    - 6.1.2 Discuss DTL
    - 6.1.3 Discuss ECL
    - 6.1.4 Discuss TTL
    - 6.1.5 Discuss IIL
    - 6.1.6 Discuss MOS
    - 6.1.7 Discuss CMOS
    - 6.1.8 Describe Interfacing Different Logic Families.
  - 6.2 Understand Specification Sheets
    - 6.2.1 List Electronic Sites
    - 6.2.2 Discuss Voltage Levels
    - 6.2.3 Discuss Current Levels
    - 6.2.4 Discuss Fan-out, Fan-in
    - 6.2.5 Understand Switching Characteristics- Propagation Delay, Noise Margin, Power dissipation.
- 7. INTERFACING WITH ANALOG WORLD**
  - 7.1 Understand Digital to Analog Conversion.
    - 7.1.1 Discuss needs and applications of DACs
    - 7.1.2 Describe Binary weighted DAC
    - 7.1.3 Describe Ladder type DAC

- 7.2 Analog to Digital Conversion.
  - 7.2.1 Discuss needs and applications of ADCs
  - 7.2.2 Describe the construction and working of Simultaneous ADC
  - 7.2.3 Describe the construction and working of Counter type ADC
  - 7.2.4 Describe the construction and working of Dual slope ADC
  - 7.2.5 Describe the construction and working of Successive Approximation ADC

## **8. MEMORY**

- 8.1 Discuss Memory Technologies.
- 8.2 Discuss General Memory Operation.
- 8.3 Describe Memory Considerations
- 8.4 List Types of Memories
  - 8.4.1 Describe ROM
  - 8.4.2 Describe RAM
  - 8.4.3 Describe SRAM
  - 8.4.4 Describe DRAM
  - 8.4.5 Describe PLDs.
  - 8.4.6 Describe Magnetic and Optical Memories
- 8.5 Discuss applications in Digital systems.

## **9. BIPOLAR JUNCTION (BJTs) & FIELD EFFECT (FET).**

- 9.1 Understand bipolar junction, its biasing and basic BJT circuits.
  - 9.1.1 Draw and label physical structure and symbols for NPN and PNP transistors.
  - 9.1.2 Show the four operation mode of BJT and application of each mode (cut off active, active and inverse).
  - 9.1.3 Explain the working of basic BJT voltage amplifier w.r.t. bias of junctions, flow of charge carriers and transistor currents.
  - 9.1.4 Define cut off and breakdown voltages of transistor.
  - 9.1.5 Derive the expression for  $I_C$  versus  $I_B$  for CE configuration in the active region.
  - 9.1.6 Sketch the input and output static characteristics curves for common base (CB) amplifier.
  - 9.1.7 Repeat 3.1.8 for CE amplifier.
  - 9.1.8 Repeat 3.1.8 for CC amplifier.
  - 9.1.9 List the types of transistor structures.
  - 9.1.10 Enlist the advantages of I.C. over conventional circuit
  - 9.1.11 Identify the high frequency limitations of BJT.
- 9.2 Discuss the operation of Transistor as a switch.
- 9.3 Discuss the operation of Transistor Clipper.
- 9.4 Understand Field Effect Transistors.
  - 9.4.1 Explain the principle of the n-channel JFET using illustrations.
  - 9.4.2 Sketch the construction of n-channel JFET & its symbol.
  - 9.4.3 Sketch & label a family of drain characteristics of a n-channel JFET.
  - 9.4.4 Define the terms  $I_{DSS}$  and  $V_p$ .
  - 9.4.5 Explain the effect of change in  $V_{GS}$  the JFET characteristics.
  - 9.4.6 Explain above from 1.4.1 to 1.4.3 for p-channel JFET.
  - 9.4.7 Define the major data-sheet parameter of a JFET.
  - 9.4.8 Explain the principle of n-channel enhancement MOSFET.
  - 9.4.9 Sketch & label the family of drain characteristics of n-channel enhancement MOSFET
  - 9.4.10 Repeat 4.4.9 for n-channel depletion-enhancement MOSFET.

- 9.4.11 Sketch symbols for p & n-channel JFET, n-channel enhancement MOSFET, p- and n- channel depletion- enhancement MOSFET.
- 9.4.12 List three advantages of n-channel over p-channel MOSFET.
- 9.4.13 List the applications of MOSFET.
- 9.4.14 Sketch the cross section of complementary MOSFET (CMOS).
- 9.4.15 List the applications of CMOS.
- 9.5 Understand FET Biasing
  - 9.5.1 Explain to FET biasing.
  - 9.5.2 Draw DC load line and locate bias point on the family of drain characteristic curves of JFET.
  - 9.5.3 Draw a self-bias arrangement p-channel & n-channel JFET.
  - 9.5.4 Set the Q-point for a self-biased JFET.
  - 9.5.5 Explain the Q-point stability of a JFET.

## 10. SPECIAL DEVICES.

- 10.1 Understand the characteristics and applications of diode used for a special purposes Zener Diode.
  - 10.1.1 Explain the construction of Zener and draw its symbol
  - 10.1.2 Draw the V-I characteristic of a Zener diode.
  - 10.1.3 Identify the characteristic features of Zener diode.
  - 10.1.4 Explain the working of Zener diode as voltage regulator.
  - 10.1.5 List the applications of Zener diode.
- 10.2 Understand the characteristics of Optical Diodes (LED, LCD and Photodiode)
  - 10.2.1 Define the term optical devices.
  - 10.2.2 List the name of opto electronic devices.
  - 10.2.3 Explain the electroluminescence process in LED.
  - 10.2.4 List the applications of LEDs.
  - 10.2.5 Describe the term Liquid crystal.
  - 10.2.6 Explain the working principle of both types of LCD.
  - 10.2.7 Compare LCD with LED.
  - 10.2.8 List the applications of LCDs.
  - 10.2.9 Explain the operation of a photo diode.
  - 10.2.10 List the applications of photodiodes.
  - 10.2.11 Draw a circuit of photoelectric relay using a photodiode.
  - 10.2.12 Define the term of Tunnel diode.
    - 10.2.12.1 Discusses negative resistance in Tunnel diode.
    - 10.2.12.2 Explain working of Tunnel diode Oscillator.
  - 10.2.13 Describe construction of LASER Diode.
    - 10.2.13.1 Discuss working principle of LASER Diode.
    - 10.2.13.2 List uses of LASER Diode.
- 10.3 Understand thyristors UJT with their applications.
  - 10.3.1 Explain the term thyristor
  - 10.3.2 Name the important thyristor family devices
  - 10.3.3 Discuss an SCR.
  - 10.3.4 Draw and label the schematic symbol for an SCR
  - 10.3.5 Explain the turn-on process of SCR using transistor equivalent circuit.
  - 10.3.6 Sketch and label the V-I characteristics for an SCR.
  - 10.3.7 Interpret the SCR data sheet parameters.



- 10.3.8 Explain the phase-control of an SCR.
- 10.3.9 Draw basic circuits for SCR used in the areas of
  - a) Power control
  - b) Switching and
  - c) Protection
- 10.3.10 Explain briefly the circuits drawn under 2.3.9.
- 10.3.11 Compare a Diac with SCR in terms of
  - a) Basic structure
  - b) Symbol
  - c) Operation
- 10.3.12 Compare a Triac with an SCR in terms of
  - a) Basic structure
  - b) Symbol operation
- 10.3.13 Sketch and label the transistor equivalent circuit for a Triac
- 10.3.14 Explain the phase-shift control of Triac with a Diac as a switching device as used in light for UJT.
  
- 10.4 Understand Uni-junction Transistor characteristics.
  - 10.4.1 Sketch the structure of a unijunction transistor (UJT).
  - 10.4.2 Sketch the equivalent circuit and symbol for UJT.
  - 10.4.3 Explain the working of UJT circuit of 2.4.2.
  - 10.4.4 Draw the V-I characteristic curve for UJT.
  - 10.4.5 Draw a circuit for UJT relaxation oscillator.
  - 10.4.6 List the three factors controlling the period of oscillation frequency of a relaxation oscillator.
  
- 10.5 Understand properties of Photo-sensitive BJT&LASCR.
  - 10.5.1 Compare a photo-transistor with a conventional BJT.
  - 10.5.2 List the factors controlling collector current of a photo transistor.
  - 10.5.3 Draw the circuit for forward and reverse acting light operated relay using a phototransistor.
  - 10.5.4 Sketch the circuit of a photo Darlington pair
  - 10.5.5 List the requirements to turn-on and turn-off of light activated SCR (LASCR).
  - 10.5.6 List the types of input devices normally used in a opt coupler
  - 10.5.7 List five types of output devices used in opto-coupler.
  - 10.5.8 List the applications of opto-coupler.

**Total Contact Hours:**

**Practical: 96 Hours.**

## **LIST OF PRACTICAL**

1. Assemble Half Adder and verify its operation.
2. Assemble Full Adder and verify its operation.
3. Assemble Binary Subtractor Circuit and verify its operation.
4. Assemble Binary Adder/ Subtractor Circuit and verify its operation.
5. Verify the operation of BCD to Decimal Converter.
6. Verify the operation of Decimal to BCD Converter.
7. Construct an RS Flip Flop using NAND gates.
8. Demonstrate the logical properties of clocked JK master/slave flip-flop.
9. Demonstrate the logical properties of D Type Flip Flop.
10. Demonstrate the logical properties of T Type Flip Flop.
11. Assemble a Monostable Multivibrator with the help of 555 Timer.
12. Assemble a Astable Multivibrator with the help of 555 Timer.
13. Construct a 4 bit shift register and study its operation.
14. Construct an 8 bit binary counter and study its operation.
15. Interfacing TTL with CMOS and CMOS with TTL ICs.
16. Construct a Binary weighted DAC and study its operation.
17. Construct a Ladder ADC and study its operation.
18. Plot the input & output characteristics of a transistor in common base configuration.
19. Plot the input & output characteristics of a transistor in common emitter configuration.
20. Plot the input and output characteristics of transistor in common collector configuration.
21. Assemble a BJT Switch circuit and check it's in put and out put.
22. Plot the transfer characteristics curve of transistor in CE configuration.
23. Assemble a transistor voltage amplifier and find its voltage gain.
24. Consult data sheet for a FET to study its parameters and ratings.
25. Demonstrate MOSFET as a switch and study its performance.
26. Draw the forward and reveres characteristics of a Zener diode.
27. Use a Zener diode as voltage regulator with diode rectifier.
28. Assemble a Zener diode Limiter circuit and observe it's in put and out put waveforms.
29. Assemble a seven segment display with the help of LEDs.
30. Assemble a circuit of photoelectric relay using a photodiode.
31. Assemble a UJT relaxation oscillator and observe its waveform.
32. Assemble a light dimmer with the help of Diac and Triac.

Course Code: **CIT- 263**

Course Title: **Relational Data Base Management System**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

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Databases are part of our everyday life. Whether we are accessing our bank accounts, paying bills, searching the Web or calling a call centre, our requests are most likely posted to a database management system. The aim of the course is a paradigm shift from "computation" to "information" and covers some of the core concepts on data structuring and querying. It covers fundamentals of database architecture, database management systems, and database systems, Principles and methodologies of database design, and techniques for database application development.

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### **Course Objectives**

At the end of the course, the students are expected to be able to

- Design and Implement a Relational database for real life problems
- Write Complex Queries and Use SQL
- Suggest a Centralized / Distributed system according to organizational needs
- Design and implement solutions for the small business organizations

### *COURSE OUTLINE*

<i>Contents</i>	<i>Hours</i>
<b>1. Introduction</b>	<b>6</b>
Introducing the Database Management System	
Field Definitions and Naming Conventions	
Components of DB Applications	
DB Tools; Microsoft Access, MySQL	
<b>2. Database System</b>	<b>4</b>
Legacy DB Systems	
File Processing Systems	
Hierarchical Model	
Network Model	
<b>3. Database Models</b>	<b>4</b>
Semantic Data Model	
Relational Model	
Database Models and the Internet	
<b>4. Relational Database Management Systems</b>	<b>6</b>
A logical view of Data; Entities and Attributes	
Tables and their Characteristics, Keys	
Integrity rules	
Entity and referential integrity	
Relational Database operators	
<b>5. Normalization of Database Tables</b>	<b>6</b>

Need for Normalization  
 Conversion to First Normal Form  
 Conversion to Second Normal Form  
 Conversion to Third Normal Form  
 Boyce-Codd Normal Form (BCNF)

<b>6. Relational Algebra and SQL</b>	<b>16</b>
Unary and Binary operations	
Cartesian Product	
Set Operations	
SQL Operators	
Relational Algebra and SQL	
Introduction to DDL and DML	
Data Control Language	
Aggregate Function in SQL, Grouping Data	
<b>7. Database Life Cycle (DBLC)</b>	<b>4</b>
Database Initial Study	
Database Design	
Database Design Strategies	
Centralized versus Decentralized Design	
<b>8. Entity Relationship (E-R) Modeling</b>	<b>12</b>
Basic Modeling Concepts	
Degrees of Data Abstraction	
Association and Cardinality	
Relationship Participation	
Composite Entities, Entity Super types and subtypes	
Enhanced Entity Relationship Diagram	
Transform ER/EER to Relational Model	
<b>9. Transaction Management</b>	<b>6</b>
What is a Transaction?	
Evaluating Transaction Results	
Transaction Management with SQL	
Transaction Log, Transaction Types	

**Total Hours: 64**

### ***References***

- **Fundamentals of Database Systems**  
 Ramez Elmasri, Shamkant Navathe  
 5<sup>th</sup> Edition 2009 ISBN: 9788131716250
- **Database Management Systems**  
 C. J. Dates  
 8<sup>th</sup> Edition, 2001 ISBN 0-901-543432-8
- **Database System Concept**  
 Peter Rob, Carlos Coronel  
 ISBN: 9788131509708
- **Introduction to PL\SQL by Oracle Press**

### ***LIST OF Practicals***

<b>Sr.</b>	<b>Lab- Topics/ Practical</b>
01.	Introduction to Microsoft Access Installation and basic usage
02.	Introduction to MySQL database management system Installation and basic usage
03.	Create Database Create Table, Data types, DML (insert, delete, update) operations Concept of primary key
04.	More than One table Concept of join and foreign key, Referential Integrity Cascade update and Cascade delete operations Master-Details tables and DML
05.	Concept of QBE (Query by Example) grid in MS Access Writing Queries using QBE Aggregate functions Datasheet, SQL and design view
06.	Simple Select Statement Select and Project operations Where clause
07.	Operators (Arithmetic, Logical, Concatenation) Null value in Expressions Between, In , Like operators Column Alias Sorting (order by clause) Single Row Functions
08.	Group functions Group By, Having Clause Joins & Types
09.	Database Concepts DDL and DML Transactions
10.	Database Connectivity with mySQL
11.	Database Connectivity(Login Problem) Save, Retrieve, Update using PHP & MySQL Data movement between page navigation
12.	User Level Security and Access Rights Relational Modeling using Erwin

***Instructional / LEARNING OBJECTIVES***

**After completing this course the student must demonstrate the knowledge and ability to:**

1. Understand the needs of a DBMS software
2. Describe the components of a database and its naming conventions.
3. Clear overview of different existing DMS tools like MS Access and MySQL
4. Understand, appreciate and effectively explain the underlying concepts of legacy and latest database technologies.
5. Understand different models of DBMS, like hierarchical and network.
6. Understand the pros and cons of semantic and relational data models.
7. Understand and apply integrity rules on a data base
8. Understand the difference between entity integrity and referential integrity.
9. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
10. Have clear understanding of relational database operators.
11. Understand the need for normalization.
12. Understand the steps required to normalize a database.
13. Should be able to practically bring a database from 1<sup>st</sup> normal form to BCNF
14. Normalize a database
15. Understand the set operations and SQL operators
16. Understand of Data Manipulation Language (DML), Data Definition Language (DDL), and Data Control Language (DCL)
17. Populate and query a database using SQL DML/DDL commands.
18. Understand all the steps required to design a basic database to meet the need of an organization.
19. Design and implement a database schema for a given problem-domain
20. Understand the importance of database modeling using ER-model and enhanced ER-model
21. Understand the difference between entities, super-types, and subtypes.
22. Should be able to transform ER / EER to relational model
23. Differentiate between transaction processing system and functional area information system
24. Understand the difference between transaction log and transaction types

اسلامیات / مطالعہ پاکستان

GEN 31

نی پنا کی  
1 0 1  
کس وقت: 20 بجے

نصاب (سہ سو گز)

حصہ اول اسلامیات

حصہ دوم مطالعہ پاکستان

موضوعات

قرآن مجید

1-

سورۃ الفاتحہ۔ آیتہ الکرسی۔ سورۃ البقرۃ کی آخری آیات از امن الرسول سے تا آخر سورۃ مہلک مع ترجمہ و تفسیر

تفہیم

سہ سو گز

حصہ اول اسلامیات

تدریس مقاصد

قرآن حکیم

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

خصوصی مقاصد: طالب علم اس قتل ہو جائے گا کہ

سورۃ الفاتحہ: آیتہ الکرسی۔ سورۃ البقرۃ کی آخری آیات از امن الرسول سے اور سورۃ مہلک کا ترجمہ و تفسیر 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 پوشاکی اللہ کی ہوگی

☆ عبادت 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

☆ تعلیم انبیاء پر ایمان لانا ضروری ہے

☆ رسول ملا کہ کتب سلویہ پر ایمان لانا فرض ہے

☆ اطاعت حقیقی صرف اللہ کے لیے ہے

☆ اسلامی احکامات پر عمل کرنا انسانی بدلتا میں ہے

☆ کفر کو اللہ کی مدد کے بغیر شکست نہیں دی جاسکتی

☆ اللہ ایک ہے

☆ اللہ کسی کا محتاج نہیں نہ اس کا کوئی شریک ہے

☆ منتخب احادیث

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

☆ خصوصی مقصد:

☆ احادیث کا ترجمہ بیان کر سکے

۶۱	احادیث کی تشریح کر سکے
۶۲	معاشرتی اور انفرادی زندگی میں احادیث سے راہنمائی حاصل کر سکے
	<b>حقوق و فرائض</b>
	عمومی مقصد: اسلامی معاشرے کا ایک اچھا فرد بن سکے
	خصوصی مقاصد:
۶۳	والدین کے حقوق و فرائض بیان کر سکے
۶۴	ہمسایوں کے حقوق بیان کر سکے
۶۵	اسلام میں حقوق و فرائض کی اگلی کی صورت میں اپنے اندر خدمت خلق کا جذبہ پیدا کر سکے
	اسلامی اقدار
	عمومی مقصد: طالب علم بن سکے گا کہ تعلیم کا مقصد حسن اخلاق سے متصف ہو رہا ہے
	خصوصی مقاصد
۶۶	اخلاق کے معنی و مفہوم کو بیان کر سکے
۶۷	اسلام میں حسن اخلاق کی اہمیت بیان کر سکے
۶۸	قرآن و سنت کی روشنی میں صبر و استقلال کی اہمیت بیان کر سکے
۶۹	اسلام میں عفو و درگزر کی اہمیت بیان کر سکے
۷۰	ایمان کے عہد کی اہمیت بیان کر سکے
۷۱	اموت کے معنی و مفہوم کو بیان کر سکے
۷۲	اخوت اسلامی کی اہمیت بیان کر سکے
۷۳	اسلام کی اعلیٰ قدر کو اپنا کر مثالی معاشرہ پیدا کر سکے



ٹی پی سی  
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کل وقت: 20 گھنٹے

GEN 3II

نصاب (سل سوئم)  
مظاہر پاکستان  
حصہ دوم

### موضوعات

- ☆ قیام پاکستان
- ☆ پونڈری کمیشن
- ☆ ریڈ کلف ایوارڈ
- ☆ تقسیم بنگلہ و کلکتہ
- ☆ تقسیم پنجاب
- ☆ مسئلہ مہاجرین
- ☆ ریاست کا الحاق
- ☆ ریاست جموں و کشمیر
- ☆ نہری پانی کا تنازعہ
- ☆ قرار داد مقاصد
- ☆ علماء کے پانچ نکات
- ☆ 1956-1962 اور 1973 کے دستاویز کی اسلامی دفعات
- ☆ پاکستان کا عمل وقوع اور اس کی جغرافیائی اہمیت
- ☆ قدرتی وسائل (تیل، گیس، کوئلہ)

## مطالعہ پاکستان (حصہ دوم) قیام پاکستان

### تدریس مقاصد

عمومی مقاصد: قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے  
خصوصی مقصد:

- ☆ باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے
- ☆ ریڈ کلف اور اس کے ایوارڈ کے بارے میں بیان کر سکے
- ☆ بنگلہ اور گلگتہ 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
- ☆ قرار داد مقاصد کی تفصیلات بیان کر سکے
- ☆ 22 علماء کے متفقہ اسلامی نکات بیان کر 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
- ☆ پاکستان میں قدرتی وسائل (تیل-گیس-کونک) کے بارے میں بیان کر سکے

## (غیر مسلم طلباء کے لئے)

ٹی پی سی  
1 0 1  
کل وقت: 20

Qen 311

نصاب اخلاقیات	☆
سال سوئم	☆
موضوعات	☆
احساس ذمہ داری	☆
مثبت ذہن	☆
عدل و انصاف	☆
قومی خدمت کا جذبہ	☆
ذکر و نظر کی پاکیزگی	☆
احترام آدمیت	☆
شائستگی	☆
خود درگزر	☆
برادری	☆
خود انحصاری	☆
اثر و نفوذ	☆
جامعیت	☆
اپنی ذات کی معرفت (پذیرا، ہم عمر طلباء، اساتذہ اہم شخصیات ادارہ)	☆

(غیر مسلم طلباء کے لئے)

نصاب اخلاقیات

سہل سوئم

### تدریس مقاصد

عمومی مقصد: ملکی ترقی کے لیے اعلیٰ اوصاف کے ساتھ بہتر طور پر ملک و ملت کی خدمت کر سکے

خصوصی مقاصد: طالب علم اس قابل ہو گا 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 و انصاف 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

Course Code: **Eng 311**  
Course Title: **Technical Report Writing**

**T**      **P**      **C**  
**1**      **0**      **1**

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Third English course in this technology program. It aims to provide students with opportunity to sharpen their skills in using the English language through writing technical reports. It covers the basics of technical writing, techniques, document design, applications of technical writing and oral reports. It is theory class.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Understand the basic techniques of technical writing.
- Use these techniques to write readable technical report
- Compose and write technical reports
- Present effective oral reports
- Write legibly in English language
- Integrate English language as second language

### *COURSE OUTLINE*

<b>Contents</b>	<b>Hours</b>
<b>1. Introduction to Technical Writing</b>	<b>2</b>
1.1. Substance of Technical Writing	
1.2. Nature of Technical Writing	
1.3. Qualities of Good Technical Writers	
1.4. Qualities of Good Technical Writing	
<b>2. Fundamentals of Technical Writing</b>	<b>6</b>
2.1. Composing	
2.2. Cooperative Writing	
2.3. Readers of Technical Writing	
2.4. Collecting and Verifying Information	
2.5. Readable Style	
<b>3. Techniques of Technical Writing</b>	<b>6</b>
3.1. Informing	
3.2. Defining	
3.3. Describing	
3.4. Arguing	
<b>4. Document Design in Technical Writing</b>	<b>6</b>
4.1. Document Design	

- 4.2. Design Elements of Reports
- 4.3. Graphical Elements of Reports

<b>5. Application of Technical Writing</b>	<b>8</b>
5.1. Correspondence	
5.2. Instructions	
5.3. Proposals	
5.4. Progress Report	
5.5. Feasibility Report	
<b>6. Oral Reports</b>	<b>4</b>
6.1. Preparations	
6.2. Delivery Techniques	
6.3. Presentation	
6.4. Visual Aids	

**Total Hours: 32**

### ***References***

- **Reporting Technical Information, 7Ed.**, K. Houp, T. Pearsall, et. al., MacMillan
- **Writing by Design, A Handbook for Technical Papers**, M. Greene, J. Ripley, Prentice Hall
- **Strategies for Technical Writing, A Handbook with Readings**, M. Lay, Holt Rinehart Winston

## **Eng 311 – Technical Report Writing**

### *LEARNING OBJECTIVES*

#### **1. Introduction to Technical Writing**

- 1.1. Differentiate technical writing from other forms of writing
- 1.2. Describe the nature of technical writing
- 1.3. List the characteristics of good technical writer
- 1.4. Describe the qualities of good technical writing

#### **2. Fundamentals of Technical Writing**

- 2.1. Compose good technical report
- 2.2. Identify the topic and purpose of a technical writing
- 2.3. Draft and revise technical report
- 2.4. Use fundamentals of technical writing to write good report
- 2.5. Plan a technical writing with several writers
- 2.6. Identify different readers of technical writers
- 2.7. Search literature for topics in technical writing
- 2.8. Write letter of inquiry
- 2.9. Write report with list and tables
- 2.10. Compose technical report that is grammatically correct and readable

#### **3. Techniques of Technical Writing**

- 3.1. Write readable report that informs
- 3.2. Use visual language, analogy, and process description to write technical report
- 3.3. Write readable report that define and describe
- 3.4. Write readable report that describe a process
- 3.5. Write readable and persuasive report that argue
- 3.6. Compose technical writing that persuade

#### **4. Document Design in Technical Writing**

- 4.1. Use correct formatting for technical writing
- 4.2. List the elements of a report
- 4.3. Describe each element of a report
- 4.4. Write report that has all the elements of report
- 4.5. Use correctly documentation formats in technical writing

#### **5. Application of Technical Writing**

- 5.1. Identify different forms of technical writing
- 5.2. Write readable correspondence
- 5.3. Write readable Instructions
- 5.4. Write readable proposals
- 5.5. Write readable progress report
- 5.6. Write feasibility report

#### **6. Oral Reports**

- 6.1. Describe elements in preparing an oral report
- 6.2. Identify different techniques of oral delivery of report
- 6.3. Present report with visual aids

Course Code: **Mgt 331**  
Course Title: **Management**

**T**      **P**      **C**  
**1**      **0**      **1**

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Introductory course on business management. It aims to prepare students to work effectively in business and industry. It discusses basic economics principles and organization management as well as skills in becoming an entrepreneur. It is pure class discussion.

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### ***Course Objectives***

At the end of the course the students are expected to be able to

- Understand the basic concepts and principles of economics, business management and organization.
- Apply management concepts in business organization
- Use economic principles and business management to organize own business
- Recognize the importance of economics and management in daily life

### ***COURSE OUTLINE***

<b><i>Contents</i></b>	<b><i>Hours</i></b>
<b>1. Economics</b>	<b>2</b>
1.1. Definition: Adam Smith, Alfred Marshall, Prof. Robins	
1.2. Nature and scope	
1.3. Importance for Technicians	
<b>2. Basic Concepts of Economics</b>	<b>1</b>
2.1. Utility	
2.2. Income	
2.3. Wealth	
2.4. Saving	
2.5. Investment	
2.6. Value.	
<b>3. Demand and Supply</b>	<b>2</b>
3.1. Definition of Demand	
3.2. Law of Demand	
3.3. Definition of Supply	
3.4. Law of Supply	
<b>4. Factors of Production</b>	<b>2</b>
4.1. Land	
4.2. Labour	
4.3. Capital	
4.4. Organization	



<b>5. Business Organization</b>	<b>3</b>
5.1. Sole Proprietorship	
5.2. Partnership	
5.3. Joint Stock Company	
<b>6. Entrepreneurial Skills</b>	<b>4</b>
6.1. Preparing, Planning, Establishing, Managing, Operating and Evaluating	
6.2. Relevant Resources in Small Business	
6.3. Business Opportunities, Goal Setting	
6.4. Organizing, Evaluating and Analyzing Opportunity and Risk Tasks	
<b>7. Scale of Production</b>	<b>2</b>
7.1. Meaning and its Determination	
7.2. Large Scale Production	
7.3. Small Scale Production	
<b>8. Economic System</b>	<b>3</b>
8.1. Free Economic System.	
8.2. Centrally planned economy.	
8.3. Mixed Economic System	
<b>9. Money</b>	<b>1</b>
9.1. Barter System and its Inconveniences	
9.2. Definition of Money and its Functions	
<b>10. Bank</b>	<b>1</b>
10.1. Definition	
10.2. Functions of a Commercial Bank	
10.3. Central Bank and its Functions	
<b>11. Cheque</b>	<b>1</b>
11.1. Definition	
11.2. Characteristics and Kinds of cheque	
11.3. Dishonour of Cheque	
<b>12. Financial Institutions</b>	<b>2</b>
12.1. IMF	
12.2. IDBP	
12.3. PIDC	
<b>13. Trade Union</b>	<b>2</b>
13.1. Introduction and Brief History	
13.2. Objectives, Merits and Demerits	
13.3. Problems of industrial Labour	
<b>14. International Trade</b>	<b>2</b>
14.1. Introduction	
14.2. Advantages and Disadvantages	
<b>15. Management</b>	<b>1</b>

- 15.1. Meaning
- 15.2. Functions

<b>16. Advertisement</b>	<b>2</b>
16.1. The Concept, Benefits and Draw-Backs	
16.2. Principal Media Used In Business World	
<b>17. Economy of Pakistan</b>	<b>1</b>
17.1. Introduction	
17.2. Economic Problems and Remedies	

***Total Hours: 32***

### ***References***

- **Business Organization**, Nisar-ud-Din, Aziz Publisher, Lahore
- **Introduction to Business**, M. Saeed Nasir, , Ilmi Kitab Khana, Lahore.
- **An Introduction to Modern Economics**, S.M. Akhtar, , United Limited, Lahore.

## **Mgt 331 - Management**

### *LEARNING OBJECTIVES*

#### **1. Economics**

- 1.1. Understand the Importance of Economics.
- 1.2. State definition of economics
- 1.3. Explain nature and scope of economics.
- 1.4. Describe importance of study of economics for technicians.

#### **2. Basic Concepts of Economics**

- 2.1. Understand Basic Terms Used in Economics
- 2.2. Define basic terms, utility, income, wealth, saving, investment and value.
- 2.3. Explain the basic terms with examples

#### **3. Demand and Supply**

- 3.1. Understand Law of Demand and Law of Supply
- 3.2. Define Demand and Supply
- 3.3. Explain law of demand with the help of schedule and diagram.
- 3.4. State assumptions and limitation of law of demand.
- 3.5. Explain law of Supply with the help of schedule and diagram.
- 3.6. State assumptions and limitation of law of supply.

#### **4. Factors of Production**

- 4.1. Understand the Factors of Production
- 4.2. Define the four factors of production.
- 4.3. Explain labour and its features.
- 4.4. Describe capital and its peculiarities.

#### **5. Business Organization**

- 5.1. Understand Forms of Business Organization
- 5.2. Describe sole proprietorship, its merits and demerits.
- 5.3. Explain partnership, its advantages and disadvantages.
- 5.4. Describe joint stock company, its merits and demerits.
- 5.5. Distinguish public limited company and private limited company.

#### **6. Entrepreneurial Skills**

- 6.1. Understand Entrepreneurial Skills
- 6.2. Explain preparing, planning, establishing and managing small business
- 6.3. Explain evaluating all relevant resources
- 6.4. Describe organizing analyzing and innovation of risk of task

#### **7. Scale of Production**

- 7.1. Understand Scale of Production
- 7.2. Explain scale of production and its determination.
- 7.3. Describe large-scale production and its merits.
- 7.4. Explain small scale of production and its advantages and disadvantages.

#### **8. Economic System**

- 8.1. Understand Different Economic Systems

- 8.2. Describe free economic system and its characteristics.
- 8.3. Explain centrally planned economic system, its merits and demerits.
- 8.4. State mixed economic system and its features.

## **9. Money**

- 9.1. Understand What Is Money
- 9.2. Define money
- 9.3. Explain barter system and its inconveniences.
- 9.4. Explain functions of money.

## **10. Bank**

- 10.1. Understand Bank and Its Functions
- 10.2. Define bank.
- 10.3. Describe commercial bank and its functions.
- 10.4. State central bank and its functions.

## **11. Cheque**

- 11.1. Understand Cheque and Dishonor of Cheque
- 11.2. Define cheque.
- 11.3. Enlist the characteristics of cheque.
- 11.4. Identify the kinds of cheque.
- 11.5. Describe the causes of dishonor of a cheque.

## **12. Financial Institutions**

- 12.1. Understand Financial Institutions
- 12.2. Explain IMF and its objectives.
- 12.3. Explain organizational set up and objectives of IDBP.
- 12.4. Explain organizational set up and objectives of PIDC.

## **13. Trade Union**

- 13.1. Understand Trade Union, Its Background and Functions
- 13.2. Describe brief history of trade union.
- 13.3. State functions of trade union.
- 13.4. Explain objectives, merits and demerits of trade unions.
- 13.5. Enlist problems of industrial labour.

## **14. International Trade**

- 14.1. Understand International Trade
- 14.2. Explain international trade.
- 14.3. Enlist its merits and demerits.

## **15. Management**

- 15.1. Understand Management
- 15.2. Explain meaning of management.
- 15.3. Describe functions of management.
- 15.4. Identify the problems of business management.

## **16. Advertisement**

- 16.1. Understand Advertisement
- 16.2. Explain the concept of advertisement.
- 16.3. Enlist benefits and drawbacks of advertisement.
- 16.4. Describe principal media of advertisement used in business world.

**17. Economy of Pakistan**

- 17.1. Understand the Economic Problems of Pakistan.
- 17.2. Describe economy of Pakistan
- 17.3. Explain economic problems of Pakistan
- 17.4. Explain remedial measures for economic problems of Pakistan

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A course introducing the design and development of a Web page with JAVA. It intends to provide the trainees with working knowledge on creating a Web page using JAVA programming language. It covers the discussion on the WWW and the Internet, HTML and CSS basics, JAVA Script, JQuery, JAVA Servlets, JSP, Session Management, JDBC Programming, JSF, tools, linking, FrontPage basics, formatting, multimedia, and site creation and maintenance. Java has strong support for web development. While Java on the desktop, with the notable exception of Eclipse RCP based application was never a huge success, Java is frequently used at the server side. This has a laboratory component to enhance learning.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Describe Web development technologies
- Describe the concepts and methods of designing a Web page for the World Wide Web.
- Use any text editor to create an HTML code.
- Use the elements of the HTML to format a Web page
- Install necessary software for Setting up development Environment
- Explain and apply HTML and CSS tags
- Apply Java Script in webpages
- Apply JQuery within webpages
- Describe and use Java servlets
- Explain and apply Java Server Pages elements
- Explain and use Session Management applications and techniques
- Explain JDBC, configure MySQL and use its methods
- Customize Tags
- Explain and apply use Java Server Faces

### **COURSE OUTLINE**

<b>Contents</b>	<b>Hours</b>
<b>1. Introduction to Web Development</b>	<b>2</b>
1.1 What is a Web Application?	
1.2 HTTP Basics	
1.3 Types of HTTP Requests	
1.4 Server Side Programming	
1.5 Client Side Programming	
1.6 Web Application Layers	
<b>2. Setting up Development Environment</b>	<b>2</b>
2.1 Installation of Apache Tomcat Server	
2.2 Installation of IDE (Eclipse / NetBeans)	
2.3 Standard Directory Structure of Java Web Application	

## 2.4 Development of Web Application

<b>3. HTML and CSS</b>	<b>2</b>
3.1 Describe Html Document Structure and Tags	
3.2 Describe CSS Styles	
3.3 Designing Tables	
3.4 Designing Forms	
3.5 Advance Page Layout	
<b>4. Javascript</b>	<b>3</b>
4.1 Introduction to Javascript	
4.2 Hiding and Showing Elements	
4.3 Styling Elements	
4.4 Using JQuery	
4.5 JQuery Selectors	
4.6 Validating Forms	
<b>5. Java Servlets</b>	<b>4</b>
5.1 What is a Servlet?	
5.2 Advantages of Servlet	
5.3 Servlet Types	
5.4 Writing Basic Hello World Servlet	
5.5 Servlet Life Cycle	
5.6 Servlet and Forms	
5.7 Servlet and Input Validation	
<b>6. Java Server Pages</b>	<b>3</b>
6.1 Introduction	
6.2 Life Cycle of JSP	
6.3 JSP Elements	
6.4 JSP Standard Actions	
<b>7. Session Management</b>	<b>2</b>
7.1 What is a Session?	
7.2 What is a Cookie?	
7.3 URL Rewriting	
7.4 Hidden Field	
7.5 Working with HTTP Session	
<b>8. JDBC Programming</b>	<b>8</b>
8.1 Introduction	
8.2 Configure MySQL	
8.3 Connecting to the Database	
8.4 Accessing Data	
8.5 The execute Query Method	
8.6 The execute Update Method	
<b>9. Custom Tags</b>	<b>2</b>
9.1 Custom Tags Overview	
9.2 Custom Tag Handlers	
9.3 Customizing Tag behavior with attributes	

## **10. Java Server Faces**

**4**

- 10.1 Introduction
- 10.2 Using JSF with JSP
- 10.3 JSF Life Cycle
- 10.4 Events Handling
- 10.5 JSF Tag Library

**Total Hours: 32**

### ***References:***

- **Learning Web Design: A Beginner's Guide to (X)HTML, Stylesheet and Web** by Jennifer Niederst Robbins
- **Beginning JSP, JSF and Tomcat** by Giulio Zambon



## **Web Development with JAVA LIST OF PRACTICAL**

16. Installation of Apache Tomcat Server
17. Installation of IDE (NetBean)
18. Deploy simple website in Apache Tomcat Server
19. Design a Page Layout using Html and CSS
20. Install ODBC Driver
21. Install and Configure MySQL
22. Design User Registration Form and Store User in Database
23. Design Login User Form and Validate User
24. Show All Registered Users in a grid
25. Search users by name and show in grid.
26. Update User Profile
27. Form Validation using JQuery
28. Create a form using Java Servlet
29. Store and Retrieve data from Session
30. Create address book application

**LEARNING OBJECTIVES**

**1. Introduction to Web Development**

- 1.1. Define Web Application
- 1.2. Explain HTTP Basic
- 1.3. Describe Types of HTTP Request
- 1.4. Discuss Server Side Programming Languages
- 1.5. Describe Client Side Programming Languages
- 1.6. Explain Web Application Layers

**2. Setting up Development Environment**

- 2.1. Install of Apache Tomcat Server
- 2.2. Install of IDE (Eclipse / NetBeans)
- 2.3. Explain the Standard Directory Structure of Web Application
- 2.4. Develop a Web Application

**3. Html and CSS**

- 3.1. Describe Html document structure
- 3.2. Describe Html Elements
- 3.3. Implement CSS styles
- 3.4. Design Tables
- 3.5. Design Forms
- 3.6. Use Page Layout

**4. Javascript**

- 4.1. Explain what is Javascript
- 4.2. Hide and Show Elements
- 4.3. Apply styles on elements
- 4.4. Define JQUERY
- 4.5. Explain the JQUERY Selectors
- 4.6. Apply validation on HTML form

**5. Java Servlets**

- 5.1. Define Servlets
- 5.2. Describe the advantages of Servlets
- 5.3. Describe different types of a Servlets
- 5.4. Describe Servlet Life Cycle
- 5.5. Create Forms using Servlet
- 5.6. Add Validation on Form

**6. Java Server Pages**

- 6.1. Define JSP
- 6.2. Describe Life Cycle of JSP
- 6.3. Explain JSP Elements
- 6.4. Explain JSP Standard Actions

**7. Session Management**

- 7.1. Define a 'Session'

- 7.2. Define a 'Cookie'
- 7.3. Explain URL Rewriting
- 7.4. Explain Hidden Field
- 7.5. Use HTTP Session

## **8. JDBC Programming**

- 8.1. Define JDBC
- 8.2. Configure MySQL
- 8.3. Connect the Database
- 8.4. Access Data
- 8.5. Implement execute Query Method
- 8.6. Implement execute Update Method

## **9. Custom Tags**

- 9.1. Explain Custom Tags
- 9.2. Describe Custom Tag Handlers
- 9.3. Customize Tag behavior with attributes

## **10. Java Server Faces**

- 10.1. Define JSF
- 10.2. Use JSF with JSP
- 10.3. Describe JSF Life Cycle
- 10.4. Explain Events Handling
- 10.5. Explain JSF Tag Library

Course Code: **CIT- 324**  
Course Title: **Network Administration**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>6</b>	<b>4</b>

The Course on Network Administration using Microsoft Windows Server 2008 Operating System aims to provide students with practical exercise and knowledge on installing and operational administration of connected system. It covers all major topics of Microsoft Windows Server 2008. This comes with practical component to complement classroom discussion.

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## Course Objectives

At the end of the course, the students are expected to be able to

- Describe the basic concepts, architecture, organization and operational principles of Windows Server 2008.
- Install and configure Windows Server 2008
- Manage the resources network users using Windows Server 2008
- Troubleshoot Windows Server 2008 faults and correct them
- Run application programs in Windows Server 2008
- Demonstrate motivation in managing users in a network
- Describe the basic concepts, steps, configuration and application of Microsoft Exchange 2013 to provided enterprise level email service.
- Demonstrate and describe the basic concepts, steps, configuration and application of Microsoft TMG server for controlled internet provision.

## COURSE OUTLINE

<b>Contents</b>		<b>Hours</b>
<b>Ch.</b>		
1.	<b>Introduction</b>	<b>2</b>
	1.1 What is a network	
	1.2 The concept of a network	
	1.3 Types of Network	
	1.4 Major Functions of a Network	
	1.5 Uses of a Network	
2.	<b>Microsoft Windows Client-End</b>	<b>5</b>
	1.6 Introduction to Microsoft Windows	
	1.7 Introduction to Client – Server Environment	
	1.8 Installation / Deployment of Windows Client end	
	1.9 Client End basic settings	
	1.10 Basic Components of a Network	
	1.11 Joining a domain	
	1.12 Client End troubleshooting and maintenance	
3.	<b>Installation and Configuration</b>	<b>6</b>
	3.1 Hardware Requirements	

	3.2 Installation of a server and Configuration	
	3.3 Installation and De-Installation process of Active Directory	
	3.4 Network Address Translation (NAT) Services	
	3.5 Print Server Management	
4.	<b>Microsoft Windows Server 2008 Active Directory Infrastructure</b>	<b>7</b>
	4.1 Function and features of an Active Directory	
	4.2 Installation of Active Directory	
	4.3 Configuration of Active Directory	
	4.4 Role of an Active Directory	
	4.5 Users, Groups and Computers in ADDS	
5.	<b>Microsoft Windows Server 2008 Network Infrastructure</b>	<b>8</b>
	4.6 Server's Network Infrastructure	
	4.7 Major Features and Functions	
	4.8 Understanding and Configuring IP	
	4.9 Configuring Name Resolution	
	4.10 Configuring a DNS Zone Infrastructure	
	4.11 Creating a DHCP Infrastructure	
	4.12 Connecting to Networks	
	4.13 Monitoring Computers	
	4.14 Managing Files	
	4.15 Managing Printers	
6.	<b>Microsoft Exchange Server 2013</b>	<b>8</b>
	6.1 Exchange Server 2013 Prerequisites, Requirements and Deployment	
	6.2 Overview of the Mailbox Server Role	
	6.3 Plan, Deploy and configure the Mailbox Server	
	6.4 Managing Exchange Server 2013 Mailboxes and Other Exchange Recipients	
	6.5 Planning and Implementing Public Folder Mailboxes, Address Lists and Policies	
7.	<b>Managing Exchange Server</b>	<b>8</b>
	7.1 The Exchange Management Shell	
	7.2 Role-based access control	
	7.3 Mailbox management	
	7.4 Addressing Exchange	
8.	<b>Microsoft Threat Management Gateway Server (TMG)</b>	<b>8</b>
	8.1 Installation of TMG Standard Edition and Enterprise Edition	
	8.2 Enabling Access to Internet Resources	
	8.3 Configuring TMG as a Firewall, Advanced Application and Web Filtering	
	8.4 Integrating TMG and Microsoft Exchange Server 2013	
9.	<b>Managing and Implementing TMG Server</b>	<b>6</b>

- 9.1 Understanding Access Rules
- 9.2 Configuring Load-Balancing Capabilities
- 9.3 Network Inspection System
- 9.4 Integrating Domain users with TMG server

10.           **Troubleshooting** **6**

- 10.1 Troubleshooting of Auditing User Access of Files, Folders and Printers
- 10.2 Event Viewer
- 10.3 Hardware Troubleshooting
- 10.4 Troubleshooting of Disk Management
- 10.5 Connectivity and Communication

**Total Hours: 64**

***References***

- MSCE Study Guide, Alan R. Carter, Comdex Computer Publishing
- Supporting Microsoft Windows Server 2008, Microsoft Press
- Administering Microsoft Windows VISTA, Microsoft Press
- TCP/IP Training, Microsoft Press
- Networking Essentials, Microsoft Press
- Microsoft Windows Exchange Server, Microsoft Press
- Microsoft TMG Server, Microsoft Press

## **CIT- 324 – Network Administration**

### ***LIST OF PRACTICALS***

1. Windows VISTA/Windows 7.0 Client End Installation
2. Windows Server 2008 Installation and Configuration
3. Hard Disk Partition Management
4. Exploring Control Panel for Task Scheduling
5. Local Printer Creation and Sharing
6. User and Group Account Management
7. Audit Implementation
8. Account Policy and User Rights Management
9. User Profile Implementation
10. System Policy Configuration
11. Active Directory Installation, Configuration and Maintenance
12. Resource Sharing and Security
13. File and Folder Auditing
14. Setting File and Folder Permissions
15. Resource Access and Permission Problems Troubleshooting
16. Backup and Restore the Data
17. DNS and WINS Installation, Configuration and Maintenance
18. TCP/IP Configuration
19. DHCP Configuration and Maintenance
20. IIS Installation with its services
21. RAS Installation and Configuration
22. VPN Configuration and Maintenance
23. FTP Services configuration
24. Distributed File System Installation and Maintenance
25. NAT Services Configuration and Maintenance
26. Deploying and Managing Exchange Server 2010 / 2013
27. Configuring Mailbox Servers
28. Managing Recipient Objects
29. Installation of TMG Server
30. Configuration of TMG Server

***INSTRUCTIONAL OBJECTIVES***

**1.Introduction**

- 1.1 Describe a network
- 1.2 Describe the concept of a network
- 1.3 Enlist Types of Network
- 1.4 Explain Functions of a Network
- 1.5 Describe the uses of a Network

**2.Microsoft Windows Client-End**

- 1.6 Give introduction of Microsoft Windows
- 1.7 Describe Client – Server Environment
- 1.8 Apply on a computer Installation / Deployment of Windows Client end
- 1.9 Configure Client End basic settings
- 1.10 Design a Basic Network using Components of a Network
- 1.11 Demonstrate how to join a domain
- 1.12 Describe Client End troubleshooting and maintenance

**3. Installation and Configuration**

- 3.1 Explain and enlist Hardware Requirements
- 3.2 Apply on a computer Installation of a server and Configuration
- 3.3 Apply on a server Installation and De-Installation process of Active Directory
- 3.4 Describe Network Address Translation (NAT) Services
- 3.5 Explain a Print Server Management

**4. Microsoft Windows Server 2008 Active Directory Infrastructure**

- 4.1 Explain Function and features of an Active Directory
- 4.2 Describe the steps of Installation of an Active Directory
- 4.3 Configure an Active Directory
- 4.4 Describe Role of an Active Directory
- 4.5 Define Users, Groups and Computers in ADDS

**5. Microsoft Windows Server 2008 Network Infrastructure**

- 5.1 Describe Server's Network Infrastructure
- 5.2 Explain Major Features and Functions
- 5.3 Apply in real environment Understanding and Configuring IP address
- 5.4 Configure Name Resolution
- 5.5 Configure a DNS Zone Infrastructure
- 5.6 Apply the setting by Creating a DHCP Infrastructure
- 5.7 Explain steps of Connecting to Networks
- 5.8 State the steps of Monitoring Computers
- 5.9 Explain the Managing Files
- 5.10 Describe Managing Printers



## **6. Microsoft Exchange Server 2013**

- 6.1 Explain Exchange Server 2013 Prerequisites, Requirements and Deployment
- 6.2 Describe the Mailbox Server Role
- 6.3 Display the methods to Plan, Deploy and configure the Mailbox Server
- 6.4 Use different settings/Managing Exchange Server 2013 Mailboxes and Other Exchange Recipients
- 6.5 Plan and Implement Public Folder Mailboxes, Address Lists and Policies

## **7. Managing Exchange Server**

- 7.1 Describe the Exchange Management Shell
- 7.2 Apply the Role-based access control
- 7.3 Show how the Mailbox management is applied
- 7.4 Use Addressing technique in MS Exchange

## **8. Microsoft Threat Management Gateway Server (TMG)**

- 8.1 Install TMG Standard Edition and Enterprise Edition
- 8.2 Apply and exercise to enable Access to Internet Resources
- 8.3 Configure TMG as a Firewall, Advanced Application and Web Filtering
- 8.4 Integrate TMG and Microsoft Exchange Server 2013

## **9. Managing and Implementing TMG Server**

- 9.1 State the understanding of Access Rules
- 9.2 Configure Load-Balancing Capabilities
- 9.3 Apply Network Inspection System
  - 9.4 Integrate Domain users with TMG server

## **10. Troubleshooting**

- 10.1 Explain Troubleshooting of Auditing User Access of Files, Folders and Printers
- 10.2 State the feature of Event Viewer
- 10.3 Hardware Troubleshooting
- 10.4 Troubleshooting of Disk Management
- 10.5 Connectivity and Communication

## DAE in Computer Information Technology

Course Code: **CIT 333**  
Course Title: **Operating System**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

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Operating System is a course on the main system software that manages the resources of the computer system. It aims to provide students with the understanding and operational principles of operating system. The course covers the issues of managing the resources of a computer by an operating and the implementation and techniques used by Unix/Linux system to address the issues. This comes with laboratory to enhance the classroom discussion.

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### Course Objectives

At the end of the course the students are expected to be able to

- Understand the concepts and issues of managing the resources of a computer by an operating system.
- Understand the operational principles and implementation of Unix/Linux/Linux operating system
- Use shell commands to administer the system.
- Run application programs in Unix/Linux/Linux environment
- Perform system administer
- Demonstrate motivation to use and administer systems in Unix/Linux/Linux platform

### COURSE OUTLINE

<i>Contents</i>	<i>Hours</i>
<b>1. Computer System Structures</b>	<b>4</b>
1.1. Computer System Operation	
1.2. I/O Structure	
1.3. Storage Structure and Hierarchy	
1.4. Hardware Protection	
<b>2. Operating System Structures</b>	<b>10</b>
2.1. System Components	
2.1.1. Process Management	
2.1.2. Memory Management	
2.1.3. Disk and Storage Management	
2.1.4. File System	
2.2. OS Services and System Calls	
2.3. System Programs and Structure	
2.4. System Design and Implementation	

<b>3. Unix/Linux Implementation</b>	<b>6</b>
3.1. Logging In and Logging Out to the System	
3.2. Configuring the Environment and Managing the Password	
3.3. Unix/Linux Manual System	
3.4. Unix/Linux File System and File System Organization	
3.5. File Types, Names and Directories	
3.6. Managing Directories: File and Directory Permissions	
<b>4. Unix/Linux Commands</b>	<b>16</b>
4.1. User-Related, Locating and Search	
4.2. Usage Determination and Process-related Commands	
4.3. File and Directory Manipulation	
4.4. File Content and File Content Search	
4.5. Printing and Scheduling	
4.6. Storage and Status	
4.7. Miscellaneous Commands	
<b>5. Text Processing</b>	<b>6</b>
<b>6. Bourne Shells</b>	<b>6</b>
6.1. Introduction	
6.2. Bourne Shell Basics	
<b>7. System Administration</b>	<b>16</b>
7.1. System Administration Tasks	
7.2. Unix/Linux Installation Basics	
7.3. Resource and User Administration	
7.4. File System and Disk Administration	
7.5. System Accounting and Performance Monitoring	
7.6. Device and Mail Administration	
7.7. UUCP and FTP Services Administration	
7.8. Backing Up and Restoring the System	

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<b><i>Total Hours:</i></b>	<b><i>64</i></b>
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### ***References***

- **Operating System Concepts, 5Ed.**, A. Silverschatz and P. Galvin, Addison-Wesley Publishing Co.
- **Unix/Linux Unleashed, 3Ed**, Robin Burk, et al., Sams Publishing
- **The Linux User's Guide**, Larry Greenfield
- **Unix System Management**, Robert King Ables
- **Red Hat Linux 6.0**, Red Hat Software, Inc.
- **Hand-on Unix: A Practical Guide with the Essentials**, Sobell
- **The Linux Users' Guide**, Larry Greefield
- **UNIX-The Text Book by Mansoor Sarwar**

## LIST OF PRACTICAL

1. Logging On and Logging Out in Unix/Linux System
2. Setting the password
3. Configuration of Own Environment
4. Using Manual Pages
5. Using User-related Commands login, rlogin, telnet, passwd, exit, which, whence, where, man
6. Using Process-related Commands: kill, nice, ps, jobs, wait, nonup, sleep,
7. Using File and Directory Commands: touch, chmod, chgrp, chown, rm, mv, cp, cat, rcp, ln, mkdir, rmdir, ls, find, file
8. Using File Content and Search Commands: more, less, tail, head, wc, read, od, pg, tee, vi, egrep, fgrep, strings
9. Using Printing and Scheduling Commands: cancel, lp, pr, lpstat, at, atq, crontab
10. Using Storage and Status Commands: compress, cpio, dd, pack, pcat, tar, uncompress, unpack, zcat, date, env, iostat, sar, uname, uptime, vmstat
11. Using Text Processing Commands: cut, ex, fmt, fold, join, paste, sort, tr, uniq, sed
12. Using Miscellaneous Commands: banner, bc, cal, clear, time
13. Text Editing Using vi
14. Installing Unix/Linux
15. Adding New User
16. Mounting and Unmounting File System
17. Creating and Repairing File System
19. Manual System Accounting Setup
20. System Accounting Report Generation
22. Connecting and Setting Up Printers
23. Backing up and Restoring System

### *LEARNING OBJECTIVES*

#### **1. Computer System Structures**

- 1.1. Describe the general operations of computer
- 1.2. Describe interrupts
- 1.3. Identify different I/O devices
- 1.4. Describe the structure of input/output system
- 1.5. Describe different storage devices
- 1.6. Explain the hierarchy of storage devices
- 1.7. Identify the protection issues encountered in a computer system
- 1.8. Describe protection methods of computer operation

#### **2. Operating System Structures**

- 2.1. List functions of an operating system
- 2.2. Describe the functions of an operating system
- 2.3. Explain memory management techniques.
- 2.4. Describe virtual memory
- 2.5. Describe hierarchical directory system.
- 2.6. Describe UNIX file system
- 2.7. Explain disk management system
- 2.8. Explain how the operating system manages the resources of a computer
- 2.9. Enumerate OS services and explain the service
- 2.10. Define system calls
- 2.11. Identify system programs that come with the operating system
- 2.12. Describe the functions of these system programs
- 2.13. Describe the general structure and architecture of an operating system
- 2.14. Illustrate the structure by diagrams
- 2.15. Discuss design goals of the operating system

#### **3. Unix/Linux Implementation**

- 3.1. Discuss the development of Unix/Linux development
- 3.2. Explain the design principles of Unix/Linux
- 3.3. Log in and log out in the system
- 3.4. Configure the user own environment
- 3.5. Change and manage own password
- 3.6. Use Unix/Linux help system (Manual System)
- 3.7. Characterize Unix/Linux file system and its organization
- 3.8. Name correctly file and directory
- 3.9. Create and delete files and directories
- 3.10. Set the permissions of files and directories

#### **4. Unix/Linux Basic Commands**

- 4.1. Invoke correctly Unix/Linux commands used in user and user-determination and file search
- 4.2. Invoke correctly Unix/Linux commands used in administration of own environment and process-related job
- 4.3. Use correctly Unix/Linux commands to manipulate files and directories
- 4.4. Use correctly Unix/Linux commands to search and view at contents of files

- 4.5. Print files using Unix/Linux commands
- 4.6. Use correctly Unix/Linux scheduling commands
- 4.7. Use correctly Unix/Linux storage and status commands
- 4.8. Invoke correctly text processing command
- 4.9. Use other miscellaneous commands available to Unix/Linux

## **5. Text Processing**

- 5.1. Invoke vi editor
- 5.2. Compose text using vi editor
- 5.3. Describe different mode of vi editor

## **6. Unix/Linux Shells**

- 6.1. Define Unix/Linux shells
- 6.2. Explain the functions of shell
- 6.3. Describe Bourne Shell of Unix/Linux
- 6.4. Use Bourne shell in Unix/Linux

## **7. System Administration**

- 7.1. Describe Unix/Linux system administration
- 7.2. Describe tasks of Unix/Linux system administration
- 7.3. Identify hardware requirements of Unix/Linux system
- 7.4. Plan and Install Unix/Linux
- 7.5. Start up and shutdown Unix/Linux
- 7.6. Add and maintain new users in the system
- 7.7. Set permission to users
- 7.8. Manage and repair file systems
- 7.9. Create file systems
- 7.10. Describe Unix/Linux system basic accounting
- 7.11. Set up accounting system in Unix/Linux
- 7.12. Describe performance monitoring in Unix/Linux
- 7.13. Use tools for monitoring performance of the system
- 7.14. Describe services facility provided by Unix/Linux
- 7.15. Describe device administrative tasks
- 7.16. Install printer to Unix/Linux system
- 7.17. Describe email facility of Unix/Linux
- 7.18. Describe mail transfer agents
- 7.19. Explain UUCP and FTP services
- 7.20. Describe FTP protocol
- 7.21. Setup and administer FTP services
- 7.22. Explain purpose of backup
- 7.23. Back -up and restore Unix/Linux system

Course Code: **CIT - 344**

Course Title: **Graphic Designing**

**T P C**

**2 6 4**

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Course on Graphic Designing using Adobe Photoshop, Corel Draw, AutoCAD and Wilcom. It aims to provide students with practical exercise and knowledge on designing graphics, designing websites and drawing computer embroidery. It covers all major topics of Graphic layers. This comes with practical component to complement classroom discussion.

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## **Course Objectives**

At the end of the course, the students are expected to be able to

- Understand basic concepts to design websites and embroidery industry design.
- What tools or knowledge will help you get to the next phase in your career?
- Moving beyond branding and starting our own businesses.
- Building our own brand.
- How to design in a broader sense than fonts and paper (i.e., traditional graphic design)
- Seeking employment as a Graphic Designer to use skills with computers and the visual arts.
- More experience and more learning

## **COURSE OUTLINE**

<b>Contents</b>	<b>Hours</b>
<b>1. Introduction</b>	<b>2</b>
1.1. Thinking Design	
1.2. The Concept of Graphic Designing	
1.3. What does a designer do?	
1.4. What is the difference between a graphic designer and an illustrator?	
1.5. What is it like being a graphic designer?	
1.6. What are the applications of graphic design?	
<b>2. Introduction to Adobe PhotoShop</b>	<b>2</b>
2.1. Adobe Photoshop Tools Overview	
2.2. What are pixels?	
2.3. Why Use Adobe Photoshop Layers?	
2.4. What is a Layer?	
2.5. Layers Panel	
2.6. Types of Layers	
2.7. Layers Short Keys	
<b>3. Adobe PhotoShop</b>	<b>3</b>
3.1. Use Magic Wand tool.	
3.2. Use Polygonal Lasso Tool.	
3.3. Use Pen Tool	
3.4. Change Colors with Edit in Quick Mask Mode	

- 3.5. Shining Face
- 3.6. Brightness Face
- 3.7. Photo Retouching

#### **4. Advanced Adobe PhotoShop**

**10**

- 4.1. Adding Eye Lashes
- 4.2. Use Brush tool
- 4.3. Makeup to a girl
- 4.4. Smudge tool
- 4.5. Filter
- 4.6. Sponge tool
- 4.7. Light Effects on an Image & Cloth
- 4.8. Oil Paint conversion
- 4.9. Convert image into sketch
- 4.10. Glamour Effect
- 4.11. Fabric Folds
- 4.12. Reflections
- 4.13. 3D Box Design
- 4.14. Use pen tool
- 4.15. Layer Style
- 4.16. Gradient Effect
- 4.17. Type Text
- 4.18. Shapes Tool Draw some Shapes on the box and some effects

#### **5. Adobe PhotoShop– Designing Website**

**6**

- 5.1. Web site Design
- 5.2. Project Web site Design

#### **6. Introduction to Corel draw**

**6**

- 6.1. What is CorelDRAW?
- 6.2. Kind of Designing
- 6.3. Kind of Media
- 6.4. Pick Tool Overview
- 6.5. Reshaping objects using Nodes
- 6.6. Aligning Objects
- 6.7. The duplicate command
- 6.8. Welding objects, Trimming objects
- 6.9. Intersecting objects
- 6.10. Simplify and Back Minus Front — Front Minus Back
- 6.11. Smudge Brush
- 6.12. Roughen Brush
- 6.13. Crop Tool
- 6.14. Knife and Erase
- 6.15. Virtual segment Delete
- 6.16. Convert outline object

#### **7. Advanced Corel draw**

**10**

- 7.1. Freehand Tool, Bezier Tool, Artistic Media Tool, Pen
- 7.2. Poly Line Tool, 3 Point Curve
- 7.3. Connector and Dimension Tools
- 7.4. Spiral Tool, Polygon Tool
- 7.5. Graph Paper Tool ,Complex Shape tools
- 7.6. Basic Shapes



7.7.	Symbol Character	
7.8.	Text Tool	
7.9.	Interactive Tools for Fast Changes	
7.10.	Interactive Bend	
7.11.	Interactive Contour	
7.12.	Interactive Distort	
7.13.	Interactive Drop Shadow	
7.14.	Interactive Envelope	
7.15.	Interactive Extrude	
7.16.	Interactive Transparency	
7.17.	Eyedropper Tool Flyout	
7.18.	Outline Tool Flyout	
7.19.	Fill Tool Flyout	
<b>8.</b>	<b>Introduction To AutoCAD</b>	<b>4</b>
8.1.	Introduction to Systems	
8.2.	Startup Command	
8.3.	Unit Set Command	
8.4.	Drawing Commands	
8.5.	Basic Commands	
<b>9.</b>	<b>AutoCAD 2D</b>	<b>6</b>
9.1.	Creating Commands(Circle)	
9.2.	Creating Commands(Arc)	
9.3.	Apply Commands	
9.4.	Draw Commands -I	
9.5.	<b>Layers</b>	
9.6.	Draw Commands -II	
9.7.	Hatch and Blocks Commands	
9.8.	<b>Elevation Drawing</b>	
<b>10.</b>	<b>AutoCAD 3D</b>	<b>6</b>
10.1.	<b>3D Drawing</b>	
10.2.	<b>3D Commands</b>	
10.3.	<b>Creating</b> a Building in 3D	
10.4.	AutoCAD Keyboard Shortcuts	
<b>11.</b>	<b>Introduction to Computerized Embroidery</b>	<b>4</b>
11.1.	Introduction to Toolbars	
11.2.	View, Outline and Control Points	
11.3.	Vectors & Images Sketching Designing	
11.4.	Input Tools	
11.5.	Pointer Tools	
11.6.	Shaping Tools	
<b>12.</b>	<b>Advanced Computer Embroidery</b>	<b>4</b>
12.1.	Duplicating Designs	
12.2.	Stitches Types	
12.3.	Travel	
12.4.	Generate	
12.5.	Automatic Digitizing	
12.6.	Creating Embroidery Lettering	

**Total Hours: 64**

### ***References:-***

- **Adobe Photoshop CC Classroom in a Book (2015 release), Andrew Faulkner and Conrad Chavez**
- **Photoshop Elements 14 For Dummies, Barbara Obermeier and Ted Padova**
- **CorelDRAW X7: The Official Guide, Gary David Bouton**
- **Coreldraw! for Dummies (For Dummies Computer Book Series), Deke McClelland**
- **AutoCAD 2016 For Beginners, CADFolks**
- **Mastering AutoCAD 2016 and AutoCAD LT 2016, George Omura and Brian C. Benton, Autodesk Official Press**
- **AutoCAD 2016 Instructor, James Leach**
- **Digitizing Made Easy: Create Custom Embroidery Designs Like a Pro, John Deer**
- **Fashion Design for Living, Alison Gwilt**

**LIST OF PRACTICALS:-**

1. Adobe Photo-Shop
  - 1.1. Editing Face beauty using Photo tools
  - 1.2. Convert an image into sketch and apply light effects
  - 1.3. Project Website Design
2. Corel draw:
  - 2.1. Write different kinds of Designing & Media
  - 2.2. Draw rectangular objects of equal size
  - 2.3. Reshaping objects like Fruits and Face parts
  - 2.4. Designing a house or a building
  - 2.5. Aligning an object
  - 2.6. Transformation of and object
  - 2.7. Designing a flower
  - 2.8. Draw Pakistan flag
  - 2.9. Design a tree
  - 2.10. Draw rectangle and round it using crop tools
  - 2.11. Designing a tea pot
  - 2.12. Draw a thing and clone it
  - 2.13. Design a leap
  - 2.14. Design cloths of a baby
  - 2.15. Designing a coat
  - 2.16. Design a rose flower
  - 2.17. Design paper borders
  - 2.18. Draw a polygon object
  - 2.19. Draw stars using complex star tools
  - 2.20. Designing a spiral shape
  - 2.21. Design a flower using basic shapes
  - 2.22. Write the name of the institute in a circle
  - 2.23. Design a logo of your institute
  - 2.24. Draw an object having showing shadow & transparency
  - 2.25. Designing a neckles
  - 2.26. Design an Interactive Envelope
  - 2.27. Draw pipe of a house using interactive tools
  - 2.28. Create a mango & apply Mesh tools
  - 2.29. Export of Files
  - 2.30. Assignment to import files and Inpage
  - 2.31. Assignment to Logo and Visiting Card
  - 2.32. Assignment to Flex sign Design
  - 2.33. Assignment of Embroidery Design
  - 2.34. Assignment of Graphic Design
  - 2.35. Girl Face Design
3. AutoCAD
  - 3.1. Define a measuring system with five examples
  - 3.2. Draw a Line of size 20'x5'
  - 3.3. Convert a line to Polyline
  - 3.4. Create a smooth curve that passes through or near specific points
  - 3.5. Draw a rectangle, circle based on a center point, radius and three point circle
  - 3.6. Draw an arc using three points
  - 3.7. Draw angular 45 angle, 5 inch
  - 3.8. Draw all 45° angles
  - 3.9. Draw a door
  - 3.10. Create and angled corner between two lines
  - 3.11. Create repeating pattern of an object
  - 3.12. Building a wall showing bricks
  - 3.13. Create and ellipse or an elliptical arc
  - 3.14. Draw a table with 4 chairs
  - 3.15. Draw a box, wedge, cone sphere and circle
  - 3.16. Draw a single story house in 3D effect

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A major course dealing with the main component of the microcomputer motherboard, its internally attached components and the peripherals. It is designed to provide student with skills and knowledge to maintain, diagnose and repair computer main system board and peripherals. It covers concepts and methods of preventive maintenance, fault diagnose of motherboard, power supply, memory, storage device, PCB, printers, monitors and other externally attached component of computer system. This has laboratory component.

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### **Course Objectives**

At the end of the course the students are expected to be able to

- Understand the concepts and methods of computer system maintenance
- Apply skills and knowledge to maintain PC main system component and peripherals.
- Understand the operational principles PC power supplies.
- Assemble and disassemble printers, scanners, monitor, mouse, keyboard and cards.
- Diagnose and repair faulty PC main system board and peripherals.
- Demonstrate patience and motivation in repairing minute computer components.

### *COURSE OUTLINE*

<b>Contents</b>	<b>Hours</b>
<b>1. Preventive and Practical Maintenance</b>	<b>2</b>
1.1. Contributors to Failures	
1.2. Scheduled Maintenance and Error/Fault Record	
1.3. Engineer's Toolbag and Use of Testing/Measuring Instruments	
1.4. Maintenance through Replacement	
1.5. Introduction of Input / Output Devices	
1.6. Second Level of Maintenance	
1.7. Hardware Diagnostic Routines and Diagnostic Software	
<b>2. Troubleshooting and Repair of Motherboard</b>	<b>3</b>
2.1. Introduction to Motherboard	
2.2. Motherboard and CPU Architectures	
2.3. CPU Socket Types	
2.4. Expansion Bus and alternatives	
2.5. Motherboard Connectors and BIOS / CMOS	
2.6. Commonly Occurring Faults and Important Signals for Fault Tracing	
2.7. Diagnostic Tests	
2.8. Preventive Measures	

<b>3. Troubleshooting and Repair of Power Supply</b>	<b>2</b>
3.1. Operating Principle of a Power Supply	
3.2. Power Supply Connectors	
3.3. Power Supply Safety	
3.4. Troubleshooting Procedures and Commonly Occurring Faults	
3.5. Repair Techniques and Replacing a Power Supply	
<b>4. Troubleshooting Memories and Storage Devices</b>	<b>4</b>
4.1. Overview of RAM Module Types	
4.2. DDR Speeds	
4.3. Installation of RAM	
4.4. Troubleshooting Routines	
4.5. Storage Technology and Types (PATA / SATA / SSD etc)	
4.6. Backup Storage and RAID Levels	
<b>5. Maintenance and Repair of Printers</b>	
<b>5.1. Ink Jet Printer</b>	<b>2</b>
5.1.1. Jet Ink Printer: An Introduction	
5.1.2. User Level Preventive and Corrective Maintenance	
5.1.3. Disassembly and Assembly of Jet Ink Printer	
5.1.4. Common Faults and Repairing Jet Ink Printer	
<b>5.2. Laser Printer</b>	<b>2</b>
5.2.1. Introduction of Laser Printing	
5.2.2. Common Faults and Safety Measures	
5.2.3. Preventive maintenance and Corrective Maintenance	
<b>5.3. Network Printer</b>	<b>2</b>
5.3.1. Introduction of Laser Printing	
5.3.2. Common Faults and Safety Measures	
5.3.3. Preventive maintenance and Corrective Maintenance	
<b>5.4. Plotters</b>	<b>2</b>
5.4.1. Introduction of Plotter	
5.4.2. Common Faults and Safety Measures	
5.4.3. Preventive maintenance and Corrective Maintenance	
<b>6. Maintenance and Repair of Scanners</b>	<b>2</b>
6.1. Types of Scanners (Flatbed vs Sheetfed)	
6.2. An Overview: Image Reading	
6.3. Disassembly and Assembly of Scanner	
6.4. Common Faults: Steps of Preventive and Corrective Maintenance	
<b>7. Maintenance and Repair of Display Devices</b>	<b>3</b>
7.1. Overview of Monitors	
7.2. Overview of LCDs	
7.3. Overview of Multimedia Projectors	
7.4. Common Faults and troubleshooting	

7.5. Diagnostics, Preventive and Repairs of Monitors	
<b>8. Maintenance and Repair of Keyboard</b>	<b>2</b>
8.1. Basic Working of Keyboard and Keyboard Installation	
8.2. Disassembly/Assembly of a Keyboard	
8.3. Interface Problems	
8.4. Diagnostics, Preventive and Repair techniques	
<b>9. Maintenance and Repair of Mouse</b>	<b>2</b>
9.1. Working of a Mouse and Installation	
9.2. Disassembly and Assembly of a Mouse	
9.3. Cleaning and Preventive Measures	
<b>10. Troubleshooting Basic I/O Interface Card and Surface Mount PCB</b>	<b>2</b>
10.1. Theory of Basic Input and Output Ports	
10.2. Construction of an I/O card	
10.3. Fault Diagnosis and Repairs.	
10.4. Use of Special Tools for Soldering	
10.5. Troubleshooting an IC and SMD	
<b>11. Customized Systems</b>	<b>2</b>
11.1. Introduction to Customized Systems	
11.2. Thick Clients	
11.3. Virtualization Workstation	
11.4. Audio Video Editing Station	
11.5. Gaming Systems	
11.6. Types of Servers	
11.7. Troubleshooting an IC and SMD	
<b>Total Hours:</b>	<b>32</b>

## ***References***

- **CompTIA A+ 220-801 and 220-802 Authorized Cert Guide, Third Edition**, Mark Edward Soper, David L. Prowse and Scott Mueller.
- **Microprocessors And Interfacing 2E**, DOUGLA V Hall by McGraw-Hill Education
- **The Complete A+ Guide to PC Repair Fifth Edition Update (5th Edition)**, Cheryl Schmidt
- **A Guidebook in PC Hardware, Maintenance And Repair Ent 284**, William A. Lloyd by PRINCE GEORGE'S COMMUNITY COLLEGE
- **Computer Hardware Technicians CH111**, 5 CD-ROM set by NCSA Academy USA  
Computer Hardware Technicians

*LIST OF PRACTICALS*

1. Use of Testing and Measuring Instrument
2. Disassembly and Identification of Motherboard Components
3. Diagnostic Test of Motherboard
4. Disassembly and Identification of Power Supply Parts
5. Troubleshooting Power Supply
6. Troubleshooting Memory
7. Disassembly and Identification of Floppy Disk Parts
8. Preventive Maintenance and Troubleshooting of Floppy Disk Drive
9. Identification of Hard Disk Parts
10. Identification and Troubleshooting of Surface Mount PCB
11. Installation and Setup of Dot Matrix Printer
12. Identification and Disassembly/Assembly of Dot Matrix Printer
13. Fault Diagnosis and Preventive and Corrective Maintenance of Dot Matrix Printer
14. Installation and Setup of Line Printer
15. Identification and Disassembly/Assembly of Line Printer
16. Fault Diagnosis, Preventive and Corrective Maintenance of Line Printer
17. Installation and Setup of Jet Ink Printer
18. Identification and Disassembly/Assembly of Jet Ink Printer
19. Fault Diagnosis, Preventive and Corrective Maintenance of Jet Ink Printer
20. Installation and Setup of Laser Printer
21. Identification and Disassembly/Assembly of Laser Printer
22. Fault Diagnosis, Preventive and Corrective Maintenance of Laser Printer
23. Installation and Setup of a Scanner
24. Identification and Disassembly/Assembly of Scanner
25. Fault Diagnosis, Preventive and Corrective Maintenance of Scanner
26. Identification and Disassembly/Assembly of Monitor and its Interface Card
27. Troubleshooting, Preventive and Corrective Maintenance of Monitor
28. Identification, Disassembly and Assembly of Keyboard and its Interface Card

- 29. Fault Diagnosis, Preventive and Corrective Maintenance of Keyboard
- 30. Identification and Disassembly/Assembly of Mouse and its Interface Card
- 31. Troubleshooting, Preventive and Corrective Maintenance of Mouse
- 32. Identification and Disassembly/Assembly of Common Interface Cards
- 33. Troubleshooting, Preventive and Corrective Maintenance of Common Interface Cards



## **CIT 352 – PC System and Peripherals Repair**

### *LEARNING OBJECTIVES*

#### **1. Preventive maintenance**

- 1.1. List the contributors to failures of system
- 1.2. Describe the effects of corrosion and magnetism to system performance
- 1.3. Handle correctly peripherals
- 1.4. Describe Virus and prescribe measures to prevent virus attacks
- 1.5. Schedule maintenance
- 1.6. List tools used for system maintenance
- 1.7. Use correctly testing and measuring instruments
- 1.8. Make error or fault records
- 1.9. Describe fault-finding flowchart
- 1.10. Perform system maintenance by replacement
- 1.11. Describe second level maintenance
- 1.12. Describe hardware diagnostic routines
- 1.13. Use diagnostic software
- 1.14. Describe the limitation of diagnostic software

#### **2. Troubleshooting and Repair of a Motherboard**

- 2.1. Describe motherboard
- 2.2. Describe system board and planar board
- 2.3. Identify motherboard components and functional block using block diagram
- 2.4. Enumerate types and characteristics of CPU
- 2.5. Differentiate types of bus and slots
- 2.6. Describe daughter boards
- 2.7. Identify common video, I / O types
- 2.8. List of commonly occurring motherboard faults
- 2.9. Identify important signals for fault tracing
- 2.10. Isolate the area of fault probability
- 2.11. Describe diagnostic tests and perform fault preventive measures
- 2.12. Perform card substitution method for repairs and replacement of motherboard

#### **3. Troubleshooting and Repair of a Power Supply**

- 3.1. Describe regulation of power supply.
- 3.2. Explain operating principle of power supply
- 3.3. Interpret block diagram or schematics of power supply
- 3.4. Describe switch mode and transformer-based unit of power supply
- 3.5. Explain block diagram of a switching power supply.
- 3.6. Describe battery type power supply
- 3.7. Determine different output voltages of power supply
- 3.8. Test good signal power supply
- 3.9. Explain how a power good signal is produced
- 3.10. Perform troubleshooting procedures of power supply
- 3.11. Localize the fault into a narrow region of the circuit

- 3.12. Identify commonly occurring faults of power supply
- 3.13. Explain causes of faults in power supply itself
- 3.14. Use essential tools and test equipment
- 3.15. Explain concept of a dummy load for testing a power supply in no load condition
- 3.16. Describe various repairing techniques
- 3.17. Perform soldering/desoldering, chip/component replacement
- 3.18. Perform replacement of power supply

#### **4. Troubleshooting Memories and Storage Devices**

- 4.1. Describe RAM and ROM
- 4.2. Enumerate different types of memories
- 4.3. Describe each type of memory
- 4.4. Describe parity error in memory
- 4.5. Perform troubleshooting routines of memory
- 4.6. Replace memory chip
- 4.7. Describe the operational principles of floppy and hard disk drives
- 4.8. Identify parts of floppy and hard disk drives
- 4.9. Describe the IDE and SCSI setup of drives
- 4.10. Install and setup floppy and hard disk drives
- 4.11. Describe operational principles of tape, compact, Bernoulli and Zip drives
- 4.12. Install and setup tape, compact, Bernoulli and Zip drives

#### **5. Peripherals**

- 5.1. Describe peripherals configuration
- 5.2. Describe CONFIG.SYS file and its significance
- 5.3. Explain configuring techniques
- 5.4. Describe auto-configuration and Plug and Play devices

#### **6. Maintenance and Repair of Printers**

##### **6.1. Dot Matrix Printer**

- 6.1.1. Maintain and Repair Dot Matrix Printer
- 6.1.2. Identify parts of dot matrix printer
- 6.1.3. Describe operation of dot matrix printer.
- 6.1.4. Describe steps to install a dot matrix.
- 6.1.5. Explain the significance of a test print / Self- Testing.
- 6.1.6. Interpret the information given on a test page.
- 6.1.7. Demonstrate the cleaning of the printer.
- 6.1.8. Explain schedule for Technician Level Maintenance.
- 6.1.9. Disassemble and assemble dot matrix printer
- 6.1.10. Diagnose faulty dot matrix printer.
- 6.1.11. Repair faulty dot matrix printer

##### **6.2. Line Printer**

- 6.2.1. Explain print mechanism of line printer to print a complete line at a time.
- 6.2.2. Describe Installation steps for a line printer
- 6.2.3. Explain every indicator especially the engineer's fault indicator of line printer control panel
- 6.2.4. Test line printer
- 6.2.5. Explain the significance of result of test.

- 6.2.6. Explain these with the help of the technical service manual, which accompanied the printer.
- 6.2.7. Explain with the help of user manual of the printer. Emphasis is given to constantly followed cleaning printer as well as the environment. Air-conditioning plus very accurate supply line.
- 6.2.8. Use the technical service manual

### **6.3. Jet Ink Printer**

- 6.3.1. Explain the operational principles of jet ink printer
- 6.3.2. Identify working parts of jet ink printer
- 6.3.3. Describe the function of each part of jet ink printer
- 6.3.4. Install a jet ink printer
- 6.3.5. Identify common faults occurring in jet ink printer
- 6.3.6. Disassemble and assemble jet ink printer
- 6.3.7. Perform preventive and corrective maintenance of jet ink printer

### **6.4. Laser Printer**

- 6.4.1. Explain the operational principles of laser diode.
- 6.4.2. Describe the working of a photocopier for comparison with working of a laser printer.
- 6.4.3. Identify the laser printer Parts
- 6.4.4. Install toner cartridge, connecting printer's Cable and cord, loading paper. customize options
- 6.4.5. Use online help
- 6.4.6. Installing memory cards.
- 6.4.7. Explain the front panel information: Error, Data, Ready, On/Off, and Blinking.
- 6.4.8. Describe the laser printer common faults
- 6.4.9. Explain the danger against laser beam exposure of eyes and skin etc.
- 6.4.10. Explain the steps for preventive maintenance with the help of a user manual.
- 6.4.11. Perform corrective maintenance

## **7. Maintenance and Repair of Scanners**

- 7.1. Explain image reading
- 7.2. Explain optical character recognition mechanism.
- 7.3. List the top software available in the market and describe their salient features.
- 7.4. List kinds of scanners
- 7.5. Explain the usage and technical difference
- 7.6. Install and operate scanner
- 7.7. Explain the physical connection, the loading of software, setting up the configuration (theory only) etc.
- 7.8. Use a scanner.
- 7.9. Disassemble/Assemble a scanner
- 7.10. Describe common scanner faults
- 7.11. Perform preventive maintenance
- 7.12. Perform corrective maintenance

## **8. Maintenance and Repair of Monitors**

- 8.1. Describe CRT, Power Supply, Scan Board
- 8.2. Define pixels, dot pitch, aspect ratio, power indicator, contrast, brightness, +/- buttons, and other adjustment buttons

- 8.3. Describe horizontal position/size, vertical position/size, 15-Pin D-Subtype connector, non-glare screen, tinted screen, and tilt/swivel stand.
- 8.4. Describe video controller chip, video RAM, video image chip, digital to analog converter, port to monitor, signal assignment, factory preset timing signals
- 8.5. Describe display adapters: MDA, CGA, EGA, VGA, SVGA, XGA, 8514.
- 8.6. Differentiate color monitor diagram from monochrome monitor diagram.
- 8.7. Enumerate common faults of a monitor
- 8.8. Classify various faults: Power Supply-based, deflection faults, horizontal hold, vertical hold, and alignment faults, supply line faults, interface-based faults.
- 8.9. Diagnose common monitor faults
- 8.10. Describe preventive measures for monitors.
- 8.11. Identify the field repairable parts of the card.
- 8.12. Describe predetermined fault.
- 8.13. Diagnose monitor interface card fault.
- 8.14. Repair repairable interface card

## **9. Maintenance and Repair of Keyboard**

- 9.1. Describe basic working of a keyboard
- 9.2. Define concept of rows and columns to form a matrix of key positions.
- 9.3. Disassemble keyboard
- 9.4. Identify keyboard matrix, controller chip, 5-pin connector.
- 9.5. Describe functions of signals between the CPU and keyboard
- 9.6. Assemble keyboard
- 9.7. Clean dirty key contacts

## **10. Maintenance and Repair of Mouse**

- 10.1. Describe operating principle of mouse
- 10.2. Describe GRU interface/ Pointing device.
- 10.3. Disassemble mouse
- 10.4. Identify mouse parts such rollers, ball, photo diode, LED
- 10.5. Describe different mouse: serial, BUS type, two buttons, three buttons, wireless type, and laptop type mouse.
- 10.6. Show restriction on mouse movement
- 10.7. Clean mouse as a preventive measure

## **11. Troubleshooting Basic I/O Interface Card and Surface Mount PCB**

- 11.1. Interpret schematic diagram of various cards
- 11.2. Identify functional blocks of I/O card
- 11.3. Describe a multi I/O card.
- 11.4. Design an I/O card to control a motor moving in counterclockwise/counterclockwise direction.
- 11.5. Describe working of I/O card
- 11.6. Identify flow of circuit through block diagram
- 11.7. Diagnose faults
- 11.8. Describe 74244 as basic input interface and 74374 as a basic output interface.
- 11.9. Describe working of 8255 and PPI chip.
- 11.10. Describe various application chip such as 8279, 8254, 8251.
- 11.11. Identify replaceable parts of a card
- 11.12. Replace replaceable parts of I/O card

Course Code: **CIT 362**  
Course Title: **Project**

<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>6</b>	<b>2</b>

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An end-term laboratory course where the students apply the concepts and principles of electronics, computer hardware and software to construct and device prototypes of simple products. It aims to provide students with opportunity to apply the knowledge and skills learned in the program. It is all practicals course.

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### **Course Objectives**

At the end of the course the students are expected to be able to construct and device simple electronics or computer hardware/software devices.

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### ***Activities***

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1. Organization
2. Research of Project
3. Project Proposal with Write Up
4. Evaluation of Project Proposal for Feasibility
5. Fabrication/Construction of Project
6. Consultation
7. Presentation

### **Proposed Minimum Qualification of Teacher/ Instructor**

- **M.Sc./ Master in Computer Science with 2-Years’ relevant experience in teaching/ industry**

**OR**

- **B.Sc. in Computer Engg. with 2-Years’ relevant experience in teaching/ industry**

**OR**

- **B.Sc. in Electrical/ Electronics Engg. with 2-Years’ relevant experience in teaching/ industry**

**OR**

- **DAE in Computer Information Technology with 6-Years’ relevant experience in teaching/ industry**

## **EMPLOYABILITY OF GRADUATES**

This course carries much value and recognized in the private, semi government and government sector as well as abroad for jobs as:-

- Assistant Programmer
- Web Developer
- Computer Hardware Engineer
- Assistant Network Administrator
- Graphic Designing Assistant
- Data-Base Assistant

Sr. No	Name & Designation	Status
1.	<b>Mr. Muhammad Arif Butt</b> Assistant Professor, Punjab University College of I.T, Old (Allama Iqbal) Campus, The Mall, Lahore	Convener
2.	<b>Mr. Imran Ashraf</b> Chief Instructor, Govt. College of Technology, Multan	Member
3.	<b>Mr. Salman Tariq,</b> HoD/ Sr. Instructor (I.T) GCT-Raiwind Road, Lahore	Member
4.	<b>Ms. Tayyaba Amin</b> HoD / Instructor(CIT), GCT (W) Lytton Road, Lahore	Member
5.	<b>Mr. Tahir Ameen</b> Manager (I.T) / Head of Department House No. 430, Block-3, sector B-2 Township, Lahore	Member
6.	<b>Mr. Muhammad Ali Butt,</b> Instructor (I.T) GTTI-Mughalpura, Lahore	Member
7.	<b>Mr. Irfan Sarwar,</b> Network Engineer, MIS Wing, TEVTA	Member
8.	<b>Muhammad Imran Rashid</b> Software Engineer, M/S Systems (Pvt.) Ltd. 97-Aziz avenue, Canal Bank, Gulberg-5, Lahore	Member