

**THE MADURA COLLEGE (Autonomous),  
Madurai – 625011.**

**The Academic Council  
16/12/2016**

**Corrected Copy**

# Department of Hindi

Course Code	Course Title	C	H	I	E	T
<b>17U1HLA1</b>	<b>Hindi I</b>	3	6	25	75	100

**Unit-1** **18 Hrs**

Vowels, Consonants, Gender, Singular, Plural, numbers 1-100

**Unit-2** **18 Hrs**

Use in sentence (Prose), choose the right answer.

**Unit-3** **18 Hrs**

Translations (1-25), correct the sentence, one line question from Prose.

**Unit-4** **18 Hrs**

Prose (Paryatan to Tulasidas lessons), Synonyms.

**Unit-5** **18 Hrs**

Topics of general importance-framing simple sentences –  
Name of Seasons and Directions.

**Text book(s):**

1. KM Chandramohan, Hindi Vatayan, Sourashtra College, Mdu
2. Hindi Parichai, DB Hindi Prachar Sabha
3. Pratam Darshan, DB Hindi Prachar Sabha
4. Pratam Kiran, DB Hindi Prachar Sabha

Course Code	Course Title	C	H	I	E	T
17U2HLA2	Hindi II	3	6	25	75	100

### Unit-1

18 Hrs

Mazedaar kahania (1-5), Letter Writing (Applying for a Post, Leave letter, Insurance claim, Congratulating a friend, Ordering of books).

### Unit -2

18 Hrs

Mazedaar kahania (6-10), Idioms and Phrases meaning (1-25) Proverbs meaning (1-10).

### Unit -3

18 Hrs

Saptharathana (1-5) Comprehension with 5 questions.

### Unit -4

18 Hrs

Essay writing (Computer, Madurai, Diwali, Nari, Siksha, GramaJeevan )

### Unit -5

18 Hrs

Use in sentence proverbs, Name of the days. Classical Tamil: Tamil Semmozhi Varalaru

தமிழ்ச்செம்மொழி வரலாறு

மொழி-விளக்கம் – மொழிக்குடும்பங்கள் - உலகச்செம்மொழிகள் - செம்மொழிகள் - இந்தியச்செம்மொழிகள் – செம்மொழித்தகுதிகள் – வரையறைகள் – வாழும் தமிழ்ச் செம்மொழி – தமிழின் தொன்மைகள் – தமிழின்சிறப்புகள் – தமிழ்ச் செம்மொழிநூல்கள்.

தமிழ்ச்செம்மொழி அறிந்தேற்பு பரிதிமாற் கலைஞர் அவர்கள் முதல்கலைஞர் திரு. மு. கருணாநிதி அவர்கள்வரை (அறிஞர்கள் – அமைப்புகள் – நிறுவனங்கள் – இயக்கங்கள் - தொடர்முயற்ச்சிகள் – அறப்போராட்டங்கள் - தொடர்முயற்சிகள் – அறப்போராட்டங்கள் – உலகத்தமிழ் செம்மொழிமாநாடு கோவை-2010).

### Text book(s):

1. KM Chandramohan, Hindi Vatayan, Sourashtra College, Mdu
2. Sapta Ratna, DB Hindi Prachar Sabha
3. Mazedar kahania, DB Hindi Prachar Sabha

### பார்வை நூல்கள்:

1. கலைஞர் மு.கருணாநிதி, செம்மொழி வரலாற்றில் சில செப்பேடுகள்.
2. ஆய்வரங்கச்சிறப்புமலர், உலகத்தமிழ்ச் செம்மொழி மாநாடு, கோவை-2010.
3. உலகத்தமிழ்ச் செம்மொழி மாநாடுச்சிறப்புமலர், கோவை-2010.
4. சாலினி இளந்திரையன், தமிழ்ச்செம்மொழி ஆவணம், மணிவாசகர் பதிப்பகம், சென்னை-2005.

Course Code	Course Title	C	H	I	E	T
<b>17U3HLA3</b>	<b>Hindi III</b>	3	6	25	75	100

**Unit -1** **18 Hrs**

Noun, Pronoun, Adjective.

**Unit -2** **18 Hrs**

Prose five lessons

(Prem Chand, Vinyapan Yug, Hum Ek Hei, Haar Jeeth, Samay Par Milne Waale),

ERC from Poetry.

**Unit- 3** **18 Hrs**

Modern Poetry

(Phool, Maa Kahe Kahaani, Bikshuk Cheenti, Karun Krandhan ), Précis Writing .

**Unit -4** **18 Hrs**

One Act Play

(Sone Ki Varsha, Seeta, Apoorva Tyag, Parivarthan, Summary), Verb, Adverb.

**Unit-5** **18 Hrs**

ERC from Poetry, Characters from one act play.

**Text book(s):**

1. KM Chandramohan, Hindi Vatayan, Sourashtra College, Mdu
2. Sathyakam Vidyalankar , Kavya Kusum, Kashmir Gate, New Delhi
3. Soney Ki Varsha, DB Hindi Prachar Sabha
4. Sathyakam Vidyalankar, Prose Gadyachayan

Course Code	Course Title	C	H	I	E	T
<b>17U4HLA4</b>	<b>Hindi IV</b>	3	6	25	75	100

**Unit -1** **18 Hrs**

Ras (Shringar, Hasya, Veer, Karun, Raudra),  
Chand (Doha, Sorta, Geethika, Rola, Hari Geethika),  
Alankar (Anupras, Yamak, Slesh, Vakrothi, Upma).

**Unit -2** **18 Hrs**

Ancient Poetry – Kabir And Soor (Erc), Translation (1-5)

**Unit – 3** **18 Hrs**

Novel (Taken Pav, Summary), Charcterisation.

**Unit-4** **18 Hrs**

Tourism (Tajmahal, Kanyakumari, Ajanta Elora Caves, Meenakshi Temple),  
Dialogue Writing (Bus Stand, Hotel, Office, Railway Station)

**Unit -5** **18 Hrs**

Preposition, Conjunction and Interjunction.

**Text book(s):**

1. KM Chandramohan, Hindi Vatayan, Sourashtra College, Mdu
2. Sathyakam Vidyalkar , Kavya Kusum, Kashmir Gate, New Delhi
3. Bhagavadhi Charan Varma , Novel Thaken Pavn, Rajpal And Sons
4. Saral Hindi Vyakaran Part 2 , DB Hindi Prachar Sabha
5. Hindi Anuvad Abhyas, DB Hindi Prachar Sabha

Course Code	Course Title	C	H	I	E	T
17U2HLD1	Hindi	3	6	25	75	100

**Unit-1** **18 Hrs**

Vowels, Consonants, Gender, Singular, Plural, numbers 1-100

**Unit-2** **18 Hrs**

Use in sentence (Prose), choose the right answer.

**Unit-3** **18 Hrs**

Translations (1-25), correct the sentence, one line question from Prose.

**Unit-4** **18 Hrs**

Five line question from Prose, Synonyms.

**Unit-5** **18 Hrs**

1. One line answer question (general), Name of Seasons and Directions.

2. Classical Tamil: Tamil Semmozhi Varalaru தமிழ்ச்செம்மொழி வரலாறு

மொழி-விளக்கம் - மொழிக்குடும்பங்கள் - உலகச்செம்மொழிகள் - செம்மொழிகள் - இந்தியச்செம்மொழிகள் - செம்மொழித்தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச்செம்மொழி - தமிழின்தொன்மைகள் - தமிழின்சிறப்புகள் - தமிழ்ச்செம்மொழி நூல்கள்.

தமிழ்ச் செம்மொழி அறிந்தேற்பு - பரிதிமாற்கலைஞர் அவர்கள் முதல் கலைஞர் திரு. மு. கருணாநிதி அவர்கள் வரை (அறிஞர்கள் - அமைப்புகள் - நிறுவனங்கள் - இயக்கங்கள் - தொடர்முயற்சிகள் - அறப்போராட்டங்கள் - தொடர்முயற்சிகள் - அறப்போராட்டங்கள் - உலகத்தமிழ் செம்மொழி மாநாடு கோவை-2010).

**Text book(s):**

1. KM Chandramohan , Hindi Vatayan, Sourashtra College, Mdu
2. Hindi Parichai, DB Hindi Prachar Sabha
3. Pratam Darshan, DB Hindi Prachar Sabha
4. Pratam Kiran, DB Hindi Prachar Sabha

**பார்வை நூல்கள்:**

1. கலைஞர் மு. கருணாநிதி, செம்மொழி வரலாற்றில் சிலசெப்பேடுகள்.
2. ஆய்வரங்கச் சிறப்புமலர், உலகத்தமிழ்ச் செம்மொழி மாநாடு, கோவை-2010.
3. உலகத்தமிழ்ச் செம்மொழி மாநாடுச் சிறப்புமலர், கோவை-2010.
4. சாலினி இளந்திரையன், தமிழ்ச் செம்மொழி ஆவணம், மணிவாசகர் பதிப்பகம், சென்னை-2005.

# Department of Sanskrit

Course Code	Course Title	C	H	I	E	T
17U1SLA1	Sanskrit I	3	6	25	75	100

**Unit I** **18 Hrs**

1. Fundamental Grammar: Vowels, Consonants, word formation, simple sentences
2. Declension of nouns in all the eight cases:  
Rama, Sita, Phalam, Asmad, Yusmad.

**Unit II** **18 Hrs**

Conjugation of Roots in i) Present (Lat) ii) Future (Lrit)

- |                    |                    |
|--------------------|--------------------|
| 1. Bhu (to be)     | 6. Khad (to eat)   |
| 2. Patt (to read)  | 7. Drus (to see)   |
| 3. Likh (to write) | 8. Gam (to go)     |
| 4. Vad (to speak)  | 9. Pib (to drink)  |
| 5. Khel (to play)  | 10. Vas (to dwell) |

**Unit III** **18 Hrs**

1. Use in sentences:  
Alam, Saha, Vina, Api, Ca, Eva, Ithi, Yada - Tada, Yatha-Thatha, Yatra-Tatra
2. Selected fifteen slokas from Subhashitani

**Unit IV** **18 Hrs**

History of Sanskrit literature: Veda, Vedangas, Ramayana, Mahabharata

**Unit V** **18 Hrs**

Translation from English to Sanskrit 20 sentences using Present and Future tense

**Text Book(s):**

1. T.K. Rama Chandra Iyer, A Short history of Sanskrit literature, R.S.Vadyar and sons, Phalghat.
2. Prof .Jegadisan, Madura College, Sahithya Rasa Kanah, AMG Publications, Madurai.

Course Code	Course Title	C	H	I	E	T
17U2SLA2	Sanskrit II	3	6	25	75	100

### Unit I

18 Hrs

Kalividambanam (20 slokas)

1. Scholars -1, 3, 6
2. Teachers -8, 9, 10
3. Astrologers -15, 16, 18
4. Physicians -23-31
5. Poets -35, 38

### Unit II

18 Hrs

Kalividambanam (10 Slokas)&Sabharanjana Satakam (10 Slokas)

Kalividambanam

1. Relatives -41,42,45,47-49
2. Poverty -53,
3. The Rich -65,
4. Traitors -74,
5. Conclusion -100

Sabharanjanasatakam

1. Strength -45,48,49,51
2. Time & Fate -57,64,65
3. Patience& Peace -71 ,75,76

### Unit III

18 Hrs

Sabharanjana Satakam (20 slokas)

1. Wisdom - 1-6,9,12
2. Poet & Poetry -18,20
3. Donation -33,35,39,41,42
4. Dharma, Artha, Kama -79,90,93
5. King & Kingdom -103,105

### Unit IV

18 Hrs

History of Sanskrit Literature:

Kavyas - Origin and development, Characteristics of Maha kavyas – Panca maha kavyas

### Unit V

18 Hrs

1. Lyrics - Bhakthi Kavyas, Sringara Kavyas
2. Classical Tamil: Tamil Semmozhi Varalaru

## தமிழ்ச்செம்மொழி வரலாறு

மொழி-விளக்கம்-மொழிக் குடும்பங்கள்-உலகச் செம்மொழிகள்- செம்மொழிகள்- இந்தியச் செம்மொழிகள்-செம்மொழித் தகுதிகள்-வரையறைகள்- வாழும் தமிழ்ச் செம்மொழி -தமிழின் தொன்மைகள்- தமிழின்சிறப்புகள்- தமிழ்ச்செம்மொழிநூல்கள்.

தமிழ்ச்செம்மொழிஅறிந்தேற்பு-பரிதிமாற் கலைஞர் அவர்கள் முதல் கலைஞர் திரு.மு.கருணாநிதி அவர்கள் வரை (அறிஞர்கள் - அமைப்புகள் - நிறுவனங்கள்- இயக்கங்கள் -தொடர் முயற்ச்சிகள்-அறப்போராட்டங்கள்-தொடர்முயற்சிகள்- அறப்போராட்டங்கள்- உலகத்தமிழ் செம்மொழி மாநாடு கோவை-2010).

### Text Book(s)

1. T.K. Rama Chandra Iyer, A Short history of Sanskrit literature, R.S.Vadyar and sons, Phalghat.
2. Prof.C.Anantha Raman, Kalividambanam and Sabaranjana satakam By Sri Nilakanta Dikshita, Madurai.

### பார்வை நூல்கள்:

1. கலைஞர் மு.கருணாநிதி, செம்மொழி வரலாற்றில் சிலசெப்பேடுகள்.
2. ஆய்வரங்கச் சிறப்புமலர், உலகத்தமிழ்ச் செம்மொழி மாநாடு, கோவை-2010.
3. உலகத்தமிழ்ச் செம்மொழி மாநாடுச் சிறப்புமலர், கோவை-2010.
4. சாலினி இளந்திரையன், தமிழ்ச் செம்மொழி ஆவணம், மணிவாசகர பதிப்பகம், சென்னை- 2005.

Course Code	Course Title	C	H	I	E	T
17U3SLA3	Sanskrit III	3	6	25	75	100

**Unit I** **18 Hrs**

- Pancatantra
- i) Origin of Pancatantra
  - ii) Mitrabeda (Camel & Lion story)

**Unit II** **18 Hrs**

- Pancatantra
- i) Kakolukiyam – Sasakavanchito gaja:
  - ii) Labhdapranasa: – Akarahrydaya gardabha:

**Unit III** **18 Hrs**

Sukanasa upedesa (full) – Kadambari Sangra:

**Unit IV** **18 Hrs**

Alankaras – Selected Alankaras from Kuvalayananda

- i) Upama
- ii) Ananvaya
- iii) Ulleka
- iv) Samasokthi
- v) Uthpreksha
- vi) Athisayokthi
- vii) Slesa
- viii) Arthantaranyasa:

**Unit V** **18 Hrs**

History of Sanskrit Literature:

- i) Prose Romances
- ii) Historical Kavyas
- iii) Popular tales
- iv) Fables

**Text Book(s)**

1. T.K. Rama Chandra Iyer , A Short history of Sanskrit literature, R.S.Vadyar and sons, Palghat.
2. R.V.Krishnamacharya, Kadambari Sangraham, R.S.vadyar & Sons, Palghat.

Course Code	Course Title	C	H	I	E	T
17U4SLA4	Sanskrit IV	3	6	25	75	100

<b>Unit I</b>		<b>18 Hrs</b>
	Karnabharam of Bhasa	
<b>Unit II</b>		<b>18 Hrs</b>
	Karnabharam of Bhasa	
<b>Unit III</b>		<b>18 Hrs</b>
	Karnabharam of Bhasa	
<b>Unit IV</b>		<b>18 Hrs</b>
	History of Drama Literature: Origin and Development of Drama literature, – Plays of Bhasa	
<b>Unit V</b>		<b>18 Hrs</b>
	History of Drama Literature: Types of Dramas, Some characteristics of Sanskrit Drama Sanskrit Dramas: From Kalidasa to Ramabhadra Dikshita .	

**Text Book(s)**

1. T.K. Rama Chandra Iyer , A Short history of Sanskrit literature, R.S.Vadyar and sons, Palghat.
2. T.K.Ramachandra Iyer, Karnabharam- An one act play – Bhasa, R.S.Vadyar & sons, palghat.

Course Code	Course Title	C	H	I	E	T
17U2SLD1	Sanskrit	3	6	25	75	100

### Unit I

18 Hrs

1. Fundamental Grammar: Vowels, Consonants, word formation, simple sentences
2. Declension of nouns in all the eight cases:  
Rama, Sita, Phalam, Asmad, Yusmad.

### Unit II

18 Hrs

Conjugation of Roots in i) Present (Lat) ii) Future (Lrit)

- |                    |                    |
|--------------------|--------------------|
| 1. Bhu (to be)     | 6. Khad (to eat)   |
| 2. Patt (to read)  | 7. Drus (to see)   |
| 3. Likh (to write) | 8. Gam (to go)     |
| 4. Vad (to speak)  | 9. Pib (to drink)  |
| 5. Khel (to play)  | 10. Vas (to dwell) |

### Unit III

18 Hrs

1. Use in sentences:  
Alam, Saha, Vina, Api, Ca, Eva, Ithi, Yada - Tada, Yatha-Thatha, Yatra-Tatra
2. Selected fifteen slokas from Subhashitani

### Unit IV

18 Hrs

History of Sanskrit literature: Veda, Vedangas, Ramayana, Mahabharata

### Unit V

18 Hrs

1. Translation from English to Sanskrit 20 sentences using Present and Future tense
2. Classical Tamil: Tamil Semmozhi Varalaru

#### தமிழ்ச்செம்மொழி வரலாறு

மொழி-விளக்கம்-மொழிக் குடும்பங்கள்-உலகச் செம்மொழிகள்- செம்மொழிகள்- இந்தியச் செம்மொழிகள்-செம்மொழித் தகுதிகள்-வரையறைகள்- வாழும் தமிழ்ச் செம்மொழி -தமிழின் தொன்மைகள்- தமிழின்சிறப்புகள்- தமிழ்ச்செம்மொழிநூல்கள்.

தமிழ்ச்செம்மொழி அறிந்தேற்பு-பரிதிமாற் கலைஞர் அவர்கள் முதல் கலைஞர் திரு.மு.கருணாநிதி அவர்கள் வரை (அறிஞர்கள் - அமைப்புகள் - நிறுவனங்கள்- இயக்கங்கள் -தொடர் முயற்ச்சிகள்-அறப்போராட்டங்கள்-தொடர்முயற்சிகள்- அறப்போராட்டங்கள்- உலகத்தமிழ் செம்மொழி மாநாடு கோவை-2010).

### Text Book(s)

1. T.K. Rama Chandra Iyer, A Short history of Sanskrit literature, R.S.Vadyar and sons, Phalghat.
2. Prof Jegadisan, Madura college, Sahithya Rasa Kanah, AMG Publications, Madurai

### பார்வை நூல்கள்:

1. கலைஞர் மு.கருணாநிதி, செம்மொழி வரலாற்றில் சிலசெப்பேடுகள்.
2. ஆய்வரங்கச் சிறப்புமலர், உலகத்தமிழ்ச் செம்மொழி மாநாடு, கோவை-2010.
3. உலகத்தமிழ்ச் செம்மொழி மாநாடுச் சிறப்புமலர், கோவை-2010.
4. சாலினி இளந்திரையன், தமிழ்ச் செம்மொழி ஆவணம், மணிவாசகர் பதிப்பகம், சென்னை-2005.

# Department of English

**B.A.-ENGLISH**  
**SYLLABUS FOR THE YEAR 2017 ONWARDS**  
**SEMESTER-I**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
III	Core Paper-I	17U1NMC1	Literary Forms & Terms	5	4
	Core Paper-II	17U1NMC2	Indian Writing in English-I	4	3
	Allied Paper- I	17U1NAC1	Social History of England	5	5
IV	Skill Based Elective Paper- I	17U1NSM1	Basic Communicative English	2	2
	EVS	17U1NES1	Environmental Studies	2	2

**SEMESTER-II**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
III	Core Paper-III	17U2NMC3	British Prose	5	4
	Core Paper-IV	17U2NMC4	Indian Writing in English-II	4	3
	Allied Paper- II	17U2NAC2	History of English Literature	5	5
IV	S.B.Elective Paper- II	17U2NSM2	Business English	2	2
	Value Education	17U2NVE1	Value Education	2	2

### SEMESTER-III

Part	Study components	Subject code	Title of the paper	Hours	Credit
III	Core Paper-V	17U3NMC5	British Poetry-I	5	4
	Core Paper-VI	17U3NMC6	Fiction-I	4	3
	Allied Paper- III	17U3NAC3	Sociological, Philosophical&Psych ological approaches in Literature	5	5
IV	S.B.Elective Paper- III	17U3NSM3	Computer Applications	2	2
	NME-I	17U3NNM1	English for Employability	2	2

### SEMESTER-IV

Part	Study components	Subject code	Title of the paper	Hours	Credit
III	Core Paper-VII	17U4NMC7	British Poetry-II	5	4
	Core Paper-VIII	17U4NMC8	Fiction-II	4	3
	Allied Paper- IV	17U4NAC4	Literature&Theatre	5	5
IV	S.B.Elective Paper- IV	17U4NSM4	Nature of Translation: Concepts and Theories	2	2
	NME-II	17U4NNM2	Soft Skills	2	2
V	Part V		Extension Activities		1

### SEMESTER-V

Part	Study components	Subject code	Title of the paper	Hours	Credit
III	Core Paper-IX	17U5NMC9	Literary Criticism	6	5
III	Core Paper-X	17U5NMC10	Shakespeare	5	4
III	Core Paper-XI	17U5NMC11	British Drama	5	4
III	Core Elective Paper-I	17U5NME1	English phonology	6	5
III	Core Elective Paper-II	17U5NME2	Short Stories	6	5
IV	Sill Based-Elective –V	17U5NSM5	Creative Writing	2	2

### SEMESTER-VI

Part	Study components	Subject code	Title of the paper	Hours	Credit
III	Core Paper-XII	17U6NMC12	New literatures in English	6	6
III	Core Paper-XIII	17U6NMC13	History of English Language	5	4
III	Core Paper-XIV	17U6NMC14	American literature	5	4
III	Core Elective Paper-III	17U6NME3	English language Teaching	6	5
III	Core Elective Paper-IV	17U6NME4	One Act Plays	6	5
IV	Sill Based-Elective -VI	17U6NSM6	Journalism	2	2

**DEPARTMENT OF ENGLISH –SYLLABUS FOR THE YEAR 2017 ONWARDS  
OVERALL CREDIT – 140/ TOTAL HOURS -180**

<b>B.A ENGLISH –SELF FINANCE CBCS – DISTRIBUTION OF CREDIT</b>							
<b>STUDY COMPONENTS</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>TOTAL CREDIT</b>
Tamil /Sanskrit/Hindi	3	3	3	3			12
English-Part-II	3	3	3	3			12
Core Paper	7	7	7	7	13	14	55
Allied Paper	5	5	5	5			20
Core -Elective Paper					10	10	20
NME			2	2			4
Skill based-elective	2	2	2	2	2	2	12
Environmental studies	2						2
Value Education		2					2
Extension activities				1			1

Course Code	Course Title	C	H	I	E	T
<b>17U1NMC1</b>	<b>LITERARY FORMS AND TERMS</b>	4	5	25	75	100

**UNIT-I Poetry** **15hrs**

1. Lyric, 2. Dramatic Monologue, 3. Sonnet, 4. Ballad, 5. Epic, 6. Satire, 7. Ode.

**UNIT-II Prose** **15hrs**

1. Biography 2. Autobiography 3. Travelogue.

**UNIT-III Drama** **15hrs**

1., One Act Play 2. Tragedy 3. Comedy 4. Farce 5. Melodrama 6. Chorus 7. Hamartia, 8. Verse Drama 9. Non Fiction

**UNIT-IV Short Story and Novel** **15hrs**

1. Plot, 2. Character 3. Setting 4. Narrative point of view 5. Bildungsroman, 6. Picturesque 7. Epistolary 8. Stream of Consciousness, 9. Novel of Social reality 10. Psychological novel 11. Historical Novel.

**UNIT-V** **15hrs**

Literary Appreciation in Practice.

Suggested Texts. for Analysis

- 1) Sonnet: John Milton - "On His Blindness"
- 2) Oscar Wilde – "Happy Prince"
- 3) Ode: John Keats – "Ode to Nightingale"

**Textbook**

1. Abrams, M.H. *A Glossary of Literary Terms* (8<sup>th</sup> Edition). New Delhi: Akash Press, 2001. Print.

**References:**

1. Baldick, Chris. *The Oxford Dictionary of Literary Terms*. Oxford: Oxford Univ., Press, 2001, Print.
2. Wimsatt and Brooks eds. *Literary Criticism: A Short History*. Oxford: Oxford Univ., Press, 2001, Print.
3. Selden, Widdowson and Brooker, ed. *A Reader's Guide to Contemporary Literary Theory*, 5th Edition Oxford: Oxford Univ., Press, 2001, Print.

Course Code	Course Title	C	H	I	E	T
17U1NMC2	INDIAN WRITING IN ENGLISH-I	3	4	25	75	100

### UNIT-I – CONCEPTS

12hrs

1. The Rise of English studies in India
2. Pre-Independence Fiction
3. The Partition as Portrayed in the novel and Short Story

### UNIT-II –POETRY

12hrs

1. A.K. Ramanujan – A River
2. Nissim Ezekiel – The Night of the Scorpion
3. Kamala Das – Krishna
4. Toru Dutt – The Broken Bell

### UNIT- III-PROSE

12hrs

1. Jawaharlal Nehru - The Glory has Departed
2. Rabindranath Tagore – Nationalism (Chapter 1 and 3 )

### UNIT- IV – DRAMA & SHORT STORY

12hrs

1. Vijay Tendulkar – Silence! The Court is in Session
2. R.K. Narayan – The Martyr’s Corner ( From Malgudi Days)

### UNIT-V – FICTION

12hrs

1. R.K. Narayan – The Guide
2. Mulk Raj Anand – Coolie

### Text Book:

Text books are listed in the syllabus itself

### References:

1. *Poetry Down the ages* Orient Blackswan Revised Edition
2. Saleem Peeradina. Ed. *Contemporary Indian Poetry in English*, Macmillan Publishers India Ltd.
3. Data, Amresh. 1994. *The Encyclopedia of Indian Literature*. New Delhi: Sahitya Academy.
4. Bharucha, Nilufer and Vilas Sarang (eds). 1994. *Indian English Fictio, 1980-90: An Assessment*. Delhi: B R Publishers.

Course Code	Course Title	C	H	I	E	T
17U1NSM1	BASIC COMMUNICATIVE ENGLISH	2	2	25	75	100

**UNIT-I** **6hrs**

Tenses- Present, Past and Future

**UNIT-II** **6hrs**

1. Unfamiliar words/Spelling Rules.

**UNIT-III** **6hrs**

1. Introducing oneself & Others.

**UNIT – IV** **6hrs**

1. Giving opinions/suggestions, Asking Permission, Giving Directions

**UNIT-V** **6hrs**

1. Expressions Emotions, Likes&Dislikes, Just a minute-(talk on current news, current issues).

**Text Book:**

1. Kumar Suresh E, P.Sreehari, J.Savithri: Communication skills and soft skills-An Intergrated Approach, Published by Darling Kindershey (India) pvt. Ltd., NewDelhi.

**References:**

1. Pillai Radhakrishnan. G. Emerald English Grammar & composition Emerald Publishers, Chennai.
2. Business Communication Techniques and Methods. Orient Black Swan. 2010 by OMP.Juneja & Aarati Mujundar.
3. A Communicative Grammar of English Geoffrey Leech & Jan svartvik.
4. A Practical English Grammar A.J. Thomson & A.V.Martinet.
5. Sadanand Kamlesh: Teaching Listening and Speaking, Orient Blackswan Private Winter Graphica Printers & Binders, Hyderabad.

Course Code	Course Title	C	H	I	E	T
<b>17U1NAC1</b>	<b>SOCIAL HISTORY OF ENGLAND</b>	5	5	25	75	100

**UNIT-I** **15hrs**

1.The early History of England 2.Introduction to Christianity 3.The Renaissance 4.The Reformation 5.The Dissolution of Monasteries 6. The East India Company

**UNIT-II** **15hrs**

1. Puritanism 2 Restoration of England 3.Coffee Houses- 4.The Union of England and Scotland

**UNIT-III** **15hrs**

1.The Agrarian Revolution 2. The Industrial Revolution 3.The Methodist Movement 4.Humanitarian Movement- 5.The American War of Independence 6.Effects of French Revolution

**UNIT-IV** **15hrs**

1.England at the beginning of Nineteenth Century 2.Victorian age- 3.The Reform Bills 4.The Development of Transport and Communication 5.The Development of Education in the nineteenth century

**UNIT-V** **15hrs**

1.The dawn of the twentieth century 2.The World Wars and Social Security 3.Means of Transport and communication 4.Trade Unionism 5.The Origin and Growth of Political Parties in England

**Text Book:**

1. A.G. Xavier: *An Introduction to the Social History of England* S. Viswanathan Pvt. Ltd.Chennai 2014, Print.

**References:**

1. G.M. Trevelyan: *The English Social History*, London Longmans Green&Co, New York 2011, print.

Course Code	Course Title	C	H	I	E	T
17U2NMC3	BRITISH PROSE	4	5	25	75	100

**UNIT-I** **15hrs**

1. Francis Bacon – Of Expenses, Of Parents and Children.
2. Addison and Steele – The Spectator Club-Will Wimble, Sir Roger and the Widow

**UNIT-II** **15hrs**

1. Samuel Johnson – Life of Gray
2. Authorised Version of the Bible-Chapter V of St. Mathew

**UNIT-III** **15hrs**

1. William Barclay – I Believe in God
2. Charles Lamb – My Relations

**UNIT-IV** **15hrs**

1. William Hazlitt – Julius Caesar
2. Thomas De Quincy – The Opium Eater

**UNIT\_V** **15hrs**

1. Newman- Knowledge Its Own End
2. R.L.Stevenson – On Falling in Love

**Text Book:**

Text books are listed in the syllabus itself

**References:**

1. Birch, Dinah, Ed. *The Oxford Companion to English Literature*. Oxford: OUP, 2009. Print.
2. Widdowson, Peter. *The Palgrave Guide to English Literature and its Contexts*. Hampshire: Palgrave Macmillan, 2004. Print.

Course Code	Course Title	C	H	I	E	T
17U2NMC4	INDIAN WRITING IN ENGLISH –II	3	4	25	75	100

### UNIT-I-CONCEPTS

12hrs

1. Women Fiction Writers 2. Dalit Fiction 3. Diasporic Fiction 4. The Post Modernist Indian English novel 5. Post Colonial Fiction

### UNIT-II-POETRY

12hrs

1. Jayanta Mahapatra – Grandfather
2. Arun Kolatkhar – Tejuri
3. G.S. Sharat Chandra – Family Mirrors

### UNIT-III-PROSE

12hrs

1. Salman Rushdie- The Riddle of Midnight India, August 1987. (Selections from Imaginary Homelands)
2. Kushwant Singh- The Way we Live ( A Selection from His Essays)

### UNIT-IV-DRAMA & SHORT STORIES

12hrs

1. Mahesh Dattani – Dance Like a Man.
2. Ruskin Bond – The Eyes Are Not Here.

### UNIT-V-FICTION

12hrs

1. Shashi Tharoor-Riot
2. Arundhati Roy- The God of Small Things

### Text Book:

Text books are listed in the syllabus itself

### References:

1. Srinivasa Iyengar K.R. 1962. *Indian Writing in English*. Delhi: Sterling Publishers Pvt Ltd.
2. Mukherjee, Meenakshi. 1985. *Realism and Reality: The Novel and Society in India*. Delhi: OUP.
3. B. N. Sahay, Ed. *New Horizons: A Verse Anthology*. Orient Longman (1986)

Course Code	Course Title	C	H	I	E	T
17U2NSM2	BUSINESS ENGLISH	2	2	25	75	100

**UNIT-I** **6hrs**

Remedial Grammar 1.Subject Verb Agreement 2.Concords

**UNIT-II** **6hrs**

Sentence Pattern. SV, SVO, SVIODO, SVC, SVA

**UNIT-III** **6hrs**

Idioms & Phrases.

**UNIT-IV** **6hrs**

1.Written Communication -Email-Letters-Faxes 2.Report Writing-Writing

CV Application and Career Skills

**UNIT-V** **6hrs**

1.Group Discussions 2.Facing Interview 3.Presentation Skills

**Text book(s):**

1. Kumar Suresh E, P.Sreehari, J.Savithri: *Communication skills and soft skills-An Intergrated Approach*, Published by Darling Kindershey(India)pvt.,Ltd. NewDelhi.
2. Pillai Radhakrishnan.G. Emerald English Grammar&composition Emerald Publishers., chennai

**References:**

1. Swan, Michael. *Practical English Usage*. NY: OUP, 2009.Print.
2. M.A. Pink & S E Thomas. *English Grammar, Composition and Effective Business Communication*. S.chandra & Company Ltd, NewDelhi.2002. Print.
3. Michael, Strumpt. *The Complete Grammar*. Goodwill Publishing House . Raymond Murphy: *Essential English Grammar*. Cambridge University Press.

Course Code	Course Title	C	H	I	E	T
17U2NAC2	HISTORY OF ENGLISH LITERATURE	5	5	25	75	100

### UNIT-I -THE AGE OF CHAUCER

15hrs

1.The Age of Chaucer 2.Life and Works in General 3.The Canterbury Tales 4.General Characteristics of Chaucer's Poetry 5.Poetry and Prose of 15<sup>th</sup> Century

### UNIT-II THE AGE OF SHAKESPEARE AND MILTON

15hrs

1. The Age of Shakespeare and Milton 2.Spencer and his Poetry 3.Other Poets from 1579-1625 4.The Play house of Shakespearean Time, Lyly & Bacon. 5. The Life of Milton-Earlier Poetry,- Prose 6.Later Poetry 7.Cowley & Metaphysical Poets and Prose

### UNIT-III-THE AGE OF DRYDEN AND POPE

15hrs

1.The Age and Life of Dryden Poetry 2.Rise of Modern Prose 3.Other Prose Writers of the Period 4.Prose and Drama of the Age of Dryden 5.The age and Life of Pope-Works 6.Other Poets & Prose Writers of the Period-Defoe-Swift-Addison & Steele

### UNIT-IV-THE AGE OF JOHNSON AND WORDSWORTH

15hrs

1.Life of Johnson- Historical Significance of the Novel 2.The Rival of Romance 3.The Growth of the Love of Nature in the Eighteenth Century Poetry 4.The Development of Naturalism. 5.The Age of Life of Wordsworth 6.The Lyrical Ballads and Wordsworth Theory of Poetry 7.The Younger Poets-Novel-Characteristics of Wordsworth Poetry-Coleridge-Scott-Byron-Shelley-Keats and other Poets 8. Prose Writers of his Age

### UNIT-V-THE AGE OF TENNYSON AND HARDY

15hrs

1.Life of Tennyson-Prose Writers and Poets of his Age-Novel 2.Life of Hardy-Poetry-Irish Drama and Poetry 3.Twentieth Century Novelist-T.S.Eliot and his contemporaries

### Text book:

- Hudson, *An Outline History of English Literature* .London;G.Bell,1913

### References:

- Crompton, Rickett.A. *History of English Literature*. London:T.C&E.C. Jack,1912
- Edward, Albert. *History of English Literature*
- Rees, R. J. Introduction to English Literature. London: Macmillan, 1966/ 1968.

Course Code	Course Title	C	H	I	E	T
<b>17U1NEK1</b>	<b>BUSINESS ENGLISH</b>	3	6	25	75	100

**Unit-I- Methods of Communication** **18hrs**

1. Verbal (written/oral)
2. Non-verbal: Facial expression, gestures, body language, silence, signs and symbols, graph charts and maps, colours.
3. Media and modes: Mail, telephone, telex, fax, posters.

**Unit-II- Interviews** **18hrs**

1. Types and techniques
2. Employment, Assessment, Grievance.
3. Exit, Under-stress interview.

**Unit-III-Public Relations** **18hrs**

1. Need and Importance
2. Communication for PR: House Organs: Bulletins, Newsletters: Press handouts.

**Unit-IV- Prose and Biography** **18hrs**

1. My Vision for India- A.P.J Abdul Kalam
2. The Best Investment I Ever Made- A.J Cronin
3. Marie Curie- Colin Swatridge.

**Unit-V- Poetry** **18hrs**

1. Where the Mind is Without Fear- Rabindranath Tagore
2. The Pulley- George Herbert
3. Wait Till the Majesty of Death- Emily Dickinson

**Text book(s):**

1. Board of Editors, Limelight-2 {An Anthology of Prose, Biography, Poetry} SSK Publishers & Distributors, Chennai.
2. Pariks J.P, Anshu Surve, Swarnabharathi, Asma Bahrainwala '*Business Communication-Basic concepts and Skills* Oriented Black Swan Pvt.Ltd,2011 Hyderabad

## References:

1. Dhanavel S.P English and Soft Skills, Hydrabad.
  - a. Orient Black Swan, 2010, print.
2. Board of Editors, Limelight-2 {An Anthology of Prose, Biography, Poetry, short Story  
a. and One Act Plays} SSK Publishers & Distributers , Chennai.
3. Mascull Bill, Business Vocabulary in use, Cambridge Univ.Press, 2004.
4. Sparle David&Geoffrey Harris Practical Newspaper Reporting, Sage Smth Asia Edition  
publish in 2012 New Delhi.
5. Sundaram Bagavathi C. Dr. “*Corporate Communicative*” New Century Book House (P)  
Ltd. Chennai.

Course Code	Course Title	C	H	I	E	T
<b>17U2NEK1</b>	<b>BUSINESS ENGLISH</b>	3	6	25	75	100

**Unit-I** Written Communication: **18hrs**

1. Need and Importance.
2. Essential of Good written Communication.
3. Letter Writing: Parts of letter, Forms of layouts, Stationary & get-up letters.

**Unit-II** 1. Report Writing **18hrs**

- Investigation Report
- Survey Reports
- Inspection Reports.
2. Reading News items.
3. Reading and responding to advertisement.

**Unit-III** Drafting of Notice of a Meeting **18hrs**

1. Preparation of Agenda.
2. Various types of Resolutions of meeting of companies & other bodies.
3. Drafting of Speeches: Welcome& Introduction, Inaugural, Send-off, and Condolence.

**Unit-IV** Short Story **18hrs**

1. The Necklace- Guy de Maupassant
2. Little Girls are Wiser than Men- Leo Tolstoy
3. An Astrologer's Day- R.K Narayan.

**Unit-V** One-Act Plays **18hrs**

1. The Bishops Candlesticks – Norman Mcklnnel
2. A meeting in a Forest – G.B Shaw
3. The Trial of Billy Scott – Mazie Hall

**Text book(s):**

1. Board of Editors, Limelight-2 {An Anthology of short Story and One Act Plays} SSK Publishers & Distributers, Chennai.
2. Spark David & Geoffrey Harris Practical Newspaper Reporting, Sage smith Asia Edition Publish in 2012 in New Delhi

**References:**

1. Gangal, J.K. Writing Skills, New Delhi. PHI Learning, 2011. Print
2. Mascull Bill, Business Vocabulary in Use, Cambridge University press 2004
3. Parikh J.P, Anushu Surve, Swarna bharathi Asma Bahrain Wala Business communication – Basic concepts and skills Orient Black Swan pvt., Ltd, 2011 Hyderabad

## COMMON QUESTION PAPER PATTERN

### INTERNAL ASSESMENT

Test: 15 marks + Assignment: 5 marks + Attendance: 5 marks = Total : 25 marks

15 –Two tests are to be conducted

5 – Assignment / quiz / seminar / field trip / verbal test

5 – Attendance

### SUMMATIVE EXAMINATION

Under CBCS Pattern

Duration: 3 hrs

Max.Marks: 75

Part - A (Answer all)

10 X 1 = 10

(All objective type questions) - two questions from each unit

Part – B (Answer all)

5 X 7 = 35

(Either or pattern - one pair question from each unit)

Part – C (Answer any three of five)

3 X 10 = 30

(Open choice - one question from each unit)

## **Certificate course in Spoken English**

In today's world, the significance of English cannot be denied as it is the most commonly used language worldwide. English plays a major role in most sectors including medicine, engineering, and education. So, learning English becomes more pertinent to display and establish the intellect globally. Most of the young aspirants, though educated, hesitate to speak English in the public because of their poor Communication and Pronunciation skills.

In this connection there is a need to train the students to equip themselves with the necessary skills required for effective communication in English thereby enabling them to get a good placement immediately after the completion of their courses.

The following curriculum is designed to meet the objectives of developing proficiency in English communication skills, Vocabulary, reading and pronunciation Skills of students & to help them to speak English fluently and confidently, whether it is for social interaction, education or for professional developments.

### **Objectives:**

- ✓ To make the students feel comfortable in understanding, and speaking in English
- ✓ To help the students acquire fundamental knowledge of grammar and its functions
- ✓ To enable the students to communicate fluently & enhance their vocabulary skills

**Duration: 30 hours**

**Code: 17C1NSE1**

**UNIT – I**

10hrs

Vocabulary & Grammar

- The Importance of English -Amazing facts of English-
- Synonyms, Antonyms
- Parts of speech
- Sentence Structures
- Word Substitution
- Dictionary & its usage
- Learning new words through newspaper
- Words often confused

**UNIT-II**

10 hrs

Reading skills

- Reading for information
- Application of scanning and skimming
- Silent and loud reading -advantages and disadvantages
- Introducing students to different text types
- Reading Fairy Tales, story books
- Reading Practice

**UNIT -III**

10hrs

Speaking Skills

- Greeting / Introducing oneself, introducing a friend to another friend
- Breaking off a conversation politely, leave-taking
- Making and responding to inquiries /request
- Expressing an opinion, agreement/ disagreement,
- Expressing emotions -pleasure, sorrow, regret, surprise, admiration etc.
- Narrating or reporting an event

Using English in Real Life Situation

- |                                             |                                         |
|---------------------------------------------|-----------------------------------------|
| 1] At the Bank/ post office/ College office | 2] At the Green Grocer                  |
| 3] At the Temple                            | 4] At the College Canteen or Restaurant |
| 5] At the Police station                    | 6] At the Railway Station/ Bus Station  |
| 7] At the Medical Shop                      | 8] At the Library                       |
| 9] Booking a Room in a Hotel                | 10] At the Travel Agency                |

## References:

1. V. Syamala, 2002. *Effective English Communication for you*. Emerald Publishers, Chennai.
2. Prasad P. *The Functional Aspects of Communication Skills*. New Delhi: S K Kataria & Sons, 2014. Print
3. Boyer, Susan. *Understanding Spoken English a Focus on Everyday Language in Context*. Boyer Educational Resources, 2003. Print
4. Sasikumar.V and P.V. Dhamija. 1993. *Spoken English: A Self-Learning Guide to Conversation Practice*. 34<sup>th</sup> Reprint. Tata McGraw-Hill. New Delhi

### Question Paper Format

- |      |                                                       |           |
|------|-------------------------------------------------------|-----------|
| I.   | Objective type question (Grammar and Vocabulary) (25) | (1x25=25) |
| II.  | Short Paragraph                                       | (5x5=25)  |
| III. | Reading                                               | (1x10=10) |
| IV.  | Speaking                                              | (1x15=15) |

## **Certificate course in Soft Skills**

In today's competitive world sharpening ones soft skills has become very imperative.

Many Students, despite possessing sound domain knowledge along with technical capability & academic competence find that they are not preferred for jobs due to their inadequacy of communication skills and soft skills.

Keeping in view their pre-employment needs and career requirements, this course on soft Skills is designed to prepare students to adapt themselves with ease to face the requirement of Industry. The course will equip the students with the necessary skills that would go a long way in helping them in their profession & personal life in this ever changing complex world.

### **Objectives**

- ✓ To develop self-esteem and inculcate leadership traits.
- ✓ To enhance and build up confidence, enthusiasm and relationships.
- ✓ To develop an overall winning and pleasing personality
- ✓ To Be Proactive & Responsible
- ✓ To be motivated & groomed with good values & attitude

**Duration - 30 hrs**

**17C1NSS1**

**Unit-I**

8 hrs

*Know yourself*

- Self Awareness

*My possessions*

- Self-esteem
- self confidence

*Get set Go!*

- Goal setting
- Dreams Actions

*Power of words*

- Communication skills
- Verbal & Nonverbal

**Unit-II**

8 hrs

*People the biggest asset*

- Team work
- Cooperation & coordination

*You the busy bee*

- Time management
- Proactive & procrastination

*Zap your Emotions*

- Managing your emotions
- Anger & stress

**Unit-III**

14 hrs

*Future is yours*

- Leadership
- Decision Making
- Problem Solving
- Negotiation Skills
- Group Discussions
- Job Interviews
- Identifying job openings
- Preparing Resumes , Covering Letter

### Reference books

- The 7 Habits of Highly Effective People, By Stephen R. Covey Published November 9th 2004 by Free Press (first published August 15th 1989)
- "You Can Win", Shiv Khera, Macmillan Books, Revised Edition, 2003
- "Success Through Soft Skills", G. Ravindran, S.P. Benjamin Elango and L. Arockiam, ICT, 2007
- "Communication Soft Skills for Professional Excellence", F Thamburaj, Grace Publisher, First Edition, 2009.

### Question Paper Format

I.	Objective type question (25)	1x25=25
II.	Short Paragraph	5x5=25
III.	Essay (15)	1x15=15
IV.	Mock Interview (10)	1x10=10

**M.A-ENGLISH**  
**SYLLABUS FOR THE YEAR 2017 ONWARDS**

**SEMESTER-I**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
<b>III</b>	Core Paper-1	<b>17P1NMC1</b>	MODERN LITERATURE-I	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-2	<b>17P1NMC2</b>	MODERN LITERATURE-II	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-3	<b>17P1NMC3</b>	A SURVEY OF BRITISH LITERATURE	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-4	<b>17P1NMC4</b>	AMERICAN LITERATURE	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-5	<b>17P1NMC5</b>	INDIAN WRITING IN ENGLISH	<b>6</b>	<b>4</b>

**SEMESTER-II**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
<b>III</b>	Core Paper-6	<b>17P2NMC6</b>	MODERN LITERATURE-III	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-7	<b>17P2NMC7</b>	MODERN LITERATURE-IV	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-8	<b>17P2NMC8</b>	20thCENTURY CANADIAN LITERATURE	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-9	<b>17P2NMC9</b>	NEW LITERATURE IN ENGLISH	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-10	<b>17P2NMC10</b>	SHAKESPEARE	<b>6</b>	<b>4</b>

**SEMESTER-III**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
<b>III</b>	Core Paper-11	<b>17P3NMC11</b>	CONTINENTAL LITERATURE	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-12	<b>17P3NMC12</b>	INDIAN REGIONAL LITERATURE IN TRANSLATION	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-13	<b>17P3NMC13</b>	LANGUAGE AND LITERATURE	<b>6</b>	<b>4</b>
<b>III</b>	Core Paper-14	<b>17P3NMC14</b>	LITERATURE BY WOMEN	<b>6</b>	<b>4</b>
<b>III</b>	CORE ELECTIVE-1	<b>17P3NMC1</b>	ENGLISH LANGUAGE TEACHING	<b>6</b>	<b>4</b>
<b>IV</b>	NON MAJOR ELECTIVE	<b>17P3NNM1</b>	ENGLISH FOR FORMAL WRITING	<b>4</b>	<b>4</b>

**SEMESTER-IV**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>	<b>Credit</b>
<b>III</b>	Core Paper-15	<b>17P4NMC15</b>	LITERARY CRITICISM	<b>6</b>	<b>5</b>
<b>III</b>	Core Paper-16	<b>17P4NMC16</b>	RESEARCH WRITING	<b>6</b>	<b>5</b>
<b>III</b>	Core Paper-17	<b>17P4NMC17</b>	COMPARATIVE LITERATURE	<b>6</b>	<b>5</b>
<b>III</b>	Core Elective-2	<b>17P4NME2</b>	INTRODUCTION TO JOURNALISM	<b>6</b>	<b>5</b>
<b>III</b>	Core Elective-3	<b>17P4NME3</b>	AN INTRODUCTION TO THEORY AND PRACTICE OF TRANSLATION	<b>6</b>	<b>5</b>

Course Code	Course Title	C	H	I	E	T
17P1NMC1	MODERN LITERATURE -I	4	6	25	75	100

**Unit 1 Poetry I** **18hrs**

1. Edmund Spenser: Prothalamion
2. Andrew Marwell: To His Coy Mistress
3. Pope: Epistle to Dr. Arbuthnot (The Atticus Passage)
4. Donne: Death be not Proud, Valediction Forbidding Mourning

**Unit II Poetry II** **18hrs**

1. John Milton : Lycidas
2. Shakespeare : Sonnet No 1, 18.
3. Herbert : The Pulley
4. Sidney : My mouth doth water, and my breast doth swell

**Unit III Drama I** **18hrs**

- 1.Christopher Marlowe : Dr. Faustus
- 2.Webster : The Duchess of Malfi

**Unit IV Drama II** **18hrs**

- 1.Ben Johnson : Volpone or the Fox
- 2.Sheridan : The School for Scandal

**Unit V Prose** **18hrs**

- 1.Francis Bacon : Of Studies, Of Truth, Of Marriage and Single Life, Of Death
- 2.The Bible: Book of Job

The textbooks for this course are listed in the syllabus.

**Reference Books:**

Hammond .G ed. *Elizabethan Poetry: Lyrical and Narrative*. London, 1984. Casebook Series.

Bennett, Joan. *Five Metaphysical Poets*. London Cambridge University Press, 1974. Reprint.

Course Code	Course Title	C	H	I	E	T
17P1NMC2	MODERN LITERATURE II	4	6	25	75	100

### Unit I Poetry

18hrs

1. John Dryden : Mac Flecknoe
2. William Wordsworth : Tintern Abbey
3. Shelley : Ode to the West Wind
4. William Blake : The Tiger

### Unit II Prose

18hrs

1. Samuel Johnson : Life of Milton
2. Edward Gibbon : Memoirs of my Life and Writings.
3. Oliver Goldsmith: 'Man in Black' 'Citizen of the World'
4. Hazlitt: My First Acquaintance with Poets, On Reading Old Books.
5. Lamb : Dream Children

### Unit III Drama

18hrs

1. Goldsmith: She Stoops to Conquer

### Unit IV Fiction I

18hrs

1. Sir Walter Scott: The Bride of Lammermoor

### Unit V Fiction II

18hrs

1. Jane Austen: Pride and Prejudice

The text books for this course are listed in the syllabus.

### Reference:

*The Oxford Anthology of English Literature*. London. 1990. OUP

Course Code	Course Title	C	H	I	E	T
<b>17P1NMC3</b>	<b>A SURVEY OF BRITISH LITERATURE</b>	4	6	25	75	100

**Unit I Before and After Chaucer** **18hrs**

1. English literature before Chaucer
  - The Age of Chaucer
  - Chaucer to Tottel's Miscellany
2. The Development of the Drama to Gorboduc
  - The Renaissance and the Reformation

**Unit II Shakespeare to Milton** **18hrs**

1. The Age of Shakespeare- Non-Dramatic Verse, Drama, Prose
  - The Age of Milton- Milton and Other poets and prose writers
2. Religious conflict and the Parliamentary conflict, Civil War.

**Unit III Dryden to Johnson** **18hrs**

1. The Age of Dryden – Prose, Drama
  - The Age of Pope – Verse, prose and the Drama
2. The Age of Johnson – Prose, Novel, Verse
  - The Development of the Coffee Houses and other influences.

**Unit IV Wordsworth to Tennyson** **18hrs**

1. The Age of Wordsworth – The Older Poets, The Younger Poets. General Prose, The Novel.
  - The Age of Tennyson – Verse, General Prose, The Novel.
2. The French Revolution and its Impact
  - Development of Education in the Victorian England

**Unit V Thomas Hardy to the Present Age** **18hrs**

1. The Age of Hardy – The Eighteen – Nineties, Thomas Hardy, Poets of the Transition, the Revival of Poetry, Dramatists of the Transition, Other playwrights, Novelists of the Transition, Twentieth Century Novelists.
  - The Present Age- G.M.Hopkins, T.S.Eliot and others.
  - The Changing Novel – Prose, Drama, Miscellaneous Prose.
  - Kitchen- Sink Drama, Samuel Beckett, Edward Albee, Robert Bolt.
  - Tom Stoppard--Movement Poets. Dylan Thomas- Philip Larkin.
  - Donald Davie.
  - Writing in Formal Colonies, African, Indian and Carribean.
2. The World Wars and Social Security
  - Trade Unions in England.
  - Contemporary Life in England.

**Text Book(s):**

1. Long William J. *English Literature: Its History and its Significance*, Kalyani Publishers, New Delhi 1977. Reprint.
2. Hudson, W.H. *An Outline History of English Literature*, B.I Publications Pvt. Ltd, Bombay, 1961. Print.
3. Trevelyan G.M. *Social History of England*.
4. Xavier A.G *An Introduction to the Social History of England*, S. Viswanathan (Printers &) Pvt. Ltd. 2005 Print.
5. Ashok Padmaja *The Social History of England*. Orient Blackswan.

Course Code	Course Title	C	H	I	E	T
17P1NMC4	AMERICAN LITERATURE	4	6	25	75	100

**Unit I Theory** **18hrs**

- |                    |                                          |
|--------------------|------------------------------------------|
| 1. John Macy       | Characteristics (of American Literature) |
| 2. Edgar Allan Poe | The Philosophy of Composition            |

**Unit II Poetry** **18hrs**

- |                        |                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------|
| 1. Ralph Waldo Emerson | Each and All                                                                                         |
| 2. Emily Dickinson     | 1. "Faith" is a fine invention<br>2. I'm "wife"- I've finished that<br>3. A bird, came down the walk |
| 3. Robert Frost        | Death of the Hired Man                                                                               |
| 4. Langston Hughes     | Mother to Son                                                                                        |
| 5. Gwendolyn Brooks    | The Mother                                                                                           |
| 6. Jean Toomer         | From <i>Cane: Karintha</i>                                                                           |

**Unit III Prose** **18hrs**

- |                        |                                                            |
|------------------------|------------------------------------------------------------|
| 1. Henry David Thoreau | Essay on Civil Disobedience                                |
| 2. Martin Luther King  | I have a Dream                                             |
| 3. Barack Obama        | Keynote Address at the 2004 Democratic National Convention |

**Unit IV Fiction** **18hrs**

- |                          |                              |
|--------------------------|------------------------------|
| 1. Ernest Hemingway      | The Old Man and Sea          |
| 2. Richard Wright        | The Man who was Almost a Man |
| 3. William Melvin Kelley | The Dentist's Wife           |

**Unit V Drama** **18hrs**

- |                              |                                |
|------------------------------|--------------------------------|
| 1. Edward Albee              | Who's Afraid of Virginia Woolf |
| 2. Lorraine Vivian Hansberry | A Raisin in the Sun            |

**Textbook:**

Texts are taken from *The Norton Anthology of American Literature* 8<sup>th</sup> Edition and other web sources.

**References:**

Massa, Ann. *American Literature in Context IV (1900-1930)*. London: Methuen, 1982. Print.  
Spiller, Robert E. and William Throp, eds. *Literary History of United States*. New Delhi: Amerind, 1963. Print.

Course Code	Course Title	C	H	I	E	T
<b>17P1NMC5</b>	<b>INDIAN WRITING IN ENGLISH</b>	4	6	25	75	100

### **Unit I Poetry**

**18hrs**

- 1.Sarojini Naidu : Village Song
2. R. Parthasarathy : Home Coming
- 3.Toru Dutt : Lakshman
- 4.Kamala Das: My Grandmother's House
- 5.Jayanta Mahapatra : Indian Summer  
A Missing Person

### **Unit II Prose**

**18hrs**

- 1.Jawaharlal Nehru : Discovery of India : The Old Indian Theatre, Raja Ram Mohan Roy
- 2.Ananda Coomaraswamy : The Dance of Siva
- 3.S.Radhakrishnan : Indian Religious Thought
- 4.Pran Neville : Lahore: A Sentimental Journey. Chapters- Introduction, Shopping in Anarkali, Picnics and Outings.
5. Sri Aurobindo: The Greatness of Indian Literature,The Indian Civilization and Culture
- 6.Nirad C. Chaudhuri : An Autobiography of an Unknown Indian (Book III, Education)
- 7.Vivekananda: Lecture from Colombo to Almora: Addresses at Ramnad, Paramakudi, Manamadurai and Madurai.
- 8.S.Gopal: Tagore and our Times
- 9.Raja Rao: The Meaning of India
- 10.Swami Ranganathananda : Our Cultural Heritage and the Modern Challenge Ethical and Spiritual Values
- 11.Ramachandra Guha : On C. Rajagopalachari (in Oct 29, 31 and Nov 2, 2014 issues of the Swarajya Magazine)

### **Unit III Drama**

**18hrs**

- 1.Vijay Tendulkar : Silence, the Court is in Session.
- 2.Tagore: Chitra

### **Unit IV Fiction**

**18hrs**

- 1.R.K.Narayan : The English Teacher
- 2.Salman Rushdie: Midnight's Children

### **Unit V Short Fiction**

**18hrs**

- 1.Ruskin Bond: My Father's Trees in Dehra
- 2.Mulk Raj Anand : The Liar

Study materials for this course will be prepared by the department.

Course Code	Course Title	C	H	I	E	T
<b>17P2NMC6</b>	<b>MODERN LITERATURE – III</b>	4	6	25	75	100

### **Unit I Poetry**

**18hrs**

1. Tennyson : Ulysses
2. Browning : Grammarian's Funeral
3. Mathew Arnold : Dover Beach
4. G.M. Hopkins: The Windhover

### **Unit II Prose**

**18hrs**

1. John Ruskin ; Sesame and Lilies
2. Carlyle ; The French Revolution (pp3-17)

Heroes and Hero Worship: The Hero As a Man of Letters, The Hero As a Poet

3. John Stuart Mill : From Autobiography- Chapters I&II

### **Unit III Drama**

**18hrs**

1. Oscar Wilde: the Important of Being Earnest

### **Unit IV Fiction I**

**18hrs**

1. Charles Dickens: Hard Times

### **Unit V Fiction II**

**18hrs**

1. Thomas Hardy: Mayor of Casterbridge

The textbooks for this course are listed in the syllabus

### **Reference Book:**

Kermode, Franked. *The Oxford Anthology of English Literature*. London. 1990. OUP.

Course Code	Course Title	C	H	I	E	T
<b>17P2NMC7</b>	<b>MODERN LITERATURE – IV</b>	4	6	25	75	100

**Unit I Poem I**

**18hrs**

- 1.W.B. Yeats : Sailing to Byzantium
- 2.T.S.Eliot : The Journey of the Magi
- 3.W.H.Auden : Musee de Beaux Arts

**Unit II Poem II**

**18hrs**

- 1.Philips Larkin; Church Going
- 2.Ted Hughes : View of a Pig
- 3.Seamus Heaney: Digging

**Unit III Prose**

**18hrs**

- 1.Somerset Maugham: After reading Burke
- 2.Arnold Toynbee: The Relativity of Historical Thought
- 3.Bertrand Rusell : The Aims of Education,  
The Functions of a Teacher
- 4.Will Durant: Life of Greece: The Zenith of Philosophy

**Unit IV Drama**

**18hrs**

- 1.G.B.Shaw: Arms and the Man
- 2.T.S.Eliot : Murder in the Cathedral

**Unit V Fiction**

**18hrs**

- 1.James Joyce : Portrait of the Artist as a Young Man
- 2.George Orwell : Animal Farm

The study materials for this course will be prepared by the department.

Course Code	Course Title	C	H	I	E	T
<b>17P2NMC8</b>	<b>20<sup>th</sup> CENTURY CANADIAN LITERATURE</b>	4	6	25	75	100

**Unit I Theory** **18hrs**

- |                     |                                     |
|---------------------|-------------------------------------|
| 1. Northrop Frye    | Preface to an Uncollected Anthology |
| 2. Neil Bissoondath | The Limits of Diversity             |

**Unit II Poetry** **18hrs**

- |                        |                                     |
|------------------------|-------------------------------------|
| 1. E.J. Pratt          | Silences                            |
| 2. Wilfred Campbell    | Winter Lakes                        |
| 3. A.J.M. Smith        | The Lonely Land                     |
| 4. A.M. Klein          | Portrait of the Poet as a Landscape |
| 5. Dorothy Livesay     | Ballad of Me                        |
| 6. Jeannette Armstrong | Indian Woman                        |
| 7. P.K. Page           | Stories of Snow                     |

**Unit III Prose** **18hrs**

- |                    |                                                     |
|--------------------|-----------------------------------------------------|
| 1. Margaret Atwood | “Survival” from <i>Survival</i>                     |
| 2. Emily Carr      | “Lecture on Totems” from <i>Opposite Contraries</i> |

**Unit IV Fiction** **18hrs**

- |                      |                                                                             |
|----------------------|-----------------------------------------------------------------------------|
| 1. Margaret Laurence | <i>A Bird in the House</i>                                                  |
| 2. Stephen Leacock   | “The Hostelery of Mr. Smith” from <i>Sunshine Sketches of a Little town</i> |
| 3. Alice Munro       | “The Flats Road” from <i>Lives of Girls and Women</i>                       |
| 4. Cyril Dabydeen    | “Deconstructing Castro” from <i>North of the Equator</i>                    |

**Unit V Drama** **18hrs**

- |                   |                     |
|-------------------|---------------------|
| 1. George Ryga    | Ecstasy of Rita Joe |
| 2. Michael Haeley | The Drawer Boy      |

**Textbook(s):**

All texts are drawn from several books and anthologies.

**References:**

New, W.H. *A History of Canadian Literature*.

Toye, William. *The Oxford Companion to Canadian Literature*.

Frye, Northrop. *The Bush Garden*.

Twigg, Alan. *Strong Voices. Conversations with 50 Canadian Authors*.

Course Code	Course Title	C	H	I	E	T
<b>17P2NMC9</b>	<b>NEW LITERATURE IN ENGLISH</b>	4	6	25	75	100

**Unit I** **18hrs**

- 1.Nelson Mandela : Long Walk to Freedom “ A Country Childhood”
- 2.Chinua Achebe : The Novelist as Teacher

**Unit II** **18hrs**

1. Wole Soyinka : The Lion and the Jewel

**Unit III** **18hrs**

- 1.Bernard B.Dadie: I Thank You God
- 2.Dennis Brutus: A Common Hate Enriched Our Love and Us
- 3.Gabriel Okara: Once Upon A Time
- 4.David Rubadiri: A Negro Labourer in Liverpool
- 5.Chinua Achebe: Refugee Mother and Child
- 6.Derek Walcott : A Far Cry from Africa
- 7.Mervyn Morris: Literary Evening, Jamaica
- 8.Shirley Lim: Words for Father
9. Muhammad Haji Salleh: Blood
- 10.Kirpal Singh: To a Visitor to Singapore
- 11.Kamala Wijerante: To a Student
- 12.Katherine Mansfield: The Man with the Wooden Leg
- 13.Faiz Ahmed Faiz: Nowhere, no Trace can I Discover
- 14.Razia Khan: My Daughter’s Boy Friend
- 15.A.D. Hope : Australia

**Unit IV** **18hrs**

- 1.V.S.Naipaul : A Bend in the River
- 2.Nadine Gordiner : My Son’s Story

**Unit V** **18hrs**

- 1.Bapsi Sidhwa : Ice Candyman

The study materials for this course are listed in the syllabus

Course Code	Course Title	C	H	I	E	T
<b>17P2NMC10</b>	<b>SHAKESPEARE</b>	4	6	25	75	100

**Unit I** **18hrs**

- 1.General Shakespeare: Shakespearean Theatre,
- 2.Classification of Shakespeare’s Plays, Sources

**Unit II** **18hrs**

- 1.Romantic Comedy: Twelfth Night

**Unit III** **18hrs**

- 1.Roman Play: Julius Caesar

**Unit IV** **18hrs**

- 1.Tragedy: Macbeth

**Unit V** **18hrs**

- 1.Last Play: The Tempest
- 2.A.C Bradley : Shakespearean Tragedy. Lecture on Othello.
- 3.Wilson Knight : The Wheel of Fire: Interpretations of Shakespearean Tragedy
- 4.Lecture on Hamlet, Macbeth.
- 5.Harold Bloom : Shakespeare- Centre of the Canon

The textbooks prescribed for this course are listed in the syllabus

Course Code	Course Title	C	H	I	E	T
<b>17P3NMC11</b>	<b>CONTINENTAL LITERATURE</b>	4	6	25	75	100

### **Unit I Poetry**

**18hrs**

1. Virgil - The Aenied (The episode of Aeneas and Dido-Book IV and their meeting in the underworld in Book V) (Latin)
2. Dante Alighieri – The Divine Comedy (Paradise Cantos 1, 2, 3) (Italian)
3. Rilke – The Book of Pictures- Autumn Day, Evening. (German)

### **Unit II Prose**

**18hrs**

1. Michel de Montaigne - Of Books(French)
2. Albert Camus - ‘ The Myth of Sisyphus’ (French)
3. Jean Paul Sartre- ‘What is Literature’ (French)

### **Unit III Drama**

**18hrs**

1. Henrik Ibsen- A Doll’s House (Norwegian)
2. August Strindberg - A Dream Play (Swedish)
3. Luigi Pirandello -Six Characters in Search of An Author (Italian)

### **Unit IV Fiction**

**18hrs**

1. Milan Kundera – The Book of Laughter and Forgetting (Czech)
2. Italo Calvino –Invisible Cities (Italian)

### **Unit V Short Fiction**

**18hrs**

1. Leo Tolstoy – Death of Ivan Ilyich (Russian)
2. Fyodor Dostoyevsky – White Nights (Russian)

The textbooks prescribed for this course are listed in the syllabus

Course Code	Course Title	C	H	I	E	T
17P3NMC12	INDIAN REGIONAL LITERATURE IN TRANSLATION	4	6	25	75	100

### Unit I Poetry

18hrs

- 1.V.Indira Bhavani : Avatars (Tamil)
- 2.Keetaki Kushari Dyson: After the Rain has ended (Bengali)
- 3.S.Usha : To Mother (Kannada)
- 4.Ilango Atikal: The Cilappatikaram (The Tale of an Anklet) (Tamil), The Book of Madurai, Cantos 11 and 21.

### Unit II: Prose

18hrs

- 1.S. Vaiyapuri Pillai : Bharathi as seen by me (Tamil)
- 2.Sri Aurobindo : Tales of Prison life (Bengali)
- 3.M.K Gandhi : The Story of My Experiments with Truth (Gujarati). Chapters- Preparation for England, Playing the English Gentleman.
- 4.Dr. Ambedkar : Speech at Mahad (Marathi)

### Unit III: Drama

18hrs

- 1.Kalidasa : Abhijnanasakunthalam (Sanskrit)
- 2.Na. Muthusami: Kattiyakkaran (Tamil)

### Unit IV: Fiction

18hrs

- 1.Sivasankari : Bridges (Tamil)
- 2.Bhisham Sahini : Tamas (Hindi)

### Unit V: Short Fiction

18hrs

- 1.Bandhumadhav: The Poisoned Bread (Marathi)
- 2.Jayakanthan : Trial by Fire (Tamil)
- 3.Saadat Hasan Manto : A Tale of 1947(Urdu)
- 4.MT Vasudevan Nair : Kuttiedathi (Malayalam)
- 5.Pudumaippittan: The Human Machine (Tamil)

The study materials for this course will be prepared by the department.

Course Code	Course Title	C	H	I	E	T
17P3NMC13	LANGUAGE AND LINGUISTICS	4	6	25	75	100

**Unit I Origin of English Language and its development 18hrs**

1.The Indo-European Family of languages 2. English in the Germanic 3. Old English 4. Standard English 5.Modern English 6. American English 7.Indian English 8. e- English.

**Unit II Phonetics 18hrs**

1.Articulatory Phonetics 2. Auditory Phonetics 3. Acoustic Phonetics 4. The Air Stream Process, 5.Organs of speech 6.Active articulators and Passive articulators 7. Description of speech sounds: Vowels, Diphthongs and Consonants.

**Unit III Morphology 18hrs**

1.Words and word-formation processes: Etymology, Coinage, Borrowing, Compounding, Blending, Clipping, Backformation, Conversion, Acronyms, Derivation, Prefixes and suffixes, Infixes and Multiple Processes. 2.Morphology, Morphemes, Free and bound morphemes, Lexical and functional morphemes, Derivational and inflectional morphemes, Morphs and allomorphs.

**Unit IV Syntax 18hrs**

1.Traditional Grammar (TG) 2. Immediate Constituent analysis (IC) 3. Labeling: Phrase Structure Grammar (PSG) 4.Transformational Generative Grammar (TG).

**Unit V Semantics 18hrs**

1.What is semantics? Synonymy, Antonym, Hyponymy, Prototypes, Homophones and homonyms, Polysemy, Word play, Metonymy, Collocation, 2.Semantic changes. Dialect, Idiolect, Register, Jargon, and Slang.

**Reference Books**

1. Lyons, J. *Language and Linguistics*, Cambridge University Press, 1981. Print.
2. Brown G. & Yule, G. *Discourse Analysis*, Cambridge University Press, 1983.Print.
3. Aitchison, J. *Language Change: Progress or Decay*, 2<sup>nd</sup> edition, Cambridge University Press, 1991.Print.
4. Verma, S.K. & N. Krishnaswamy *Modern Linguistics—An Introduction* Oxford University Press, 1989. Print.
5. Wrenn,C.L. *The English Language*. Delhi:AITBS Publishers, 2013.Print.
6. Tarni Prasad. *A course in Linguistics*, New Delhi: PHI, 2008. Print.
7. Pushpinder Syal & D.V. Jindal. *An Introduction to Linguistics* New Delhi: PHI, 2014. Print.
8. Aslam, Mohammad & Aadil Amin Kak. *Introduction to English Phonetic and Phonology*. New Delhi: Foundation books, 2011. Print.

Course Code	Course Title	C	H	I	E	T
<b>17P3NMC14</b>	<b>LITERATURE BY WOMEN</b>	4	6	25	75	100

**Unit I Theory** **18hrs**

- |                      |                                                                 |
|----------------------|-----------------------------------------------------------------|
| 1.Toril Moi          | Feminist, Female, Feminine                                      |
| 2.Greta Claire Gaard | Ecofeminism on the Wing: Perspectives on Human-Animal Relations |

**Unit II Poetry** **18hrs**

- |                           |                                            |
|---------------------------|--------------------------------------------|
| 1.Anne Spencer            | Letter to my Sister                        |
| 2.Anna Wickham            | The Affinity                               |
| 3.Edna St. Vincent Millay | [The Courage that my mother had]           |
| 4.Dorothy Parker          | From <i>A Pig's Eye View of Literature</i> |
| 5.Elizabeth Bishop        | The Fish                                   |
| 6.Judith Wright           | Eve to her daughters                       |
| 7.Sylvia Plath            | Daddy                                      |

**Unit III Prose** **18hrs**

- |                      |                                                                                                    |
|----------------------|----------------------------------------------------------------------------------------------------|
| 1.Zora Neale Hurston | How It feels to be Colored Me                                                                      |
| 2.Maya Angelou       | “The Peckerwood Dentist and Momma’s Incredible Powers” from <i>I know why the caged bird sings</i> |

**Unit IV Fiction** **18hrs**

- |                        |                        |
|------------------------|------------------------|
| 1.Elizabeth Bowen      | The Demon Lover        |
| 2.Bessie Head          | Snapshots of a Wedding |
| 3.Maxine Hong Kingston | No Name Woman          |
| 4.Temsula Ao           | Death of the Hunter    |

**Unit V Drama** **18hrs**

- |                     |                      |
|---------------------|----------------------|
| 1.Toni Morrison     | A Mercy              |
| 2.Clare Boothe Luce | Slam the Door Softly |

**Textbook:**

Texts are taken from the following book and other sources  
 Gilbert, Sandra M. and Susan Gubar, eds. *The Norton Anthology of Literature by Women: The Traditions in English*. New York: W.W. Norton, 1985. Print.

**Recommended Reading:**

Cornilloj, Susan Koppelman, eds. *Images of Women in Fiction: Perspectives*. Ohio: BGUP Press, 1972. Print.

Coward, Rosalind. *Female Desire: Women’s Sexuality Today*. London: Paladin, 1984. Print.

Kristeva, Julia. “Women’s Time.” *Signs*. 7.1 (1981): 13. Print.

Course Code	Course Title	C	H	I	E	T
17P3NME1	ENGLISH LANGUAGE TEACHING	4	5	25	75	100

**Unit I** **15hrs**

1. General theories -psychological - cognitive theories 2. pedagogic theories-error analysis

**Unit II** **15hrs**

1. Curriculum and syllabus and tests and evaluation 2. curriculum design -basic principles 3. different types of syllabi. 4. Test –definition- characteristics of good test. 5. types of questions

**Unit III** **15hrs**

1. History of English Teaching Methodology 2. Structural Approach 3. Situation Method 4. Audio – Lingual Approach. 5. Audio-visual Method 6. Notional and Functional Methods

**Unit IV** **15hrs**

1. Current Communicative Approaches 2. Communicative Language Teaching 3. Natural Approach 4. Co operative Language Learning 5. Content Based Instruction 6. Task Based Language Teaching

**Unit V** **15hrs**

1. Teaching of Skills 2. Exploiting prose, poetry, Drama in class 3. Grammar.

**Reference Books:**

Jack C Richards and Theodore Rodgers. Approaches and Methods in Language teaching

Brumfitt and Johnson. The communicative Approach to Language Teaching.

J B Heaton writing English Language Tests.

Course Code	Course Title	C	H	I	E	T
<b>17P3NNM1</b>	<b>ENGLISH FOR FORMAL WRITING</b>	4	4	25	75	100

**Unit I** **12hrs**

1. Difference between oral communication and written communication. Values and Guiding Principles. Difference between formal and Informal Correspondence.

**Unit II** **12hrs**

1. Different types of writing: Narrative Argumentative and Analytical.

**Unit III** **12hrs**

1. Formal Correspondence: Description of situation contexts. Styles of formal correspondence. Formalities.

**Unit IV** **12hrs**

1. Project Writing: Nature of project writing. Form and content. Writing project proposal. Formalities
2. Essay writing: Nature of project writing. Form and Content. Writing project proposal. Formalities. Documentation.

**Unit V** **12hrs**

1. Drafting of official communication: Circular, Memo, Minutes, Report, Summary, etc., (domestic), Letters, Agreements, Contracts, etc., (outside organization)

**Reference Books:**

Baugh. How to Write First-class Letters.

Amin. Fravertly, et al. Grammar Builder

Course Code	Course Title	C	H	I	E	T
<b>17P4NMC15</b>	<b>LITERARY CRITICISM</b>	5	6	25	75	100

**Unit I** **18hrs**

- 1.Aristotle – Poetics
- 2.Horace – Ars Poetica

**Unit II** **18hrs**

- 1.Sir Philip Sydney – The Defense of Poesy
- 2.John Dryden – An Essay of Dramatic Poesy

**Unit III** **18hrs**

- 1.Samuel Johnson – Life of Pope
- 2.Coleridge – Biographia Literaria, Part I, Chapter 1,4, 13.
- 3.Matthew Arnold – The Function of Criticism at the Present time

**Unit IV** **18hrs**

- 1.T.S. Eliot – Tradition and Individual Talent
- 2.Edmund Wilson – The Historical Interpretation of Literature

**Unit V** **18hrs**

- 1.Foucault – What is an Author?
- 2.Simone de Beauvoir – The Second Sex. Chapter XI, Myth and Reality
- 3.Terry Eagleton – Literary theory: An Introduction: Chapter I. The Rise of English
- 4.Homie Bhabha – The Commitment to Theory

**Text book(s):**

1. The Norton Anthology of Literary Theory and Criticism (Second Edition)

Course Code	Course Title	C	H	I	E	T
17P4NMC16	RESEARCH WRITING	5	6	25	75	100

### Unit I Research Writing

18hrs

1.The Research Paper 2. Selecting a Topic 3. Using the Library 4. Compiling a Working Bibliography 5.Taking Notes 6. Plagiarism, 7.Outlining, Writing Draft, and Guide to Writing (pp.1-62 from 7<sup>th</sup> edition & pp.3 – 18 from 8<sup>th</sup> edition)

### Unit II Mechanics of Writing

18hrs

1.Spelling 2. Punctuation 3. Names of Person, Numbers,4.Titles in the Research Paper, Quotations, Dates and Times(pp. 66-114 from 7<sup>th</sup>edition & pp. 61 - 94 from 8<sup>th</sup>edition)

### Unit III Creating Documentation I

18hrs

A) List of Works Cited: i) Core Elements: Author,Title of Source, Title of Container, Other Contributors, Version, Number,Publisher, Publication Date, Location ii) Optional Elements: Date of OriginalPublication, City of Publication, Other Facts about the Source, Date of Access  
B) In-Text Citations (pp. 19 -60 from 8<sup>th</sup> edition)

### Unit IV Creating Documentation II

18hrs

A) Works Cited: Names of Authors, Titles,Versions, Publisher, Locational Elements, Punctuation in the Works Cited List,Formatting and Ordering the Works Cited List  
B)In-Text Citations: Author, Title, Numbers, Indirect Sources, Repeated Use of Sources, Punctuation in their-text citation  
C) Citations in Forms Other Print(pp.102-128 from 8<sup>th</sup>edition)

### Unit V

18hrs

The Format of the Research Paper(pp.115-122 from 7<sup>th</sup> edition);  
Abbreviations (pp. from 233-256 7<sup>th</sup> edition & 95-101 from 8<sup>th</sup> edition)

### Textbook(s):

**The following are the sources from where all the 5 Units are drawn.**

The Modern Languages Association of America. *MLA Handbook for Writers of Research Papers*. 7<sup>th</sup> Edition. New York: MLA, 2009. Print.

The Modern Languages Association of America. *MLA Handbook*. 8<sup>th</sup> Edition. New York: MLA, 2016. Print.

### References:

Anson, Chris M., and Robert A. Schwegler. *The Longman Handbook for Writers and Readers*. 6th ed. New York: Longman, 2010.

Ruszkiewicz, John J., et al. *The Scott, Foresman Handbook for Writers*. 9th ed. New York: Longman, 2010.

Course Code	Course Title	C	H	I	E	T
<b>17P4NMC17</b>	<b>COMPARATIVE LITERATURE</b>	5	6	25	75	100

**Unit I** **18hrs**

Comparative Literature – Definition and Scope

**Unit II** **18hrs**

Influence and Imitation – Reception and Survival

**Unit III** **18hrs**

Problems of Literary History – Definition of terms like Epoch, Period, Generation and Movement.

**Unit IV** **18hrs**

Genre- Generic Theory – Generic Approach – Tamil Generic Theories

**Unit V** **18hrs**

Thematology – Theme, Form, Content and Meaning – Theme and Motif – Myths – The Mutual Illumination of the Arts.

**Reference Books:**

Satchidanandan, V. Oppilakkiam: An Introduction to Comparative Literature. Madras: OUP, 1985.

Weisstein, Ulrich. Comparative Literature and Literary Theory: Survey and Introduction. London: OUP, 1973.

Wellek, Rene and Austin Warren. Theory of Literature. Middlesex: Penguin, 1973

Dr. Chandramohan – Comparative Literature.

**Evaluation Pattern: Internal :25 marks; External: 75 marks.**

Internal Assessment: (Test: 20 marks = Assignment: 5 marks)

Two internal tests each for 20 marks are to be conducted. 5 marks are allotted for assignment on comparison of any two writers of the students' choice or they can work on any one of the following topics.

Suggested Topics (These topics are NOT meant either for the internal tests or for summative examination)

1. Whitman and Bharati
2. Shelley and Bharati
3. John Donne and Kannadasan
4. Byron and Bharatidasn
5. Ted Hughes and Sujatha
6. Walter Scott and Kalki
7. D.H Lawrence and Jeyakantan
8. Mulk Raj Anand and Jeyakantan
9. Thomas Hardy and Jeyakantan
10. Virginia Woolf and Vaasanthi
11. George Eliot and Na. Parthasarathy
12. Dickens and Na. Pathasarathy
13. Margaret Laurence and Vaasanthi
14. Toni Morrison and Rajam Krishnan

Course Code	Course Title	C	H	I	E	T
17P4NME2	INTRODUCTION TO JOURNALISM	5	6	25	75	100

**Unit I Nature and History of Journalism** **18hrs**

1. What is Journalism? Functions and responsibilities of Journalism 2. Early days of Journalism in India 3. Journalism in Tamilnadu.

**Unit II The Laws, Standards and Ethics** **18hrs**

1. Nature and Principles of the Constitution of India 2. Fundamental rights: Right to Information. 3. Freedom of Expression, Freedom of Press: India before and after Independence. 4. Press Laws. 5. Code of Ethics.

**Unit III Practical Journalism** **18hrs**

1. Inside a Newspaper – Editorial Department – Editor – Assistant Editors – Editor  
2. Reporting – Types and Different Fields. 3. Editing – Principles, Rights and Responsibilities 4. Style.

**Unit IV News Writing in Print & Electronic Media** **18hrs**

1. What is News? 2. Elements of News 3. Language of News 4. Radio News Writing and Television News Writing 5. Online Journalism.

**Unit V Writing** **18hrs**

1. Free Lance Writing and Professional Writing 2. Column Writing - Features, Articles, Editorials, Interviews and Reviews. 3. Visual Material 4. Advertising 5. Copy Writing 6. Blog Writing 7. Content writing.

**Reference Books:**

Parthasarathy, Rangaswami. *Journalism in India*. New Delhi. India. Print.

Course Code	Course Title	C	H	I	E	T
<b>17P4NME3</b>	<b>AN INTRODUCTION TO THEORY AND PRACTICE OF TRANSLATION</b>	5	6	25	75	100

**Unit I**

**18hrs**

- 1.Introduction to Translation
- 2.Terms and Definitions
- 3.History of Translation

**Unit II**

**18hrs**

- 1.Kinds of Translation
- 2.Three Methods of Translation
- 3.Translation: Science or Art?

**Unit III**

**18hrs**

- 1.Translation Procedures
- 2.Equivalence
- 3.Translator Responsibilities and Requirements

**Unit IV**

**18hrs**

- 1.The role of linguistics in translation grammar & linguistic analysis: the letter and the spirit of text
- 2.Bible Translation
- 3.Translation of Literature
- 4.Translation as Scientific and Technological Texts

**Unit V**

**18hrs**

- 1.Study of Translations Contribution of the Indologists
- 2.Translator practice
- 3.Edwin Arnold's 'The light of Asia' and Kavimani Desika Vinayakam Pillai's translation
- 4.Asiya Jothi : The episode of the Mother who has lost her son
- 5.Fitzgerald's translation of the Rubaiyat of Omarkayyam
- 6.Desika Vinayakam Pillai's Translation of Omarkayyam

**Reference Books:**

- Ames,P.R.Early Theories of Translation.  
Cartrod,J.C.A Linguistic Theory of Translation.  
Frenz, Horst. The art of Translation.  
Jacobson,Eric. Translation: A Traditional Art.  
Lakshmi,H. Problems of Translation.  
Lefevene,Andera. Translating Literature.  
Nida,Eugene. Towards a Science of Translating.  
Nandakumar. Translation: A Creative Process.  
Newmarch,Peter. Approches to Translation.

## COMMON QUESTION PAPER PATTERN

### INTERNAL ASSESMENT

Test:20 marks + Assignment: 5 marks = Total : 25 marks

15 – Two tests are to be conducted

5 – Assignment / seminar.

### SUMMATIVE EXAMINATION

Under CBCS Pattern

Duration: 3 hrs

Max.Marks: 75

Part - A (Answer all)

10 X 1 = 10

(All objective type questions) - two questions from each unit

Part – B (Answer all)

5 X 7 = 35

(Either or pattern - one pair question from each unit)

Part – C (Answer any three of five)

3 X 10 = 30

(Open choice - one question from each unit)

**M.PHIL-ENGLISH**  
**SYLLABUS FOR THE YEAR 2017 ONWARDS**

**SEMESTER-I**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>
<b>III</b>	Core Paper-1	<b>17M1NMC1</b>	RESEARCH METHODOLOGY	<b>6</b>
<b>III</b>	Core Paper-2	<b>17M1NMC2</b>	MODERN CRITICAL THEORY	<b>6</b>

**SEMESTER-II**

<b>Part</b>	<b>Study components</b>	<b>Subject code</b>	<b>Title of the paper</b>	<b>Hours</b>
<b>III</b>	Core Paper-1	<b>17M1NMC3</b>	RECENT WRITINGS	<b>6</b>

## M.PHIL-ENGLISH

Course Code	Course Title	H	I	E	T
17M1NMC1	RESEARCH METHODOLOGY	6	25	75	100

### Unit I

1.What is research? 2. Responsibilities of a Good Researcher – Purpose of research 3. Conducting research 4.Sources of research – Primary and Secondary Sources – 5.Library sources 6. Web sources.

### Unit II

1. Selection of Topics 2. Statements of the Problem 3. Hypothesis 4. Field Work 5. Library visit 6. Data Collection 7.Data Analysis.

### Unit III

1. Format of the research paper 2. Note-Taking 3. Note-Making 4. Outline - First Draft – Final Draft 5.Style – Format.

### Unit IV

1.Plagiarism and Academic Integrity 2. Definition of Plagiarism – Consequences of Plagiarism – Avoiding Plagiarism 3. Mechanics of Writing.

### Unit V

1. Documenting Sources 2. Parenthetical Documentation 3. Using Quotations 4. Preparation of Works Cited List.

### Reference Books:

Anson, Chris M., and Robert A. Schwegler. *The Longman Handbook for Writers and Readers*. 6th ed. New York: Longman, 2010.

Ruszkiewicz, John J., et al. *The Scott, Foresman Handbook for Writers*. 9th ed. New York: Longman, 2010.

Course Code	Course Title	H	I	E	T
<b>17M1NMC2</b>	<b>MODERN CRITICAL THEORY</b>	6	25	75	100

### **Unit I Structuralism and Post Structuralism**

1.Ferdinand de Saussure : The Object of Study

2.Jacques Derrida : Structure, Sign and Play in the Discourse of Human Science.

### **Unit II Reader Response Theory and Deconstruction**

1.Wolfgang Iser : The Reading Process : A Phenomenological approach

2.M.H Abrams : The Deconstructive Angel

### **Unit III Feminism and Psychoanalysis**

1.Spivak : Feminism and Critical Theory

2.C.J Jung : Psychology and Literature

### **Unit IV Hermeneutics and New Historicism**

1. E.D Hirsch, Jr : Three Dimension of Hermeneutics

2.Stephen Greeblat : The Circulation of Social Energy

### **Unit V Post Colonialism and Post Structuralism**

1. Edward Said : Crisis (Selection from ‘Orientalism’)

2.Terry Eagleton : Capitalism, Modernism and Post Modernism

**Reference Books:**

Sethuraman. V.S ed Contemporary Criticism; An Anthology. New delhi Trinity. 2016 Print.

Lodge, David S. Nigel Wood. Modern Criticism and Theory: A reader 3<sup>rd</sup> Edition. New Delhi: Pearson Education 2008.

Lodge, David 20<sup>th</sup> Century Literary Criticism: A Reader. Longman Publishers 1972.

Habib.M.A.R A History Of Literary Criticism: From Plato to the Presen , London, Blackwell, 2005, distributed in IndiabyAtlantic Publishers and Distributer.

Barry Peter, Beginning Theory: An Introduction to Literary and Cultural Theory 1995:Manchester University Press 2002.

Bertons, hans. Literary Theory: The Basics. London: Rontledge, 2001.

Course Code	Course Title	H	I	E	T
17M2NMC3	RECENT WRITINGS	6	25	75	100

### Unit I Poetry

- 1 James Berry – It's Me Man
2. Prithvi Nandy – The Nowhere Man
3. Sherman Alexie – The Facebook Sonnet
4. Thomas Sayers Ellis – Role Change Operation
5. Tina Chong – So Much Light We Could See to the Other Side

### Unit II Short Story

1. Alice Munro – 'Voices' taken from 'Dear Life' Vintage Publication
2. Ruskin Bond – The Thief
3. M. G Vasanji – Leaving

### Unit III Drama

1. Wole Soyinka – A Dance of the Forests
2. Mahesh Dattani – The Big Fat City

### Unit IV Fiction

1. Gabriel Garcia Marquez – One Hundred Years of Solitude
2. Ameen Merchant – Silent Rage

### Unit V Prose

1. MJ Akbar- Blood Brothers
2. VS Naipaul- Among the Believers
3. Pico Iyer- The Man within My Head
4. William Dalrymple- Delhi: City of Djinn.

The textbook prescribed for this course are listed in the syllabus

## COMMON QUESTION PAPER PATTERN

### INTERNAL ASSESMENT

Test: 20 marks + Assignment: 5 marks = Total: 25 marks

15 – Two tests are to be conducted

5 – Assignment / seminar.

### SUMMATIVE EXAMINATION

Duration: 3 hrs

Max.Marks: 75

Answer any THREE Questions out of Five:[3X10 = 30]

Answer any THREE Questions out of Five:[3X15=45]

# Department of Commerce

**B.Com Course Structure under CBCS Pattern with effect from the Academic Year 2017-18****Semester -I**

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core 1	17U1KMC1	Financial Accounting -I	6	4
Core 2	17U1KMC2	Business Mathematics	6	4
Allied 1	17U1KAC1	Managerial Economics	4	4
<b>Part IV</b>				
Skill Based Elective	17U1KSM1	Accounting Software	2	2
	17U1KES	Environmental Studies	2	2

**Semester –II**

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core 3	17U2KMC3	Financial Accounting-II	6	4
Core 4	17U2KMC4	Business Statistics	6	4
Core 5	17U2KMC5	Marketing	4	4
<b>Part IV</b>				
Skill Based Elective	17U2KSM2	Branding and Advertising	2	2
	17U2KVE	Value Education	2	2

**Semester – III**

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core -6	17U3KMC6	International Trade	4	4
Core-7	17U3KMC7	Cost Accounting	6	4
Core-8	17U3KMC8	Partnership Accounts	6	4
Allied-2	17U3KAC2	Company Law & Practice	5	4
Allied-3	17U3KAC3	Practical Banking	5	4
<b>Part IV</b>				
Skill Based Elective	17U3KSM3	Logistics and Supply Chain	2	2
Non Major Elective	17U3KNM1	Business Accounting	2	2

### Semester – IV

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core -9	17U4KMC9	Insurance & Risk Management	4	4
Core-10	17U4KMC10	Financial Management	5	4
Core-11	17U4KMC11	Special Accounts	6	4
Allied-4	17U4KAC4	Business Planning and Research	5	4
Allied-5	17U4KAC5	Business Legislation - I	6	4
<b>Part IV</b>				
Skill Based Elective	17U4KSM4	E-Commerce	2	2
Non Major Elective	17U4KNM2	Business Accounting	2	2

### Semester – V

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core -12	17U5KMC12	Elements of Operations Research	5	5
Core-13	17U5KMC13	Management Accounting	6	5
Core Elective-1	17U5KME1	Income- Tax-I	6	4
Core Elective-2	17U5KME2	Business Legislation - II	6	4
Core Elective-3	17U5KME3	Investment Management	5	4
<b>Part IV</b>				
Skill Based Elective	17U5KSM5	Stock Market Operations	2	2

### Semester – VI

Category	Course Code	Paper	Hrs	Credit
<b>Part III</b>				
Core -14	17U6KMC14	Corporate Accounting	6	5
Core-15	17U6KMC15	Auditing and Assurance	6	5
Core Elective-4	17U6KME4	Income – Tax –II	6	4
Core Elective-5	17U6KME5	Business Management	5	4
Core Elective-6	17U6KME6	Indirect- Tax	5	4
<b>Part IV</b>				
Skill Based Elective	17U6KSM6	E-Filing	2	2

Part V: NSS/NCC/AEEP/PHY. Extension Activities Credit: 1  
 Total Credits = 22+22+24+24+24+24+1 =141

U- Under graduate, K- Commerce, LA- Language, EN- English, MC- Major Core, AC- Allied Core, SM-Skill Based Elective Major, ES- Environmental Studies, VE- Value Education, NM- Non Major Elective, ME- Major Elective

Course Code	Course Title	C	H	I	E	T
17U1KLA1	Business Communication	4	5	25	75	100

### Unit I Introduction to Communication

12 Hrs

Meaning - Definition- Characteristics – Process - Essentials of Effective Communication- Forms of Communication- Verbal and Non-Verbal - Types - Formal and Informal - Media of Communication- Written – Oral - Visual - Audio Visual- Computer based Communication - Barriers and remedies.

### Unit II Written Communication

12 Hrs

Meaning - Business Letters- Essentials of a good Business Letter- Layout - Trade Letters – Enquiries & Offers – Quotations – Orders- Circular Letters- Sales Letters- E-mail Etiquettes.

### Unit III Oral Communication

12 Hrs

Oral and other forms of Communication – Speeches- Group Communication- Presentations- Listening – Dialogue skills.

### Unit IV Drafting of a resume

12 Hrs

Application for a situation – Structure - Preparation of Curriculum vitae – Drafting an application for different positions.

### Unit V Report Writing

12 Hrs

Meaning- Types of Business Reports- Structure of a Report- Stock exchange reports and Sales reports.

### Text Book

1. Urmila Rai & S.M Rai, “*Business Communication*”, Second Edition, 2015, Himalaya Publishing House, Mumbai.

### Reference Books

1. Rajendra Pal & J.S. Korlahalli, “*Essentials of Business Communication*”, Thirteenth Edition, 2013, Sultan Chand & Sons, New Delhi.
2. M.S. Ramesh, C.C. Pattanshetti “*Business Communication*”, Twenty Eight Edition, 2015, R. Chand & Co, New Delhi.
3. R.S.N. Pillai & Bagavathi, “*Modern Commercial Correspondence*”, 2007, S.Chand & Company Ltd, New Delhi.
4. Herta A Murphy, Herbert W Hildebrandt & Jane P. Thomas, Seventh Edition, 2010, “*Effective Business Communication*”, MCGraw Hill Education Private Limited, New Delhi.
5. Sanjay Kumar & Pushp Lata, 2012, “*Communication Skills*”, Oxford University Press.

Course Code	Course Title	C	H	I	E	T
17U1KMC1	Financial Accounting – I	4	5	25	75	100

**Unit I Introduction to Financial Accounting** **18 Hrs**

Definition – Accounting Principles, Concepts and Conventions – Rules – Accounting Equation – Double Entry System - Advantages of Double entry system- Basic knowledge of Accounting Standards and Ind AS.

**Unit II Subsidiary Books** **18 Hrs**

Bank Reconciliation Statement – Trial Balance – Rectification of errors – Suspense Account – Effect of errors on profit.

**Unit III Final Accounts** **18 Hrs**

Preparation of Manufacturing, Trading and Profit and Loss Account and Balance Sheet – Adjustment Entries – Closing entries.

**Unit IV Depreciation** **18 Hrs**

Meaning – Causes – Fixed installment method, Written down value method, Change in the providing depreciation with Prospective and Retrospective Effect, Annuity method, Sinking fund method, Insurance policy method –Application of depreciation as per Companies Act (useful life method) and Income-Tax Act.

**Unit V Accounting for Insurance Claims and Average Due Date** **18 Hrs**

Accounting for Insurance claims- Loss of Stock – Loss of Profit (Simple Problems Only). Average Due Date and Account Current.

The Questions should be asked in the ratio of 80% Problems and 20 % for theory

**Text Book**

1. S.P. Jain & K.L Narang, “*Advanced Accountancy*” Vol-I, Nineteenth Edition, 2015, Kalyani Publishers, Mumbai.

**Reference Books**

1. R.L. Gupta & M. Radhaswamy, “*Advanced Accountancy*” Vol-I, 2015, Sultan Chand & Sons, New Delhi.
2. M.A. Arulanandam & K.S. Raman, “*Advanced Accountancy*” Vol-I, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
3. S. N. Maheshwari & Suneel K Maheshwari, “*Financial Accounting*”, Fifth Edition, 2012, Vikas Publishing House.
4. R.S.N. Pillai, Bagavathi & S. Uma, “*Fundamentals of Advanced Accountancy*”, Third Edition, 2015, S. Chand, New Delhi.
5. SP. Iyengar, “*Advanced Accountancy*” Vol-I, Fourth Edition, 2004. Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U1KMC2	Business Mathematics	4	5	25	75	100

### Unit I Ratios and Proportions

18 Hrs

Theory of Indices and Surds- Logarithms.

### Unit II Matrices and Determinants

18 Hrs

Solving Equations using Crammers Rule and Matrix Inversion only - Permutations and Combinations - Progressions - Arithmetic and Geometric.

### Unit III Set Theory

18 Hrs

Theory of Equations- Linear and Simultaneous Equations – Quadratic Equations. Introduction to Boolean Algebra (Properties only).

### Unit IV Calculus

18 Hrs

Basic concepts of Differential and Integral Calculus- Applications of Standard Results- Simple application of Differentiation and Integration of Commerce and Economics.

### Unit V Commercial Arithmetic

18 Hrs

Interest and Annuities- Simple and Compound Interest- Rule 72 – EMI – Annuity- Future value- Present value- Sinking fund.

### Text Book

1. C.K. Ranganath, C.S. Sampagiram and Y. Rajaram, *“Business Mathematics”*, Third Edition, 2014, Himalaya Publishing House, Mumbai.

### Reference Books

1. Qazi Zameeruddin, Vijay K Khanna & S.K. Bhambri, *“Business Mathematics”*, Second Edition, 2015, Vikas Publishing House Pvt Ltd.
2. V. Sundaresan and S.D.Jeyaseelan, *“An Introduction to Business Mathematics”*, 2010, S.Chand (G/L) & Company Ltd.
3. D.C. Sanchetti & V.K. Kapoor, *“Business Mathematics”*, Eleventh Edition, 2014, Sulthan Chand & Sons.
4. P.R. Vittal, *“Business Mathematics & Statistics”*, 2012, Margham Publications, Chennai.

Course Code	Course Title	C	H	I	E	T
17UIKAC1	Managerial Economics	4	5	25	75	100

**Unit I Nature, Scope and Methods of Managerial Economics** **12 Hrs**

Meaning - Definition - Nature and scope of managerial economics - Methods of managerial economics - Role and functions of managerial economist- Managerial economics with other disciplines - Basic concepts in managerial economics.

**Unit II Cardinal Utility Analysis** **12 Hrs**

Introduction - Concepts of Utility - Total, Marginal Utility - Law of Diminishing Marginal Utility - Law of Equi-Marginal Utility - Consumer's surplus.

**Unit III Demand and Demand Forecasting** **12 Hrs**

Demand – Meaning – Definition - Law of Demand - Demand determinants- Elasticity of Demand - Types of Elasticity of Demand - Degrees of Price Elasticity of Demand - Measurement of elasticity of Demand - Meaning of demand forecasting - Methods of demand forecasting for established products.

**Unit IV Production, Costs and Revenue Analysis** **12 Hrs**

Introduction - Features of factors of production - Law of returns (Increasing, Constant and Diminishing) – Isoquant - Iso-cost line- TC – VC – FC – AC – MC – AR – MR - Factors of Production.

**Unit V Pricing Policies and Strategies** **12 Hrs**

Pricing - Pricing policy - Formulation of pricing policy - Objectives of pricing policy - Factors involved pricing policy - Pricing strategies - Skimming pricing and Penetration pricing - Pricing over the life cycle of a product - Cyclical pricing - Transfer pricing - Differential pricing - Full cost pricing.

**Text Book(s):**

1. R. Cauvery, U.K. Sudha Nayak, M. Girija and R. Meenakshi “*Managerial Economics*”, 2002, S.Chand & Co, New Delhi.
2. V.G. Mankar, “*Business Economics*”, 1999, Marcmillan India Ltd, New Delhi.

**Reference Books**

1. M.L. Jhingan and J. K Stephen, “*Managerial Economics*”, 2012, Vrinda Publications (P) Ltd., Delhi.
2. Varshney and Maheswary, “*Managerial Economics*”, 2004, Sultan Chand & Co., Delhi.
3. Managerial Economics, D. M. Mithani, “*Managerial Economics*”, 2006, Himalaya Publishing House, Delhi.
4. Branton, Noel and James M. Livingstone, “*Managerial Economics in Practice*”, 2001, Oxford University Press, Delhi.

Course Code	Course Title	C	H	I	E	T
17U1KSM1	Accounting Software	2	2	25	75	100

### Unit I Introduction to Accounting through Computers

5 Hrs

Tally- Features of Tally– Tally and Accounting – Tally and Financial Management – Tally and Inventory/stock Management – Security Features of Tally – VAT and Tally – Service Tax and Tally – TDS and Tally – Benefits of Tally (Controlling Costs) – Benefits of Tally (Enhancement of Productivity)- Features & Configuration: General features- Accounting Features – Inventory Features.

### Unit II Creation of Company

6 Hrs

Directory/Name/Mailing Name/Address/State/Pin code/E-mail Address- Using security control- Groups – Sub-group – Reserved Account groups- Display of groups – Primary groups- Capital & revenue nature- Alteration of Groups- Deletion of Groups- Creation of ledgers- Process of creation of ledger.

### Unit III Display of Predefined Vouchers

6 Hrs

Creation and alteration of vouchers - Types of voucher- Voucher Numbers- Day – Date- Alteration of voucher- Cancellation of voucher- Deletion of voucher- Creation and alteration of New voucher types- Examples for recording transactions. Final accounts and Tally – Trial balance-Profit and loss account- Balance sheet at the gateway of Tally- Method of showing Balance sheet- Import and Export of data through Excel.

### Unit IV Bank Reconciliation Statement

8 Hrs

Meaning – Drawbacks - Voucher-wise reconciliation –Process of Bank reconciliation. Inventory – Introduction – Buying and Selling Activity of a Trader – Stock Journal – Non-Inventory Vouchers – Inventory Masters – Stock Groups and Stock Items Creation, Alteration and Deletion of category and Items.

### Unit V Interest Calculations

5 Hrs

Interest Calculations- Simple Interest – Compound interest. Backup and Restore.

### Text Book

1. S.Palanivel, “*Tally- Accounting Software*”, Margham Publications, Chennai

### Reference Books

1. Nellai Kannan C, “*Tally*”, 2004, Nels Publications.
2. Shraddha Singh & Navneet Mehra, “*Tally.ERP 9- Power of Simplicity*”, 2014, ITC Publication.
3. Asok K Nadhani, “*Mastering Tally.ERP 9*”, 2012, BPB Publications.
4. “*Accounting Package*”, ICAI New Delhi Publications.
5. “*Tally9*”, Tally Solutions Ltd. Bangalore.

Course Code	Course Title	C	H	I	E	T
17U2KLA2	Technology for Business Applications	3	5	25	75	100

### Unit I Introduction to Computer

12 Hrs

Introduction - Types of Computers - Characteristics of Computers – Classification of Digital Computers Systems – Micro Computers, Mini Computers, Main Frame Computers, Super Computers, Network Computers – Uses of Computers.

### Unit II Anatomy of a Digital Computer

12 Hrs

Digital Computers - Functions and Components of a Computer – CPU – ALU – Memory – Registers – Address – Computer Architecture – Memory Units – RAM, ROM, FROM, EPROM, EEPROM, FLASH MEMORY – Auxiliary Storage Devices. Machine Language – Assemble language – High level language – Compilers and Interpreters.

### Unit III Data Base Management Systems

12 Hrs

Introduction – Meaning - History of Information - Quality of Information - Information Processing - Characteristics of Data in Data Base - Types of Data Base Management Systems.

### Unit IV MS Word

12 Hrs

Introduction – Creating word document - Editing text - Creating a Resume Wizard – Adding and Formatting Numbers and Symbols - Print. MS Excel - Creating Tables, Graphs and Charts – Finance, Mathematical and Statistical Functions. Power Point - Presentation through Templates.

### Unit V MS Access

12 Hrs

Introduction – Creation of Table – Preparation of Pay Roll - Report for Product Data Base - Big Data - Data Mining - Data Warehousing – Cloud Computing - Knowledge Management System - An overview of Statistical Package for Social Science (SPSS).

### Text Book

1. Alexis Leon & Mathews Leon, *“Fundamentals of Information Technology”*, 2013, Vijay Nicole Imprints Pvt., Ltd., Chennai.

### Reference Books

1. Manas Parhi & Jagjit Singh, *“Information Technology for Business”*, 2003, Unistar Books Pvt., Ltd.
2. Dennis P. Curtin, Kim Foley, Kunal Sen, & Cathleen Morin, *“Information Technology”*, 2013, McGraw Hill Education (India)Pvt., Ltd.
3. Chetan Srivastava, *“Principles of Information Technology”*, 2004, Kalyani Publishers, New Delhi.
4. Brain K. Williams & Stacey. C. Sawyer, *“Using Information Technology”*, Third Edition, 2003, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
17U2KMC3	Financial Accounting - II	4	5	25	75	100

### Unit I Consignment

18 Hrs

Meaning - Distinction between sale and consignment – Account sale – Journal entries and Ledger Accounts in the books of consignor and consignee – Valuation of unsold stock on Consignment – Normal loss and Abnormal loss – Invoicing goods higher than cost.

### Unit II Joint Venture

18 Hrs

Meaning - Journal & Ledger Accounts in the books of Venturers - Existing books - Separate Set of Books - Memorandum Joint Venture method.

### Unit III Self- Balancing Ledgers

18 Hrs

Meaning - Sectional Balancing (Excluding Errors affecting Self Balancing Ledgers) Royalty Account: Meaning - Minimum Rent- Short working - Recouping short workings- Restricted and unrestricted – Entries and Ledger Accounts in the Books of Lessor and Lessee – Sub-Lease.

### Unit IV Accounting for Incomplete Records

18 Hrs

Introduction - Ascertainment of Profit – Net worth Method - Conversion Method.

### Unit V Financial Statements for Not-for-Profit Organisation

18 Hrs

Meaning- Distinction between profitable and Not for Profitable Organisation – Books to be maintained - Distinction between Capital and Revenue – Basic Records –Preparation of Income and Expenditure Account and Balance sheet from Receipts and Payments and vice versa.

### Text Book

1. S.P. Jain & K.L. Narang, “*Advanced Accountancy*” Vol- I, Nineteenth Edition, 2015, Kalyani Publishers, Mumbai.

### Reference Books

1. R.L. Gupta & M. Radhaswamy, “*Advanced Accountancy*” Vol- I, 2015, Sultan Chand & Sons, New Delhi.
2. M.A. Arulanandam & K.S. Raman, “*Advanced Accountancy*” Vol- I, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
3. S. N. Maheshwari & Suneel K Maheshwari, “*Financial Accounting*”, Fifth Edition, 2012, Vikas Publishing House.
4. R.S.N. Pillai, Bagavathi & S. Uma, “*Fundamentals of Advanced Accountancy*”, Third Edition, 2015, S. Chand, New Delhi.
5. SP. Iyengar, “*Advanced Accountancy*” Vol-I, Fourth Edition, 2004, Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U2KMC4	Business Statistics	4	5	25	75	100

**Unit I Introduction to Statistics** **18 Hrs**

Definition – Functions- Collection, Classification, Tabulation and Presentation of Data- Frequency Distribution- Graphical and Diagrammatic Presentation – Histogram- Frequency Polygon – Ogive- Bar and Pie Diagram.

**Unit II Measures of Central Tendency** **18 Hrs**

Mean – Meaning – Definition – Arithmetic Mean, Geometric Mean & Harmonic Mean – Combined Mean- Median, Quartiles, Deciles and Percentiles – Mode (Uni and Bi Model) - Measures of Dispersion – Range- Standard Deviation- Combined Standard Deviation- Coefficient of Variation.

**Unit III Correlation and Regression Analysis** **18 Hrs**

Correlation - Meaning – Definition - Types- Measures of Correlations- Karl Pearson’s Coefficient of Correlation – Rank Coefficient of Correlation – Concurrent Deviation. Regression Analysis – Meaning - Definition - Regression Lines.

**Unit IV Index Numbers and Analysis of Time series** **18 Hrs**

Index Numbers – Meaning – Types – Definition - Methods - Tests of consistency of Index number (Time reversal & Factor reversal test)- Cost of Living Index – Chain Base – Fixed Base – Base shifting.  
Analysis of Time Series – Meaning – Definition - Models- Method of Least Square and Moving Average.

**Unit V Probability** **18 Hrs**

Meaning - Addition- Multiplication – Conditional- Bayes’ Theorem- Mathematical Expectation.

The Questions should be asked in the ratio of 80% Problems and 20 % for theory

**Text Book**

1. RSN. Pillai & Bagavathi, “*Business Statistics*”, Eighth Edition, 2016, S.Chand & Co Pvt., Ltd., New Delh.

**Reference Books**

1. S.P. Gupta, “*Statistical Methods*”, Forty Fourth Edition, 2014, Sultan Chand & Sons, New Delhi.
2. S.C. Gupta & V.K. Kapoor, “*Fundamentals of Mathematical Statistics*”, 2014, Sultan Chand & Sons, New Delhi.
3. J.K. Sharma, “*Fundamentals of Business Statistics*”, Second Edition, 2014, Vikas Publishing House Pvt., Ltd., Noida.
4. B.M. Aggarwal, “*Business Mathematics and Statistics Fundamentals*”, Twentieth Edition, 2008, Sultan Chand & Sons, New Delhi.
5. D. C. Sancheti & V.K. Kapoor, “*Statistics [Theory, Methods & Applications]*”, Seventh Edition, 2010. Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U2KMC5	Marketing	4	5	25	75	100

### Unit I Introduction to Marketing

12 Hrs

Definition – Importance – Evolution of Marketing Concept – Marketing Functions – Classification – Approaches to the Study of Marketing – Meaning of market – Kinds of Market – Market Segmentation – Methods of Segmentation - Concept of Market Targeting and Positioning.

### Unit II Functions of Exchange

12 Hrs

Introduction - Buying – Meaning – Kinds of buyers – Elements of buying – Methods of buying – Assembling. Selling – Meaning – Elements of Selling – Kinds of Selling. Functions of Physical Supply: Transportation – Importance and Functions – Modes of Transportation – Storage and Warehousing – Meaning – Functions – Types of Warehouses.

### Unit III Consumer Behaviour

12 Hrs

Introduction - Buying Motive - Determinants – Buying Process. Standardization & Grading – Meaning – Importance of Standardization & Grading in India – Bureau of Indian Standards – AGMARK – Meaning and uses.

### Unit IV Marketing Mix

12 Hrs

Introduction – Meaning - 4 P’s - Product, Price, Place and Promotion - Product Planning & Development – Meaning and Importance – Steps involved in the Development of a New Product – Product and Product Line Modification – Diversification – Simplification – Product Life Cycle – Stages in the product life cycle – Reasons for new product failure.

### Unit V Service Marketing

12 Hrs

Introduction - Definition - 3 P’s- People, Process and Physical evidence - Reasons for Growth - Characteristics of Services – Intangibility – Inseparability – Heterogeneity – Perishability - Ownership - Marketing Mix in Service Marketing - Service Quality.

### Text Book

1. R.S.N. Pillai and Bagavati, “*Modern Marketing Principles & Practices*”, Fourth Edition, 2015, S.Chand & Company Pvt., Ltd., New Delhi.

### Reference Books

1. Philip Kotler, Gary Armstrong, Prafulla Y. Agnihotri and Ehsan ul Haque, “*Principles of Marketing- A South Asian Perspective*”, Thirteenth Edition, 2010, Pearson India.
2. N. Rajan Nair & Sanjith R Nair, “*Marketing*”, 2011, Sultan Chand & Sons, New Delhi.11.
3. S.A. Sherlekar, “*Modern Marketing*”, 2016, Himalaya Publishing House, Mumbai, Second Edition.
4. S.M. Jha, “*Services Marketing*”, Sixth Edition, 2009, Himalaya Publishing House.

Course Code	Course Title	C	H	I	E	T
17U2KSM2	Branding and Advertising	2	2	25	75	100

### Unit I Introduction to Branding

6 Hrs

Meaning - Uses – Registration – Essentials of Good Brand – Kinds of Brands – Merits and Demerits. Packing and Packaging – Needs – Requisites – Kinds – Merits and Demerits. Labeling – Kinds – Merits and Demerits.

### Unit II Promotion

6 Hrs

Introduction - Promotional activities – Need – Importance – Promotional mix – Personal selling, Advertisement and Sales promotion – Personal selling – Nature and Importance of Personal selling – Process of Selling – Qualities of a Good salesman – Duties and Responsibilities of sales man.

### Unit III Advertising

6 Hrs

Meaning – Importance – Types – Advantages – Criticism. Preparation of an Advertisement Copy – Qualities of a Good Advertisement Copy – Advertisement Media – Meaning – Kinds of Media – Advertising Agencies – Role and Importance – Functions – Advantages.

### Unit IV Creating Brand Name and Labeling

6 Hrs

Introduction - Creating a Brand name and Labeling for a Product- Legal Framework for Branding and Advertisement.

### Unit V Creating Slogans for Products and Services

6 Hrs

Introduction - Slogans for Radios, Televisions and Social Networks – Preparation of an Advertisement copy - Introduction of a new product for new firm and established firm – Non Commercial Advertising for Social Activities.

### Text Book(s):

1. R.S.N. Pillai and Bagavati, “*Modern Marketing Principles & Practices*”, Fourth Edition, 2015, S.Chand & Company Pvt., Ltd., New Delhi.
2. Y.L.R Moorthy, “*Brand Management*”, Second Edition, 2008, Vikas Publication, New Delhi.
3. Debraj Datta & Mahua Datta, “*Advertising and Sales Promotion*”, 2015, Virunda Publication (P) Ltd.

### Reference Books

1. Kirti Dutta, “*Brand Management*”, 2012, Oxford University Press.
2. Philip Kotler, Gary Armstrong, Prafulla Y. Agnihotri & Ehsan ul Haque, “*Principles of Marketing- A South Asian Perspective*”, Thirteenth Edition, 2010, Pearson India.
3. Debraj Dutta & Mahua Dutta, “*Advertising & Sales Promotion*”, 2009, Virinda Publications (P) Ltd.,
4. Rustom S Davar, Sohrab R Davar & Nusli R Davar, “*Salesmanship and Publicity*”, 2015, Vikas Publishing House Pvt. Ltd.

*Note: C- Credit, H- Hours, I- Internal mark, E- External mark, T- Total marks*

**M.Com**  
**Course Structure under CBCS Pattern with effect from Academic Year 2017-18**  
**Semester – I**

<b>Course Code</b>	<b>Paper</b>	<b>Hours</b>	<b>Credit</b>
17P1KMC1	Business Environment and Ethics	6	4
17P1KMC2	Advanced Financial Accounting	6	5
17P1KMC3	Company Law and Governance	6	4
17P1KMC4	Research Methods and Statistics	6	4
17P1KMC5	Advanced Cost Accounting	6	5

**Semester – II**

<b>Course Code</b>	<b>Paper</b>	<b>Hours</b>	<b>Credit</b>
17P2KMC6	Advanced Corporate Accounting	6	5
17P2KMC7	Marketing Management	6	4
17P2KMC8	Financial Markets and Services	6	4
17P2KMC9	Advanced Management Accounting	6	5
17P2KMC10	Indian Accounting Standards and Accounting Software	6	4

**Semester – III**

<b>Course Code</b>	<b>Paper</b>	<b>Hours</b>	<b>Credit</b>
17P3KMC11	Security Analysis and Portfolio Management	5	4
17P3KMC12	Export Managements	5	4
17P3KMC13	Applied Operations Research	5	4
17P3KMC14	Internet and E- Commerce	5	4
17P3KME1	Applied Direct Taxation	6	5
17P3KNM	Entrepreneurial Skill Development	4	4

### Semester – IV

<b>Course Code</b>	<b>Paper</b>	<b>Hours</b>	<b>Credit</b>
17P4KMC15	Strategic and Human Resource Management	6	4
17P4KMC16	Corporate Finance	6	5
17P4KMC17	Strategic Cost Management	6	4
17P4KME2	Applied Indirect Taxation	6	4
17P4KME3	Project Management	6	4

P- Post graduate, K- Commerce, MC- Major Core, ME- Major Elective, NM- Non Major Elective

Course Code	Course Title	C	H	I	E	T
17PIKMC1	Business Environment and Ethics	4	5	25	75	100

### Unit I Introduction to Business Environment

18 Hrs

Introduction - Scope of Business - Characteristics of Business - Business Goals - Factors influencing Business Environment - Environmental Analysis and Forecasting.

### Unit II Economic Environment

18 Hrs

Introduction - Nature of Economy - Economic Policies and Planning the Economic conditions. Political Environment - Economic roles of the Government. Social Environment - Business and Society Ecology - Consumerism and Consumer Rights - Cultural Environment - Technological Environment - Legal Environment.

### Unit III Global Environment

18 Hrs

Introduction - GATT – GATS – TRIPs – TRIMs – WTO - International Investments - FDI & FII - Development Regulation of Foreign Trade - EPZs, EOUs, TPs – SEZs - FEMA Act 1999.

### Unit IV Introduction to Business Ethics

18 Hrs

Introduction – Meaning – Definition - Nature – Purpose - Morals for Organisational Interest - Ethics and Conflicts of Interest - Ethical and Social Implications of Business Policies and Decisions - Corporate Social Responsibility.

### Unit V Ethical Management

18 Hrs

Introduction – Meaning – Definition - Ethics in Work place - Ethics in Marketing and Consumer Protection - Ethics in Accounting and Finance.

### Text Book(s):

1. Francis Cherunilam, “**Business Environment Text & Cases**”, Twenty Third Edition, 2014, Himalaya Publishing House, Mumbai.
2. S. Parthasarathy & P. Rengarajan, “**Concepts and Realities in Business Ethics**”, 2003, Sadagopan Publishers.

### Reference Books

1. Dr.A. Mushtafa, “**Business Environment and Law**”, 2010, AITBS Publishers and Distributors, Delhi.
2. H.C. Mruthyunjaya, “**Business Ethics and Value System**”, 2013, PHI Learning Pvt., Ltd., Delhi.
3. Namita Gopal, “**Business Environment**”, Second Edition, 2009, McGraw Hill Education Pvt. Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
<b>17P1KMC2</b>	<b>Advanced Financial Accounting</b>	5	5	25	75	100

**Unit I Advanced Final Accounts** **18 Hrs**

Introduction - Preparation of Final Accounts - Closing and Adjustment entries- Sole proprietors - Firms. Accounting of Private individuals, Doctors and Solicitors.

**Unit II Financial Statements for Not-for-Profit Organisation** **18 Hrs**

Meaning- Distinction between profitable and Not for Profitable Organisation – Books to be maintained - Distinction between Capital and Revenue – Basic Records –Preparation of Income and Expenditure Account and Balance sheet from Receipts and Payments and vice versa.

**Unit III Branch, Departmental and Investment Accounting** **18 Hrs**

Introduction to Branch Accounting - Independent – Dependent – Stock and debtors system and Foreign branch.

Introduction to Departmental Accounts – Inter-department transfers at cost and invoice price. Investment Accounting.

**Unit IV Accounting for Leasing and Hire Purchase** **18 Hrs**

Leasing – Meaning - Advantages and Disadvantages – Classifications - Operating and Finance – Accounting Treatment.

Hire-Purchase and Installment purchase systems – Hire purchase trading account.

**Unit V Partnership Accounts** **18 Hrs**

Introduction - Admission – Retirement – Death of a partner – Dissolution.

**Text Book**

1. S.P. Jain & K.L Narang, “**Advanced Accountancy**” Vol-I, Nineteenth Edition, 2015, Kalyani Publishers, Mumbai.

**Reference Books**

1. R.L. Gupta & M. Radhaswamy, “**Advanced Accountancy**” Vol-I, 2015, Sultan Chand & Sons, New Delhi.
2. M.A. Arulanandam & K.S. Raman, “**Advanced Accountancy**” Vol-I, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
3. S. N. Maheshwari & Suneel K Maheshwari, “**Financial Accounting**”, Fifth Edition, 2012, Vikas Publishing House.
4. R.S.N. Pillai, Bagavathi & S. Uma, “**Fundamentals of Advanced Accountancy**”, Third Edition, 2015, S. Chand, New Delhi.
5. SP. Iyengar, “**Advanced Accountancy**” Vol-I, Fourth Edition, 2004, Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17P1KMC3	Company Law and Governance	4	5	25	75	100

**Unit I Introduction to Company Law** **18 Hrs**

Meaning –Definition- Scope – Features of a Company –Kinds of Companies- (including One Person Company- Dormant Company—Small Company—Associate Company – Licensed Company)—Formation and incorporation of a Company – Memorandum of Association – Articles of Association- Prospectus.

**Unit II Share Capital** **18 Hrs**

Sources of raising Share capital—Kinds-Public offer—Issue of Securities by a Public company and Private Company-Offer for sale by members, Shares—Kinds—Nature of shares—Share certificate—Voting rights—Sweat equity shares –Debentures—main features—Issue of debenture under Companies Act

**Unit III Company Management** **18 Hrs**

Director—Legal Positions—Kinds—Appointments—Powers—Duties—Liabilities— Removal—Constitution of important committee—Audit Committee—Nomination and Remuneration Committee—Stakeholder relationship committee—Related Party Transactions—Corporate Governance—E Governance—Listing agreement—Corporate Social Responsibility—Whistle Blowing.

**Unit IV Company Meeting and Proceedings** **18 Hrs**

Definition of a meeting—Essentials of valid meeting—Agenda—Kinds of Meeting— Annual General Meeting—Extra-ordinary General Meeting—Board Meeting and E Board Meeting—special provisions for One Person Company (OPC)—Notice of Meeting—Chairman of Meeting—quorum—E Voting—Resolutions—Meaning— Kinds—Reports.

**Unit V Winding up** **18 Hrs**

Meaning—Modes of Winding up—Winding up by the Tribunal—Vountary Winding up—Creditors Voluntary Winding up—Company Liquidator—appointment—Duties and powers—Official liquidator.

**Text Book**

1. N.D.Kapoor, “**Elements of Company Law**”, Thirtieth Edition, 2016, Sultan Chand Publications, New Delhi.

**Reference Books**

1. Ashok K Bagrial, “**Company Law**”, Twelfth Revised Edition, 2015, Vikas Publishing House.
2. A.C.Fernando, “**Corporate Governance Principles, Policies & Practices**”, Second Edition, 2015, Pearson Publication.
3. V. Balachandran & V. Chandrasekaran, “**Corporate Governance, Ethics & Social Responsibility**”, Second Edition, 2013, PHI Learning Pvt. Ltd.

Course Code	Course Title	C	H	I	E	T
7P1KMC4	Research Methods and Statistics	4	5	25	75	100

### Unit I Introduction of Research

18 Hrs

Meaning – Definition - Classification - Nature and Scope- Significance – Benefits - Types of Research - Methods of Research-Research Process – Identification – Selection - Formulation of a research Problem- Necessary of defining problem. Research Design – Meaning - Features of good research design - Preparation of model research design.

### Unit II Sampling

18 Hrs

Meaning - Advantages and Limitations – Steps – Types - Sampling and Non-sampling errors. Data Collection - Primary and Secondary – Investigation – Methods - Survey method - Case study method – Observation - Interview schedule – Questionnaire – Pre-testing - Pilot study – Sources of Secondary data. Scaling Technique – Meaning - Basis of Classification- Techniques – Attitude-scaling. Processing, Analysis and Interpretation of data.

### Unit III Data Analysis

18 Hrs

Correlation and Regression Analysis – Meaning - Multiple & Partial - Hypothesis - Types - Testing of hypothesis - Test of significance for Small (t test) and Large samples – The Chi-Square – Goodness of fit test.F Test and Analysis of variance. (hands on training through SPSS).

### Unit IV Analysis of Time series

18 Hrs

Components of Time series - Measurement of Trend - Measurement of Personal variations - Seasonal variations - Cyclical variations - Irregular variations (hands on training through SPSS).

### Unit V Research Report

18 Hrs

Meaning - Significance – Types – Contents – Layout - Precautions in writing a research report - Model Research Report.

### Text Book

1. C.R. Kothari & Gaurav Garg, “**Research Methodology Methods and Techniques**”, Third Edition, 2016, New Age International Publishers, New Delhi.

### Reference Books

1. S.L. Gupta & Hitesh Gupta, “**Business Research Methods**”, 2015, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
2. Anil Kumar Mishra, “**A hand Book on SPSS for Research Work**”, 2011, Himalaya Publishing House.
3. O.R. Krishnaswami & M. Renganathan, “**Methodology of Research in Social Science**”, Second Edition, 2015, Himalaya Publications, Mumbai.
4. TN. Srivastava & Shailaja Rego, “**Business Research Methodology**”, 2012, McGraw Hill Education Private Ltd., New Delhi.
5. S.P. Gupta, “**Statistical Methods**”, Forty Fourth Edition, 2014, Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17P2KMC5	Advanced Cost Accounting	5	5	25	75	100

**Unit I Introduction to Cost Accounting** **18 Hrs**

Meaning - Objectives - Cost Concepts - Cost Accounting Standards (CAS), Generally Accepted Cost Accounting Principles (GACAP) - Purpose - Objectives - Applicability.

**Unit II Direct Material and Employee Cost** **18 Hrs**

Introduction - Material (CAS-6) - EOQ - Different Levels of Stock- Methods of Pricing Issues – Wastage - Scrap, spoilage and defectives and its treatment.

Employee Cost (CAS-7) - Idle time - Over time- treatment - Employee turnover - Remuneration and Incentives Schemes - Co-Partnership and Profit Sharing Schemes - Control over employee cost prevention of fraud in wage payments. Capacity Determination (CAS-2)

**Unit III Overhead- (CAS-3)** **18 Hrs**

Meaning - Classification - Steps in Overhead accounting - Allocation, Apportionment – Overheads to cost centres - Absorption of overheads - Over and under absorption and treatment - Activity Based Costing.

**Unit IV Accounting Entries of an Integrated Accounting System** **18 Hrs**

Introduction - Cost Ledger and Non Integrated Accounting and Reporting - Reconciliation between Cost Account and Financial Account - Profit and Loss.

**Unit V Cost Accounting Methods and System** **18 Hrs**

Introduction - Contract Costing - Process costing – loss model, equivalent model, inter process profit - Joint product - by product - Service costing- Unit costing - Cost sheet - quotation sheet.

**Text Book(s):**

1. SP. Jain, KL Narang & Simmi Agrawal, “**Advanced Cost Accounting**”, 2013, Kalyani Publications Ltd.
2. **Cost Accounting Standards**, Publications of Institute of Cost Accountants of India.

**Reference Books**

1. RSN.Pillai and V.Bagavathy, “**Cost Accounting**”, Sixth Edition, 2015, S Chand Publications.
2. TS. Reddy & Y. Hari Prasad Reddy, “**Cost Accounting**”, Margham Publications, Chennai.
3. SN. Maheshwari & SK. Maheswari, “**A Text Book of Accounting for Management**”, 2006, Vikas Publishing House.
4. Bhabatosh Banerjee, “**Cost Accounting- Theory & Practice**”, Twelfth Edition, 2013, PHI Ltd, New Delhi.
5. VK. Saxena & CD. Varshist, “**Cost Accounting**”, Seventh Edition, 2008, Sultan Chand & Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17P2KMC6	Advanced Corporate Accounting	5	5	25	75	100

### Unit I Issue of Share Capital

18 Hrs

Introduction – Meaning - Issue of Shares – Equity - Preference and Debentures - Redemption of Preference shares and Debentures – Underwriting - Profit prior to Incorporation.

### Unit II Final Accounts

18 Hrs

Introduction - Preparation of Final accounts of Companies as per Schedule III - Valuation of Goodwill and Shares

### Unit III Restructuring and Liquidation

18 Hrs

Introduction - Amalgamations, Absorption and Reconstruction (External and Internal) of Companies – Liquidation - Statement of affairs - Liquidators final statement of account

### Unit IV Accounts of Holding Companies

18 Hrs

Introduction - Preparation of Consolidated profit and loss account and Balance sheet (Excluding Inter Company holding, Chain holdings merger and acquisition)

### Unit V Accounts for Banking and Insurance Companies

18 Hrs

Introduction - Final accounts and schedules - Preparation of profit and loss account and Balance sheet - Asset classification and Provisioning Norms - Capital Adequacy Norms. Insurance Companies Accounts - Schedules – Final Accounts for Insurance Companies.

### Text Book

1. S.P. Jain & K.L Narang, “Corporate Accounting”, 2015, Kalyani Publishers, Mumbai.

### Reference Books

1. R.L. Gupta & M. Radhaswamy, “Corporate Accounting”, 2015, Sultan Chand & Sons, New Delhi.
2. M.A. Arulanandam & K.S. Raman, “Advanced Accountancy”, Vol-II, Sixth Edition, 2015, Himalaya Publishing House, Mumbai.
3. S. N. Maheshwari & Suneel K Maheshwari, “Corporate Accounting”, Fifth Edition, 2010, Vikas Publishing House Pvt. Ltd.
4. MC. Sukla, TS. Grewal, & SC. Gupta, “Advanced Accounting” Vol-II, 2013, S.Chand.

Course Code	Course Title	C	H	I	E	T
17P2KMC7	Marketing Management	4	5	25	75	100

### Unit I Introduction to Marketing Management

18 Hrs

Meaning – Marketing Concept – Marketing Environment – Marketing Mix – Marketing Planning and Strategy – Market research and Market Information System.

### Unit II Product

18 Hrs

Definition - Product Policy – Product Classification – Product Mix – Product Line – Brand Policy – Packaging and labeling decisions – Legal aspects – Product Life Cycle – Marketing Strategies in different stages.

### Unit III Pricing

18 Hrs

Definition - Importance of price in business – Pricing policies – Objectives and Strategies – Factors that affect price decisions – Basic pricing policies – Kinds of pricing – Special problems in pricing – Legal restrictions in pricing – Resale price maintenance.

### Unit IV Channels of Distribution

18 Hrs

Definition – Channel functions – Factors considered in the selection of channels – Wholesalers – Retailers – Distribution cost analysis – Inventory and warehousing decisions – Producers problems in channel determination and usage. Management of physical distribution.

### Unit V Promotional Strategy

18 Hrs

Introduction - Marketing Communications and persuasion – Purposes of Sales promotion – Decision in sales promotion - Publicity – Decisions – Objectives – Salesmanship – Designing of sales force – Management of sales force – Principles of personal selling – Advertising – Types of advertising –Advertising policy – Causes for failure of advertising appeal - Selection of media – Classification of Media.

### Text Book

1. RSN Pillai and Bhagavathi, “Marketing Management”, 2015, S.Chand & Sons, New Delhi.

### Reference Books

1. Philip Kotler & Kevi Lane Keller, “Marketing Management”, Fifteenth Edition, 2015, Pearsons Publications.
2. Ramaswamy & Namakumari, “Marketing Management”, Fifteenth Edition, 2013, McGraw Hill Education (India) Pvt. Ltd., New Delhi.
3. Rajan Nair & C B Gupta, “Marketing Management”, Fourteenth Edition, 2011, Sultan Chand & Sons.
4. SA. Sherlekar & R. Krishnamoorthy, “Marketing Management – Concepts and Cases”, Fourteenth Edition, 2016, Himalaya Publishing House.

Course Code	Course Title	C	H	I	E	T
17P2KMC8	Financial Markets and Services	4	5	25	75	100

**Unit I Indian Financial system** **18 Hrs**

Introduction - Structure – Equilibrium in financial markets – Financial system in Economic development – Financial development – Concepts – Efficiency Innovation – Diversification – Broad, Deep, Wide and Shallow markets – Financial Liberalization or deregulation – Securitization – Disintermediation – Internationalization and globalization.

**Unit II Money Market** **18 Hrs**

Introduction - Call money market – Gilt edged securities – Treasury bills market - Discount market – Government securities market.

**Unit III Capital market** **18 Hrs**

Introduction - Stock Exchange – Organization and Functions – Trading in stock exchanges, Listing of securities – Regulation and control of stock exchanges in India – New Issues Market- IPO – Introduction to stock trading market options.

**Unit IV Merchant Banking** **18 Hrs**

Introduction - Functions and services – Guidelines of RBI and SEBI regarding Merchant banking. Mutual funds – Management of mutual funds – Asset Management company – Formation – Parties of mutual fund – Types of mutual fund- NAV – Calculation of NAV – Entry load and Exit load – RoI in Mutual fund.

**Unit V Venture Capital and Factoring** **18 Hrs**

Venture Capital – Meaning - Concepts and dimensions – Functions – Prerequisites to the success of venture capital.

Factoring – Parties – Functions of a factor – Essentials of factoring – Mechanics of factoring – Classification of factoring – Cost benefit analysis of factoring vs. Bill discounting – Merits and demerits.

**Text Book**

1. E. Gordon & K. Natarajan, “**Financial Markets and Institutions**”, Third Edition, 2015, Himalaya Publishing House.

**Reference Books**

1. Dr. S. Guruswamy, “**Financial Market and Institutions**”, Fourth Edition, 2015, McGraw Hill Education Private Limited, New Delhi.
2. C.M. Bhole, “**Financial Institutions & Markets-Structure, Growth & Innovations**”, Third Edition, 2006, McGraw Hill Education Private Limited, New Delhi.
3. M.Y. Khan, “**Financial Services**”, Eighth Edition, 2015, McGraw Hill Education Private Limited, New Delhi.

Course Code	Course Title	C	H	I	E	T
17P1KMC9	Advanced Management Accounting	5	5	25	75	100

### **Unit I Introduction to Management Accounting** **18 Hrs**

Definition – Scope – Functions - Advantages and Limitation - Management Accounting vs. Financial Accounting - Cost Accounting vs. Management Accounting – Tools of Management Accounting.

### **Unit II Financial Statement Analysis** **18 Hrs**

Introduction - Comparative and Common size statements – Uses and Limitations of Ratio analysis - Types of Ratio - Liquidity, Profitability, Solvency and Turnover ratios.

### **Unit III Funds flow and Cash flow analysis** **18 Hrs**

Introduction - Uses and limitations - Distinction between Cash Flow and Fund flow – Preparation of statement of Fund Flows - Preparations of Statement of Cash flows (Ind AS 7).

### **Unit IV Cost-Volume- Profit analysis** **18 Hrs**

Introduction - Concepts - BEP – Utility - Limitations of CVP analysis - Decision involving alternative choices - Key factors - Determination of Sales mix - Exploring markets - Discontinuance of Product line - Make or Buy decisions - Change vs. Status expand or Contract - Shutdown or Continue and Pricing decision.

### **Unit V Variance analysis and Budgeting** **18 Hrs**

Introduction - Cost variance- Material, Labour and Overheads variance and Sales Profit variance - Control of Variance. Budget and Budgetary control - Classification of Budgets. Responsibility account – Meaning - Objectives - Control Ratios - Responsibility centers - Process – Advantages - Base Budgeting Management Reporting – Meaning – Types - Requisites of Report - Steps for Effective reporting.

#### **Text Book**

1. S.N.Maheshwari, “**Management Accounting and Financial Control**”, Sixteenth Edition, 201, Sultan Chand & Sons.

#### **Reference Books**

1. RSN Pillai & Bagavathy, “**Management Accounting**”, Fourth Edition, 2015, S.Chand & Company Pvt. Ltd.
2. TS. Reddy & Y. Hari Prasad Reddy, “**Cost and Management Accounting**”, Fourth Edition, 2013, Margham Publications, Chennai.
3. IM. Pandey, “**Management Accounting**”, Third Edition, 2010, Vikas Publishing House.
4. Ravi M Kishore, “**Advanced Management Accounting**”, 2013, Taxman Publication Pvt. Ltd.

Course Code	Course Title	C	H	I	E	T
17P2KMC10	Indian Accounting Standards and Accounting Software	4	5	25	75	100

**Unit I Introduction to Accounting Standards 18 Hrs**

Introduction - International and Indian Accounting Standards- Composition of the Accounting Standards Board-Compliance with Accounting Standards under various Statues- Categorisation of enterprises for the applicability of various accounting standards- An over view of IFRS.

**Unit II IndAS1, IndAS2, IndAS7 and IndAS10 18 Hrs**

Ind AS1- Disclosure of Accounting Policies- Meaning of Accounting policies- Need for accounting policies- Selection of an Accounting policy- Fundamental Accounting assumptions- Disclosure requirements- simple problems.

Ind AS2 – Valuation of Inventories – applicability- measurement of Inventories- Cost of purchase- conversion cost- other costs – Determination of Net Realisable value- Disclosure requirements- simple problems.

Ind AS 7 – Cash Flow Statements-Applicability- Meaning of Cash- Cash Equivalents- Cash flow- presentation of cash flow statements- operating –investing –financing activities- Disclosure requirements- simple problems.

Ind As 10 – Contingencies & Events occurring after the Balance sheet data- Adjustments to be made- Non-adjusting events- Disclosure requirements- simple problems.

**Unit III Ind AS 16, Ind AS 18 and Ind AS 23 18 Hrs**

Ind AS 16- Property Plant and equipments - Depreciation Accounting- Accounting treatments- Change in method of depreciation- Change in useful life-Change in value due to revaluation- Addition/Extension to asset(becoming integral part of existing asset) Disclosure requirements- simple problems

Ind AS 18 - Revenue recognition – Meaning- Timing of recognition of revenue- Revenue from sale of goods- Revenue from rendering of services- Other revenues- Disclosure requirements- simple problems

Ind AS 23 Borrowing Costs- Meaning – Qualifying asset- Recognition of borrowing costs- Acquisition-Construction or production of qualifying assets.

**Unit IV Accounting Package 18 Hrs**

Tally –Features & Configuration - Creation of Company - Groups – Sub-group – Reserved Account groups- Display of Groups – Primary groups-Capital nature & revenue nature- Introduction – Alteration of Groups - Deletion of Groups - Creation of ledgers- Process of creation of ledger. Vouchers-Creation and alteration of vouchers - Final accounts and Tally.

**Unit V Inventory 18 Hrs**

Introduction – Buying and Selling Activity of a Trader – Stock Journal – Non – Inventory Vouchers – Inventory Masters – Stock Groups and Stock Items Creation & Alteration of category and Items -Deletion of a category and items.

Interest – Calculations- Introduction – Simple Interest – Compound Interest – Method of calculation of interest

**Text book(s):**

1. Guidance Note on Accounting Standards, Institute of Chartered Accountants of India Publications.
2. CA.Dr.Rajkumar S.Adukia, Guide on Indian Accounting Standards, Rishabh Academy Pvt Ltd, Mumbai.

# Department of Mathematics

**The Madura College (Autonomous), Madurai – 625011.**  
**Department of Mathematics**  
**B.Sc Mathematics Major-Course Structure**

Semester	Sub. Code	Title of the Paper	Hours	Credits	
I	17U1MMC1	Calculus	4	4	
	17U1MMC2	Trigonometry and Theory of Equations	4	4	
	17U1MES1	Environmental Studies	2	2	
	17U1MSM1	Major Skill Based Elective– I : Switching Theory	2	2	
II	17U2MMC3	Analytical Geometry (3D) and Vector Calculus	4	4	
	17U2MMC4	Discrete Mathematics	4	4	
	17U2MVE1	Value Education	2	2	
	17U2MSM2	Major Skill Based Elective – II : Fourier Series and Z-Transforms	2	2	
III	17U3MMC5	Groups and Rings	6	6	
IV	17U4MMC6	Sequence and Series	2	2	
	17U4MMC7	Mathematical Statistics	2	2	
	17U4MSM3	Major Skill Based Elective – III :Integral Transforms	2	2	
V	17U5MMC8	Real Analysis	6	6	
	17U5MMC9	Differential Equations	6	6	
	17U5MMC10	Mechanics	6	6	
	<b>Major Elective – I (one to be chosen)</b>				
	17U5MME1	Probability Theory	6	7	
	17U5MME2	Theory of Numbers and Inequalities			
	17U5MME3	Mathematical Modelings			
	VI	17U6MMC11	Complex Analysis	4	4
		17U6MMC12	Linear Algebra	4	4
		17U6MMC13	Graph Theory	4	4
17U6MSM4		Major Skill Based Elective – IV(Quantitative Aptitude Mathematics)	2	2	
<b>Major Elective – II (one to be chosen)</b>					
17U6MME4		Optimization Techniques	5	6	
17U6MME5		Astronomy			
17U6MME6		Fuzzy Mathematics			
<b>Major Elective – III (one to be chosen)</b>					
17U6MME7		Numerical Methods	5	6	
17U6MME8		Automata Theory			
17U6MME9	Integral Equations				

**The Madura College (Autonomous), Madurai – 625011.**  
**Department of Mathematics**  
**B.Sc Mathematics Ancillary (Computer and Computational Methods)**  
**Course Structure**

<b>Semester</b>	<b>Sub. Code</b>	<b>Title of the Paper</b>	<b>Hours</b>	<b>Credits</b>
III	17U3MAC1	Ancillary CCM-I: Office Automation	2	1
	17U3MAP1	LAB: Practical in Office Automation	2	1
IV	17U4MAC2	Ancillary CCM – II: Programming in C	4	2
	17U4MAP2	LAB: Practical in Programming in C	2	1
V	17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2
	17U5MAC3	Ancillary CCM - III: Fundamentals of JAVA Programming	2	1
	17U5MAP3	LAB: Practical in JAVA Programming	2	1
VI	17U6MAC4	Ancillary CCM - IV: Programming with C++	4	2
	17U6MAP4	LAB: Practical in C++	2	1

Course Code	Course Title	C	H	I	E	T
17U1MMC1	Calculus	4	4	25	75	100

**Unit I Successive and Partial Differentiation** **12 Hrs**

Higher derivatives -  $n^{\text{th}}$  derivatives - Leibnitz's theorem (without proof) – Partial differentiation – Problems.

**Unit II Application of Differentiation** **12 Hrs**

p-r equation-Curvature – Radius of curvature – Evolutes – Envelopes – Maxima and minima for functions of two variables.

**Unit III Evaluation of Integrals** **12 Hrs**

Evaluation of definite integrals - Properties– Integration by parts - Reduction formulae – Problems.

**Unit IV Double and Triple Integrals** **12 Hrs**

Double integrals - Evaluation of double integral – Triple integrals – Change of variables.

**Unit V Beta and Gamma functions** **12 Hrs**

Definition – Properties of Beta and Gamma functions – Problems.

**Text Book(s)**

1. S. Arumugam, Calculus, 2011 Edition, New Gamma Publishing House

**Reference(s)**

1. T. K. Manicavachagom Pillay Differential Calculus, 2003 Edition, S. Viswanathan (Printers & Publishers) Pvt. Ltd.
2. T. K. Manicavachagom Pillay, Integral Calculus 2000 Edition, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

Course Code	Course Title	C	H	I	E	T
17U1MMC2	Trigonometry and Theory of Equations	4	4	25	75	100

**Unit I Trigonometry** **12 Hrs**

Hyperbolic function – Relation between hyperbolic function and circular trigonometric functions – Inverse hyperbolic functions.

**Unit II Trigonometric series** **12 Hrs**

Logarithm of a complex number – Summation of trigonometric series – Difference method – C+iS method – Gregory’s series (Excluding the method angles in arithmetic progression).

**Unit III Roots and Coefficients** **12 Hrs**

Equations with real coefficients and imaginary roots-equations with rational coefficients and irrational roots- Relation between roots and coefficients – Symmetric functions of the roots – Sum of the power of the roots.

**Unit IV Reciprocal equations and Transformations of equations** **12 Hrs**

Reciprocal equations –solution of standard reciprocal equation- Solving reciprocal equations by reducing to standard form – Transformation of equations- Roots with signs changed- Roots multiplied by a given number – Increasing and decreasing the roots-Removal of terms-Descartes’s rule of sign- Rolle’s theorem(without proof).

**Unit V Cubic and Biquadratic equation** **12 Hrs**

Horner’s method– Cardon’s method – Trigonometrical method- Ferrari’s method of solvingbiquadratic equations.

**Text Book(s):**

1. T. K. ManicavachagomPillay, Algebra Vol. I, 2003 Edition, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

**Chapters:** 6(6.9-6.11, 6.13, 6.15- 6.18, 6.24, 6.25, 6.30, 6.34 &6.35).

2. Dr. S. Arumugam, Trigonometry and Fourier series, 1999 Edition, New Gamma Publishing House.

**Chapters:** 2, 3, 4.

**Reference Books:**

1. M. K. Venkatraman, Manorama Sridhar, Classical Algebra & Trigonometry, 1<sup>st</sup> Edition 2002, The National Publishing Company.
2. T. K. ManicavachagomPillai, Trigonometry, 1997 Edition, S. Viswanathan (Printers & Publishers) Pvt.Ltd.

Course Code	Course Title	C	H	I	E	T
17U1MSM1	Major Skill Based Elective– I : Switching Theory	2	2	25	75	100

**Unit I Number system and Codes 6 Hrs**

Number representation- Conversion of bases - Binary arithmetic - Binary codes weighted and non-weighted codes.

**Unit II Switching Algebra 6 Hrs**

Fundamental postulates – Basic properties – Switching expressions and their manipulation – De’ Morgan’s theorem.

**Unit III: Switching Function 6 Hrs**

Definition - Simplification of expression – Canonical forms-functional properties-exclusive-OR operation-functionally complete operations.

**Unit IV:Isomorphic System 6 Hrs**

Series – Parallel switching circuits –Propositional calculus-Electronic gate networks – Boolean algebras.

**Unit V: Minimization of Switching Function 6 Hrs**

Introduction – The map method – Simplification and minimizing of functions – Determination of the minimal product of the sums – Don’t care combination-The five-variable map.

**Text Book:**

1. Zvikhovian and Niraj K. Jha, Switching and Finite Automata Theory , 3<sup>rd</sup> Edition 2010, Cambridge University Press.

**Chapters:** 1(1.1,1.2), 3 & 4 (4.1, 4.2).

**Reference Books:**

1. Anita Goel and Ajay Mittal, Computer Fundamentals and Programming in C, Second Impression (2014), by Pearson (India).
2. A.P. Godse and D. A. Godse, Switching Theory and Logic Design by, 1<sup>st</sup> Edition 2009, Technical Publications.

Course Code	Course Title	C	H	I	E	T
17U2MMC3	<b>Analytical Geometry of three dimension and Vector Calculus</b>	4	4	25	75	100

**Unit I Planes** **12 Hrs**

Equation of a plane - Angle between two planes - Angle bisectors of two planes.

**Unit II Straight Lines** **12 Hrs**

Equation of a straight line - A plane and a straight line -Equation of two skew lines in a simple form.

**Unit III The Sphere** **12 Hrs**

Equation of a sphere - Tangent line and tangent plane – Section of a sphere.

**Unit IV Vector Differentiation** **12 Hrs**

Differentiation of vectors - Gradient - Divergence and curl.

**Unit V Vector Integration** **12 Hrs**

Line integrals - Surface integrals - Green's, Gauss and Stoke's theorems (without proof) - Problems.

**Text Book:**

1. S. Arumugam&A.ThangapandiIssac, Analytical Geometry (3D) and Vector Calculus, Edition 2011, New Gamma Publishing House.

**Chapters:** 2 (2.1 - 2.3), 3 (3.1 - 3.3), 4 (4.1 - 4.3), 5 (5.2 - 5.4), 7 (7.1 - 7.3).

**Reference Books:**

1. T. K. ManickavachagomPillai and T. Natarajan, Analytical Geometry (3D), Edition 2011, S. Viswanathan (Printers & Publishers) Pvt. Ltd.
2. M. K.Venkataraman and Manorama Sridhar, Vector calculus and Fourier series, 2002 Edition, The National Publishing Company.

Course Code	Course Title	C	H	I	E	T
17U2MMC4	Discrete Mathematics	4	4	25	75	100

### Unit I Set Theory

12 Hrs

Introduction – Sets and Elements – Universal Set and Empty Set – Subsets – Venn Diagrams – Set Operations – Algebra of Sets and Duality – Finite, Infinite Sets and Counting Principle – The Inclusion – Exclusion Principle – Classes of Sets, Power Sets, Partitions – Mathematical Induction – Multi Sets – Solved Problems.

### Unit II Relations and Functions

12 Hrs

Introduction – Product Sets – Relations – Pictorial Representations of Relations – Composition of Relations – Types of Relations – Closure Properties – Equivalence Relations – Partial Ordering Relations – n-ARY relations – Solved Problems.

**Functions:** Introduction – Functions – One-to-One, Onto, Invertible Functions – Mathematical, Exponential and Logarithmic Functions – Solved Problems

### Unit III Logic and Propositional Calculus

12 Hrs

Introduction – Propositions and Compound Propositions – Basic Logical Operators – Propositions and Truth Tables – Tautologies and Contradictions – Logical Equivalence – Algebra of Propositions – Conditional and Biconditional Statements – Arguments – Logical Implication – Propositional Functions, Quantifiers – Negation of Quantified Statements – Normal Forms – Solved Problems.

### Unit IV Matrix Theory

12 Hrs

Introduction – Algebra of Matrices – Types of Matrices – Inverse of a Matrix- Elementary transformation-Rank of a matrix – Consistency and Inconsistency of simultaneous linear equations using Matrices - Problems

### Unit V Characteristic Equation of Matrices

12 Hrs

Characteristic Equation of a Matrix – Cayley Hamilton theorem – Finding Powers and Inverse of a Matrix using Cayley Hamilton Theorem – Eigen Values and Eigen Vectors – Properties of Eigen Values and Eigen Vectors – Determination of Eigen Values and Eigen Vectors.

### Text Book(s):

1. Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics, 3<sup>rd</sup> Revised Edition (2013), Schaum's Outlines Tata McGraw Hill Education (India) Private Limited.  
**Chapters :** 1, 2(2.1-2.10), 3 (3.1-3.4) and 4 (For Units – I, II and III )
2. S. Arumugam and A. T. Issac, Modern Algebra, Reprint 2011, Scitech Publications.  
**Chapter:** 7 only (For Units – IV & V)

### Reference Books:

1. J. P. Tremblay and Manohar Discrete Mathematical Structures with Applications to Computer Science, 28<sup>th</sup> Reprint 2007, Tata McGraw – Hill Publications.
2. M. K. Venkatraman, N. Sridharan and N. Chandrasekaran, Discrete Mathematics, The National Publishing Company (2000).

Course Code	Course Title	C	H	I	E	T
17U2MSM2	Major Skill Based Elective –II: Fourier series and Z -Transforms	2	2	25	75	100

### Unit I Fourier Series

6 Hrs

Definition - Euler's formula (Statement only) - Fourier coefficients-Fourier Series Simple Problems.

### Unit II Half Range Fourier Series

6 Hrs

Half Range Sine Series, Half Range Cosine Series - Problems.

### Unit III Harmonic Analysis

6 Hrs

Definitions - First Harmonic - Second Harmonic Coefficients.

### Unit IV Z-Transforms

6 Hrs

Introduction -Definition - Damping Rule, Shifting Theorem - Initial value theorem - Final value theorem - Convolution theorem (Statement only) - Simple Problems.

### Unit V Inverse Z-Transform and its Application

6 Hrs

Definition - Inverse Z-transform - Applications of Z-transform - Problems.

#### Text Book:

1. S. Arumugam A. Thangapandi Isaac and A. Somasundaram, Higher Engineering Mathematics Volume-II, Edition 2010, Scietech Publications.

**Chapters:** 13(13.3,13.5,13.8),16(16.1-16.4).

#### Reference Books:

1. B.S Grewal, Higher Engineering Mathematics, 40<sup>th</sup> Edition, Khanna Publishers.
2. T.Veerarajan, Engineering Mathematics, 4<sup>th</sup> Edition 2005, Tata McGraw Hill Publishers.

**The Madura College (Autonomous), Madurai – 625011.**  
**Department of Mathematics**  
**Course Structure for Ancillary Mathematics (B.Sc Phy&Chem)**

<b>Semester</b>	<b>Sub. Code</b>	<b>Title of the Paper</b>	<b>Hours</b>	<b>Credits</b>
I	17U1MAC1	Allied Mathematics – I	6	3
II	17U2MAC2	Allied Mathematics – II	6	3
III	17U3MAC3	Allied Mathematics - III	4	2
	17U3MSA1	Ancillary Skill Based Elective	2	2
IV	17U4MAC4	Allied Mathematics - IV	4	2

Course Code	Course Title	C	H	I	E	T
<b>17U1MAC1</b>	<b>Allied Mathematics – I (I Phy. and I Chem.)</b>	3	6	25	75	100

### **Unit I Theory of Equations**

**18 Hrs**

Formation of Equations – Relation between roots and Coefficients- Reciprocal equation – Transformation of Equation – Approximate solutions of Numerical Equations – Newton’s Methods – Horner’s Method.

### **Unit II Differential Calculus**

**18 Hrs**

Curvature – Radius of Curvature – p-r equation – Evolutes.

### **Unit III Integral Calculus**

**18 Hrs**

Integration – Evaluation of definite integrals – Integration by parts – Reduction Formulae – Evaluation of Double and Triple Integrals.

### **Unit IV Trigonometry**

**18 Hrs**

Applications of Demoivre’s Theorem – Expression for  $\sin n\theta$ ,  $\cos n\theta$  and  $\tan n\theta$  – Expression for  $\sin^n \theta$ ,  $\cos^n \theta$  and  $\sin^m \theta \cos^n \theta$ - Problems - Expansion of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  in powers in  $\theta$  – Hyperbolic functions – Inverse Hyperbolic functions.

### **Unit V Trigonometric series**

**18 Hrs**

Logarithm of a complex number – Summation of Trigonometric Series – Difference Method – Angles in arithmetic progression method – C+iS method (Excluding Gregory’s series).

#### **Text Book:**

1. S. Arumugam and A. Thangapandi Isaac, Allied Mathematics Paper – I, Edition 2014, New Gamma Publishing House.

**Chapters:** Part I, Part II & Part III.

#### **Reference Books:**

1. M. K. Venkataraman and Manorama Sridhar, Allied Mathematics Vol. I by 1<sup>st</sup> Edition 2005, Agasthiar Publications.
2. P. R. Vital, Allied Mathematics, Margam Publications (2009).

Course Code	Course Title	C	H	I	E	T
17U2MAC2	Allied Mathematics – II (I Phy. and I Chem.)	3	6	25	75	100

### Unit I Vector Calculus

18 Hrs

Vector differentiation – Vector differential operator – Gradient – Divergence – Curl & their simple properties – Directional Derivatives – Solenoidal and irrotational Vectors – Line integrals.

### Unit II Matrix Theory

18 Hrs

Types of Matrices – Rank of a Matrix – Consistency of equations – Cayley Hamilton theorem – Eigen Values and Eigen Vectors.

### Unit III Correlation & Regression

18 Hrs

Correlation – Rank Correlation – Spearman's formula – Regression.

### Unit IV Interpolation

18 Hrs

Finite differences – Newton's Formula – Lagrange's Formula.

### Unit V Index Numbers

18 Hrs

Simple index number– Weighted index number – Weighted aggregative method – Weighted average of price relative method – Consumer price index numbers – Conversion of chain base index number into fixed base index and conversely.

#### Text Book:

1. S. Arumugam and A.Thangapandi Isaac, Allied Mathematics Paper II (MKU) by Edition 2011, New Gamma Publishing House.

**Chapters:** 1, 2, 3,6,7,9.

#### Reference Books:

1. S. P. Gupta, Statistical Methods, Revised edition 2011, S.Chand Publishing.
2. P. R. Vital, Allied Mathematics, Margam Publications (2009).

**The Madura College (Autonomous), Madurai – 625011.**  
**Department of Mathematics**  
**Course Structure for Non-Major Elective (For U.G)**

<b>Semester</b>	<b>Sub. Code</b>	<b>Title of the Paper</b>	<b>Hours</b>	<b>Credits</b>
III	17U3MNM1	Quantitative Aptitude Mathematics	2	2
IV	17U4MNM1	Numerical Aptitude	2	2

**COMPONENTS OF C.I.A AND QUESTION PATTERN FOR  
END SEMESTER EXAMINATIONS**

**Components of C.I.A**

i)	Test	-	15 marks
ii)	Assignment/Quiz/Seminar	-	5 marks
iii)	Attendance	-	5 marks
			_____
	<b>Total</b>	-	<b>25 marks</b>
			_____

**End Semester Exam Components for U.G.**

**Time: 3 Hours**

**Maximum Marks: 75**

**Part –A (10 x 1 = 10 Marks)**

(Answer ALL questions)

- Objective type Questions.
- Two questions from each unit.

**Part –B (5 x 7 = 35 Marks)**

(Answer ALL questions)

- Either or pattern.
- One question from each unit.

**Part –C (3 x 10= 30 Marks)**  
(Answer any THREE questions)

- Out of FIVE questions, THREE questions to be answered
- One question from each unit.

# Department of Physics

**Department of Physics – Curriculum structure for B.Sc. Physics (Major)**

<b>Sem.</b>	<b>Subject Code</b>	<b>Course title</b>	<b>No. of hours</b>	<b>Credits</b>	<b>Paper Type</b>
<b>I</b>	17U1PMC1	Mechanics, properties of matter and sound	5	5	Major
	17U1PSM1	Physics of electrical appliances	2	2	SBE Major (Skill Based Elective)
	17U1PES1	Environmental Studies	2	2	
<b>II</b>	17U2PMC2	Electricity and electromagnetism	5	5	Major
	17U2PMP1	Practical – I	3+3	6	Major Practical
	17U2PSM2	Numerical methods	2	2	SBE Major (Skill Based Elective)
	17U2PVE1	Value Education	2	2	
<b>III</b>	17U3PMC3	Optics	4	4	Major
<b>IV</b>	17U4PMC4	Energy physics	2	2	Major
	17U4PMP2	Practical – II	2+2	4	Major Practical
	17U4PSM3	Programming in C++	2	2	SBE Major (Skill Based Elective)
<b>V</b>	17U5PME1	Relativity and atomic physics	5	6	Major Elective
	17U5PMC5	Basic electronics	5	5	Major
	17U5PMC6	Thermodynamics and statistical physics	5	5	Major
	17U5PMC7	Nuclear physics	3	3	Major
<b>VI</b>	17U6PME2	Quantum principles and spectroscopy	6	7	Major Elective
	17U6PME3	Solid state physics	5	6	Major Elective
	17U6PMC8	Digital electronics and communication	5	5	Major
	17U6PSM4	Microprocessors	2	2	SBE Major (Skill Based Elective)
	17U6PMP3	Practical – III	3+3	6	Major Practical
	17U6PMP4	Practical – IV	3+3	6	Major Practical

Course code	Course Title	C	H	I	E	T
17U1PMC1	Mechanics, properties of matter and sound	5	5	25	75	100

### Unit 1 Dynamics of rigid bodies

Newton's law of motion – Principle of conservation of linear momentum – Collision – impulse – Work done by a constant force – Translatory and rotatory motion – Uniform circular motion – Centripetal and centrifugal forces - Moment of inertia (M.I.) and its physical significance – Angular acceleration and angular momentum – Conservation of angular momentum – Torque – Work done by torque – Theorem of perpendicular and parallel axes – M.I. of a thin uniform bar, ring, uniform circular disc and solid sphere – Kinetic energy of a body rolling on a horizontal plane – Acceleration of a body rolling down an inclined plane – M.I. of a flywheel and its uses.

### Unit 2 Friction and gravitation

Static friction –Laws of friction–Sliding friction – Angle of friction – Cone of friction – Rolling friction – Friction and stability – Necessity of friction – Newton's law of gravitation – acceleration due to gravity – Compound bar pendulum – Inter changeability of points of suspension and oscillation – Minimum time period –Difference between mass and weight – Gravitational field – Gravitational potential energy – Gravitational potential and field due to a uniform solid sphere and thin circular plate – Rocket equation.

### Unit 3 Elasticity

Elasticity – Definition – Stress – Strain – Three moduli of elasticity – Units – Dimension – Hook's law – Definition – Yield point – Elastic limit – Elastic fatigue – Poisson's ratio – Definition – Limiting values – Relation between three moduli – Twisting of a cylinder – Torsion pendulum – Bending of beams – Bending moment – Basic assumptions for theory of bending – Cantilever – Beam supported at its ends and loaded in the middle.

### Unit 4 Viscosity, physics of low pressure and surface tension

Introduction – Stream line motion and rate of flow - Equation of continuity – Bernoulli's theorem – Venturimeter – Poiseuille's flow – Rotary oil pump – Mercury diffusion pump – Pirani gauge - Surface tension (S.T.) – Explanation and examples of S.T. – Surface energy – excess pressure inside a spherical liquid drop and soap bubble – Difference in pressure across a curved surface – Angle of contact (Definition only) – Capillarity – Theory – determination of surface tension by capillary rise and Jaeger's method.

### Unit 5 Sound

SHM – Compositions of two SHMs in a straight line (analytical method only) – Composition of two simple harmonic vibrations of equal time periods acting at right angles – Uses of Lissajous figures - Free, undamped, damped and forced vibrations – Resonance and sharpness of resonance – Q factor – Applications. interference of sound waves – Analysis – Beats – analytical treatment of beats – Acoustics – Reverberation – Acoustic measurements – Factors affecting the

acoustics of buildings – Requisites for good acoustics – Ultrasonics – production – Piezo-electric oscillator – Applications.

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**Text Book(s):**

1. Brijlal & N. Subrahmanyam, Properties of matter, 2001, S.Chand & Co. Ltd.  
Unit 1: Chapters 2.10–2.15, 2. 17–2.20, 2.23, 3.1–3.11, 3.16–3.17, 3.20, 3.27–3.30.  
Unit 2: Chapters 5.4, 5.9, 5.11–5.14, 5.20, 5.22–5.24, 5.26, 5.28, 5.34–5.35.  
Unit 3: Chapters 6.1–6.2, 6.5, 6.6, 6.9–6.11, 6.14, 6.16, 6.18–6.22.  
Unit 4: Chapters 7.1–7.5, 7.7(1), 7.9, 7.11, 7.12, 7.21–7.22, 7.24, 8.1–8.5, 8.7–8.10, 8.13–8.17.
2. D.S. Mathur, Elements of Properties of Matter, 2006, S.Chand & Co. Ltd.  
Unit 2: Chapters 11.1–11.3, 11.5–11.7.
3. Brijlal & N. Subrahmanyam, Text Book of Sound, 2010, Vikas publishing House Pvt. Ltd.  
Unit 5: Chapters 1.3, 2.2 (analytical method only), 2.4, 2.9, 3.1–3.8, 6.6–6.7, 6.13–6.14, 10.14–10.15, 10.19–10.20, 10.22–10.23, 10.24 (3), 10.27.

**References:**

1. D.S. Mathur, Mechanics, 2006, S. Chand & Co. Ltd.
  2. Alonso and Finn, Physics, 1992, Addison–Wesley Publishing Company Inc.
  3. Halliday, Resnick and Walker, Fundamentals of Physics, 6<sup>th</sup> edition, 2001, John Wiley & Sons, Inc.
  4. Brijlal & N. Subrahmanyam and Jivan Seshan, Mechanics and Electrodynamics, 2011, S. Chand & Co. Ltd.
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Course code	Course Title	C	H	I	E	T
17U2PMC2	Electricity and electromagnetism	5	5	25	75	100

### **Unit 1 Electrostatics**

Electric field and electric intensity – Force between a point charge and a linear charge distribution – Electrostatic potential – Potential and intensity at a point due to a dipole – Electric potential at a point due to an electric quadrupole – Electric potential at a point due to a charged sphere – Electric potential energy – Gauss’s theorem – Application of Gauss’s theorem – Coulomb’s law – Mechanical force experienced by unit area of a charged surface – Electrified soap bubble – Electrical images.

### **Unit 2 Capacitors and dielectrics**

Capacity of a capacitor – Principle of a capacitor – Energy of a charged conductor – Sharing of charge between two charged conductors – Capacity of a spherical capacitor – Capacity of a cylindrical capacitor (with and without dielectrics) – Parallel plate capacitor (with and without dielectrics) – Capacitors in series and parallel – Types of capacitors.

### **Unit 3 Current measurement and thermoelectricity**

Carey-Foster’s bridge – Theory and experiment to find the temperature coefficient and specific resistance – Potentiometer – Measurement of thermo emf using potentiometer – Measurement of current and resistance – Calibration of low range voltmeter and ammeter– Seebeck effect– Law of successive temperatures and intermediate metals – Peltier effect – Peltier co-efficient – Thermodynamics of Peltier effect – Thomson effect – Thermoelectric power.

### **Unit 4 Magnetism**

The Biot Savart law – Divergence of B – Calculation of B using Biot Savart law – Circular current loop – Field midway between two similar coaxial circuits – Field on the axis of a spinning charged disc – Field along the axis of a solenoid – Ampere’ circuital law – Ampere’s law and Curl B – Application of Ampere’s law - Moving coil galvanometer – Ballistic galvanometer – Moving coil ballistic galvanometer – Correction for damping in ballistic galvanometer.

### **Unit 5 Electromagnetic induction**

Faraday’s laws of electromagnetic induction – Lenz’s law – Self and mutual inductance – Determination of resistance AC Bridges –Anderson, Owen’s bridges – Theory and experiments – Charging of a condensers through resistance and inductance – Charging and discharging of a condenser through L and R – Series and parallel resonance circuits – Power in an AC circuit (circuits containing only resistance, capacitance and inductance) – Maxwell’s displacement current – Maxwell’s equation.

**Text Book(s):**

1. Brijlal & N. Subramanyam, Electricity and magnetism, 2000, Ratan Prakashan Mandir Publications.

Unit 1: Chapters 5.2–5.8, 6.1–6.7.

Unit 2: Chapters 7.1–7.7.

Unit 3: Chapters 13.32, 13.35, 13.38, 13.40, 13.41, 17.1–17.5, 17.7, 17.8, 17.10.

Unit 4: Chapters 12.4–12.7, 12.9.

Unit 5: Chapters 18.1, 18.2, 18.6–18.7, 18.13, 18.18–18.22, 20.10, 20.11, 20.12, 20.18, 20.19, 20.20, 20.25, 20.26.

2. D.C. Tayal, Electricity and magnetism, 2000, Himalaya Publishing House.

Unit 4: Chapters 8.7, 8.8 (excluding f<sup>2</sup>), 8.9, 8.10.

Unit 5: Chapters 12.1, 12.2.

**References:**

1. Segal, Chopra & Segal, Electricity and magnetism, 2000, Sultan Chand & Co.

2. R. Murugesan, Electricity and magnetism, Reprint - 2005, S.Chand & Co.

3. Dugel, Chopra, Electricity and magnetism, 2000, Sultan Chand & Co.

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Course code	Course Title	C	H	I	E	T
17U1PSM1	Physics of electrical appliances	2	2	25	75	100

### Unit 1 Safety measures

Safety practice – First aid – Fire extinguishers – Neutral and earth conductor – Fuses and circuit breakers.

### Unit 2 Batteries

Primary cells – Voltaic cell – Leclanche cell – alkaline cell – mercury cell – silver oxide cell – lithium cell – secondary cell – lead– acid battery – nickel– iron battery.

### Unit 3 Magnetic circuits and capacitors

Inductors, types and applications – Magnetic circuits – Electric bell – Mobile crane – Capacitors, types and applications

### Unit 4 Heating appliances

Joule’s heating law – Electric heater – Non automatic iron box – Thermostat – Bimetal thermostat – Adjustable thermostat – Automatic iron box.

### Unit 5 Electrical lamps

Filament lamp – Fluorescent lamp – Low voltage lamps – Instant start fluorescent lamp – Low voltage bulbs – LED halogen lamp – Mercury and sodium vapour lamps.

### **Text Book(s):**

1. Electrician 1<sup>st</sup> year Trade Theory, 2<sup>nd</sup> edition, 2005, Central Instructional Media Institute, Chennai.

Unit 1: Pages 6–18, 37–38, 71–72.

Unit 2: Pages 74–76, 79–83.

Unit 3: Pages 98–102, 94–97, 114–117.

Unit 4: Pages 58, 269–278.

Unit 5: Pages 283–287, 291, 293–298.

### **References:**

1. [www.howstuffworks.com](http://www.howstuffworks.com)

Course code	Course Title	C	H	I	E	T
17U2PSM2	Numerical Methods	2	2	25	75	100

**Unit 1**      **Curve fitting** (Problems and theory)

Principle of least squares - Fitting a straight line – Fitting a parabola – Fitting of an exponent curve.

**Unit 2**      **Roots of algebraic equations** (Problems and theory)

Iterative method of successive approximations – Bisection method – Newton–Raphson method.

**Unit 3**      **Simultaneous equations** (Problems only)

Gauss elimination method – Gauss–Jordan method – Inverse of a matrix.

**Unit 4**      **Interpolation and numerical integration** (Problems only)

Lagrange’s interpolation – Trapezoidal method – Simpson’s one third rule.

**Unit 5**      **Numerical solution of ordinary differential equations** (Problems only)

Euler’s method – Improved Euler’s method – Modified Euler’s method – The Runge-Kutta Second order method.

**Text Book(s):**

1. A.Singaravelu, Numerical methods, Ist Edition, 2002, Meenakshi Agency, Chennai.

Unit 1: Pages 1.15–1.33.

Unit 2: Pages 2.2–2.20.

Unit 3: Pages 2.41–2.51, 2.77.

Unit 4: Pages 4.9–4.14, 4.31–4.33.

Unit 5: Pages 5.12–5.20.

**References:**

1. V. Rajaraman, Computer Oriented Numerical Methods, 3<sup>rd</sup> edition, 1997, McGraw Hill.

Course code	Course Title	C	H	I	E	T
17U2PMP1	Practical – I	6	6	25	75	100

Physics – Major Practical – List of Experiments  
(Any fourteen/year)

No.	Experiment
1	Young's Modulus – Uniform bending (pin and microscope)
2	Young's Modulus – Non-uniform bending (pin and microscope)
3	Young's Modulus – Uniform bending (scale and telescope)
4	Young's Modulus – Non-uniform bending (scale and telescope)
5	Young's modulus – Cantilever depression
6	Acceleration due to gravity and the radius of gyration – Compound pendulum
7	Rigidity modulus – Torsion pendulum (with symmetrical masses)
8	Rigidity modulus – Static torsion (scale and telescope)
9	Surface Tension of water and Interfacial Surface – Drop weight method
10	Surface tension of water – Capillary rise method
11	Comparison of viscosities – Capillary flow
12	Co-efficient of viscosity – Stoke's method
13	Co-efficient of viscosity – Poiseulli's flow
14	Co-efficient of linear expansion of rod
15	Specific heat capacity – Cooling method
16	Specific heat capacity – Joule's calorimeter
17	Specific heat capacity – Method of mixtures
18	Latent heat of steam – Newton's law of cooling
19	Thermal conductivity – Lee's Disc
20	Frequency of the tuning fork –Sonometer
21	Frequency of the A.C Mains – Sonometer
22	Frequency of the vibrator– Melde's string
23	Comparison of resistances – Potentiometer
24	Resistance and specific resistance – Carey-Foster's bridge
25	Resistance of the coil – Meter bridge
26	Any experiment related to general physics

**Books for Reference:**

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, 2007, Sultan Chand & Sons.
2. Indu Prakash & Ramakrishna, A Text Book of Practical Physics, 2011, Kitab Mahal Agencies, New Delhi. .
3. S.R. Govinda Rajan, T. Murugaiyan, S. Sundara Rajan, Practical Physics, 2007, Rochouse & Sons.

**Department of Physics – Curriculum structure  
For B.Sc. Mathematics with ancillary Physics**

Sem	Subject Code	Course title	No. of hours	Credits
I	17U1PAC1	Mechanics and properties of matter	4	2
II	17U2PAC2	Optics and electricity	4	2
II	17U2PAP1	Practical – I	4	2
III	17U3PAC3	Digital electronics and communication	2	1
III	17U3PSA1	Physics of electrical appliances	2	2
IV	17U4PAC4	Renewable energy sources	2	1
IV	17U4PAP2	Practical – II	4	2

**Department of Physics – Curriculum structure  
For B.Sc. Chemistry with ancillary Physics**

Sem	Subject Code	Course title	No. of hours	Credits
III	17U3PAC1	Digital electronics and communication	2	1
IV	17U4PAC2	Mechanics and properties of matter	4	2
IV	17U4PAP1	Practical – I	4	2
V	17U5PAC3	Renewable energy sources	2	1
V	17U5PSA1	Physics of electrical appliances	2	2
VI	17U6PAC4	Optics and electricity	4	2
VI	17U6PAP2	Practical – II	4	2

**Department of Physics – Curriculum structure  
For B.Sc. Physics with ancillary Electronics\***

Sem	Subject Code	Course title	No. of hours	Credits
III	17U3EAC1	AC Circuits	2	1
IV	17U4EAC2	Semiconductor diodes and applications	4	2
	17U4EAP1	Anc. Electronics Practical – I	4	2
V	17U5EAC3	Electronics devices and circuits	2	1
	17U5ESA1	Electronic Instrumentation	2	2
VI	17U6EAC4	Linear Integrated Circuits	4	2
	17U6EAP2	Ancillary Electronics Practical – II	4	2

Course code	Course Title	C	H	I	E	T
17U1PAC1/ 17U4PAC2	Mechanics and properties of matter	2	4	25	75	100

### Unit 1                      **Mechanics**

Laws of impact – Direct impact of spheres – Expression for loss of kinetic energy during collision – Moment of inertia – Parallel & perpendicular axes theorem – Proof – Law of conservation of angular momentum – Expression for rotational kinetic energy – Torque – Moment of inertia of a uniform rod, circular disc and solid sphere (proof).

### Unit 2                      **Elasticity**

Definition of elasticity – Stress – Strain – Three moduli of elasticity – Units – Dimensions – Hooke's law – Definition – Yield point – Elastic limit – Elastic fatigue – Poisson's ratio – Definition – Limiting values – Relation between the three moduli – Torsion pendulum theory – Expression for bending moment – Cantilever – Beam supported at its ends and loaded in the middle.

### Unit 3                      **Viscosity & fluid motion**

Definition – Units – Dimension – Stream lined motion & turbulent motion – Definition – Poiseuille's formula to determine  $\eta$  (without correction for pressure head) – Equation of continuity – Bernoulli's theorem – Statement only – Venturimeter – Ostwald's viscometer – Motion of bodies in highly viscous media – Definition – Terminal velocity – Stoke's formula – Derivation – Experiment to determine the viscosity of a highly viscous liquid.

### Unit 4                      **Surface tension**

Definition – Units – Dimensions – Surface energy definition – Units – Excess pressure across a curved surface (special cases: spherical and cylindrical drop and bubble) – Angle of contact – Capillarity – Determination of surface tension by capillary rise – Experiment to determine surface tension & interfacial surface tension by drop weight method – Determination of surface tension of a liquid by Jaeger's method.

### Unit 5                      **Gravitation**

Kepler's laws of motion – Newton's universal law of gravitation – Determination of Gravitational constant by Boy's method – Acceleration due to gravity – Compound pendulum theory – Period – Inter changeability of point of suspension and oscillation – Variation of acceleration due to gravity ( $g$ ) with altitude, depth, rotation of the earth, poles and equator – Difference between mass and weight – Inertial mass & gravitational mass – Satellites – Stationary satellite – Escape velocity.

**Text Book(s):**

1. Brijlal & N Subrahmanyam, 2001, Mechanics & Properties of matter, S.Chand & Co. Ltd.  
Unit 1: Chapters 3.1, 3.2, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.16, 3.17, 3.20.  
Unit 2: Chapters 6.1, 6.2, 6.5, 6.6, 6.9–6.11, 6.16, 6.17, 6.18, 6.19, 6.21, 6.22.  
Unit 3: Chapters 7.1–7.5, 7.7(1), 7.9–7.11, 7.13.  
Unit 4: Chapters 8.1–8.5, 8.7–8.10, 8.13–8.16, 8.17.  
Unit 5: Chapters 5.2, 5.4, 5.6, 5.7, 5.9, 5.11, 5.12, 5.13, 5.16–5.21, 5.29–5.31.

**References:**

1. R.Murugesan, Mechanics, Properties of matter and sound, 2006, S.Chand & Co. Ltd.
  2. D.S. Mathur, Mechanics, 2006, S.Chand & Co. Ltd.
  3. Brijlal, N. Subrahmanyam and Jivan Seshan, Mechanics and Electrodynamics 2011, S.Chand & Co. Ltd.
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Course code	Course Title	C	H	I	E	T
17U2PAC2/ 17U6PAC4	Optics and electricity	2	4	25	75	100

### Unit 1 Optics

Dispersion – Dispersive power – Deviation without dispersion – Achromatic combination of prisms – Dispersion without deviation – Direct vision spectroscopy – Lenses – Power of a lens – Two lenses in contact and separated by a distance – Chromatic aberration in a lens – Expression for longitudinal chromatic aberration for an object at infinity – Achromatic lenses – Condition for achromatism of two lenses placed in contact and separated by a distance – Spherical aberration – Explanation – Eyepieces Huygen & Ramsden – Differences.

### Unit 2 LASER

Stimulated emission – Absorption – Spontaneous emission – Population inversion – Optical pumping – Working principles of Ruby LASER – He–Ne LASER – LASER applications.

### Unit 3 Fibre optics & holography

Introduction – Optical fibres – Necessity of cladding – Optical fibre system – Optical fibre cable – Total internal reflection – Propagation of light through optical fibre – Numerical Aperture (NA) – Fibre optic communication system and applications – Principles of hologram.

### Unit 4 Electrostatics

Inverse square law – Electric field – Electric potential – Equi potential surface – Electric potential energy Gauss theorem – Proof – Applications – Mechanical force by charged surface – Electrified soap bubble – Capacity of a conductor – Energy of a charged conductor – Sharing of charge between two charged conductor – Principle of capacitor – Cylindrical capacitor – Parallel plate capacitor with & without dielectrics – Combination of capacitors in series & in parallel.

### Unit 5 Current electricity

Ohm's law – Standard Unit of current – Definition of ampere – Units of voltage & resistance – Kirchoff's I & II law – Wheatstone's network – Condition for balance – Condition for sensitiveness – Carey Foster's bridge – Theory – Determination of the temperature coefficient of resistance – Principle of potentiometer – Measurement of current & resistance – Calibration of low & high range voltmeter.

### Text Book(s):

- N. Subramanyan, Brijlal and M. N. Avadhanulu, Text Book of optics, 25<sup>th</sup> edition, 2014, S. Chand & Co.  
 Unit 1: Chapters 4.2, 4.16, 4.17, 4.17.1, 8.1, 8.4, 8.6–8.8, 9.1, 9.2, 9.5, 9.10, 9.11 (A), 9.13, 10.10, 10.11, 10.12.  
 Unit 2: Chapters 22.1, 22.4, 22.7.1, 22.14.1, 22.14.3, 22.19  
 Unit 3: Chapters 23.1, 23.2, 24.1, 24.2, 24.3, 24.4, 24.6, 24.21

2. Brijlal & N. Subrahmanyam, Electricity & magnetism, 2000, Ratan Prakashan Mandir publishers.

Unit 4: Chapters 5.1, 5.2, 5.4, 5.7(iii), 5.8, 6.1, 6.2, 6.4, 6.6, 7.1–7.2, 7.4–7.6

Unit 5: Chapters 13.1, 13.2, 13.13, 13.15, 13.21–13.22, 13.24, 13.32, 13.35, 13.40, 13.41.

**References:**

1. Segal, Chopra & Segal, Electricity and magnetism, 2000, Sultan Chand & Co.
  2. R. Murugesan, Electricity and magnetism, Reprint - 2005, S.Chand & Co.
  3. Dugel, Chopra, Electricity and magnetism, 2000, Sultan Chand & Co.
  4. D.C. Tayal, Electricity and magnetism, 2000, Himalaya Publishing House.
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Course code	Course Title	C	H	I	E	T
17U3PAC3/ 17U3PAC1	Digital electronics and communication	1	2	25	75	100

### Unit 1            Number systems and logic gates

Number systems – Binary – Octal – Hexadecimal – Conversions – Codes – Gray – ASCII Excess3 code – Gates – OR , NOT, AND, NAND, NOR, Ex–OR.

### Unit 2            Laws related to digital electronics

De Morgan’s theorem and proof – Universal gates – Boolean laws – K-map simplifications – SOP – Implementing the simplified equation.

### Unit 3            Digital circuits

Binary arithmetic – 1’s Complement, 2’s Complement – Addition & subtraction (unsigned numbers only) – Half adder – Full adder – Multiplexers – De multiplexers – Decoders – Encoders – BCD to decimal decoders – Decimal to BCD encoder.

### Unit 4            Flip-Flops

Flip–flops – RS, D (Using NAND gates), JK Flip flop – JK master - slave – Four bit shift register ( serial in–serial out) – Working with waveforms.

### Unit 5            Communication

Introduction – Need for modulation – Modulation – Methods of modulation – Amplitude modulation (AM) – Percent modulation – Upper and lower side frequencies – Upper and lower sidebands – Mathematical analysis of a modulated carrier wave – Power relations in an AM wave – Frequency modulation – Modulation index – Deviation ratio – Percent modulation.

### **Text Book(s):**

1. Donald P. Leach, Albert Paul Malvino and Goutham Saha, Digital principles and Applications, VI Edn., 2002, TATA McGraw–Hill Publishing Company Limited, New Delhi.  
Unit 1: Chapter 5, Sections 5.1–5.8  
Unit 2: Chapter 2, Sections 2.1, 2.2; Chapter 3, Sections 3.1, 3.2, 3.3, 3.4, 3.5.  
Unit 3: Chapter 4, Sections 4.1, 4.2, 4.3, 4.4, 4.5, 4.6; Chapter 6, Sections 6.1, 6.2, 6.3, 6.5, 6.6, 6.7  
Unit 4: Chapter 8, Sections 8.1, 8.4, 8.5, 8.7.; Chapter 9, Sections 9.1, 9.2.
2. B.L. Theraja, Basic electronics, (Reprint 2008), S. Chand & Co, New Delhi.  
Unit 5: Chapter 30, Sections 30.1, 30.5, 30.7–30.14, 30.20, 30.22–30.24.

### **References:**

1. S. Manoharan, Digital Principles and system design, Revised edition, May 2013, Charulatha Publications.

Course code	Course Title	C	H	I	E	T
17U3PSA1/ 17U5PSA1	Physics of electrical appliances	2	2	25	75	100

### **Unit 1 Safety measures**

Safety practice – First aid – Fire extinguishers – Neutral and earth conductor – Fuses and circuit breakers.

### **Unit 2 Batteries**

Primary cells – Voltaic cell – Leclanche cell – alkaline cell – mercury cell – silver oxide cell – lithium cell – secondary cell – lead– acid battery – nickel– iron battery.

### **Unit 3 Magnetic circuits and capacitors**

Inductors, types and applications – Magnetic circuits – Electric bell – Mobile crane – Capacitors, types and applications

### **Unit 4 Heating appliances**

Joule’s heating law – Electric heater – Non automatic iron box – Thermostat – Bimetal thermostat – Adjustable thermostat – Automatic iron box.

### **Unit 5 Electrical lamps**

Filament lamp – Fluorescent lamp – Low voltage lamps – Instant start fluorescent lamp – Low voltage bulbs – LED halogen lamp – Mercury and sodium vapour lamps.

### **Text Book(s):**

1. Electrician 1<sup>st</sup> year Trade Theory, 2<sup>nd</sup> edition, 2005, Central Instructional Media Institute, Chennai.  
Unit 1: Pages 6–18, 37–38, 71–72.  
Unit 2: Pages 74–76, 79–83.  
Unit 3: Pages 98–102, 94–97, 114–117.  
Unit 4: Pages 58, 269–278.  
Unit 5: Pages 283–287, 291, 293–298.

### **References:**

1. [www.howstuffworks.com](http://www.howstuffworks.com)

Course code	Course Title	C	H	I	E	T
17U4PAC4/ 17U5PAC3	Renewable energy sources	1	2	25	75	100

**Unit 1                      Solar thermal systems**

Solar radiation and its measurements – Solar constant – Applications of solar energy – Solar collectors – Solar water heating systems (natural circulation, pressurized).

**Unit 2                      Applications of solar energy**

Solar pumping – Solar distillation – Solar cooking – Box type solar cooker.

**Unit 3                      Solar photovoltaic systems**

Solar electric power generation – Solar photo – Voltaics and solar cell principles – Applications of solar photovoltaic systems.

**Unit 4                      Energy from wind and biomass**

Wind energy – Principles and applications – Energy from biomass – Bio gas generation – Bio gas plants – KVIC digesters.

**Unit 5                      Geothermal energy and tides**

Geothermal sources – Vapour dominated systems – Energy from oceans – Ocean thermal energy conversion (OTEC) – Open cycle OTEC systems – Energy from tides – Simple single basin tidal system.

**Text Book:**

1. G.D.Rai, Non-conventional energy sources, IV Edn., 1997.

Unit 1: Chapter 2, Sections 2.1, 2.2, 2.5; Chapter 5, Sections 5.1, 5.2.

Unit 2: Chapter 5, Sections 5.5, 5.8, 5.9, 5.11;

Unit 3: Chapter 5, Section 5.6

Unit 4: Chapter 6, Sections 6.1, 6.2; Chapter 7, Sections 7.1–7.4, 7.9

Unit 5: Chapter 8, Sections 8.1–8.4; Chapter 9, Sections 9.1, 9.2.1–9.2.3, 9.3.1, 9.3.2, 9.3.5

**References:**

1. S.P.Sukhatme, Solar energy, II Edn., 1998, McGraw Hill Education (India) Private Limited, New Delhi.

Course code	Course Title	C	H	I	E	T
17U2PAP1/ 17U4PAP1	Practical – I	2	2	25	75	100

I B.Sc. (Maths) & II B.Sc. (Chemistry) – ancillary physics Practical  
(Any fourteen only/year)

No.	Experiment
1	Compound pendulum – Determination of ‘g’
2	Comparison of viscosities using Poiseuille’s method
3	Latent heat of steam
4	Young’s modulus – Non– uniform bending
5	Linear expansion of the rod
6	Sonometer – Determination of frequency of tuning fork
7	Surface tension of water – Drop weight method
8	Stoke’s method – Viscosity of highly viscous liquid
9	Specific heat capacity – Cooling method
10	Young’s modulus – Uniform bending
11	Young’s modulus by stretching
12	Cantilever depression method – Determination of ‘Y’
13	Poiseuille’s flow method – Determination of viscosity
14	Torsional pendulum – Determination of rigidity modulus
15	Surface tension of water – Capillary rise method
16	Lee’s disc – Determination of thermal conductivity of a bad conductor
17	Static torsion – Determination of rigidity modulus
18	Falling plate method – Frequency of tuning fork
19	Kundt’s tube – Determination of velocity of sound
20	Melde’s string – Frequency of electrically maintained tuning fork
21	Thermal conductivity – Forbe’s method
22	Ostwald’s viscometer – Comparison of viscosities
23	Specific heat capacity of solid
24	Sonometer – Comparison of linear densities
25	Any experiment related to general physics

#### Books for Reference:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, 2007, Sultan Chand & Sons.
2. Indu Prakash & Ramakrishna, A Text Book of Practical Physics, 2008, Kitab Mahal Agencies
3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan, Practical Physics, 2006, Rochouse & Sons
4. Relevant references from internet

Course code	Course Title	C	H	I	E	T
17U4PAP2/ 17U6PAP2	Practical – II	2	2	25	75	100

II B.Sc. (Maths) & III B.Sc. (Chemistry) – Ancillary physics Practical  
(Any fourteen only/year)

No.	Experiment
1	Determination of the radius of curvature of the given lens – Newton's rings.
2	Determination of the focal length of the given Concave lens by conjugate foci method.
3	Figure of merit – MG
4	Logic gates using discrete components.
5	Determination of L of a coil – de Sauty's bridge.
6	Half adder and full adder.
7	Determination of the refractive index of a given prism – Spectrometer.
8	Calibration of low range voltmeter – Potentiometer
9	M and B <sub>H</sub> – Deflection and vibration magnetometer.
10	Universality of NOR gate.
11	Determination of the focal length of the given long focus convex lens by different methods
12	Determination of the thickness of the given material – Air wedge
13	Field along the axis of the coil.
14	Universality of NAND gate.
15	Determination of pole strength of the magnet – Tan C position
16	Determination the wavelength of the prominent line using grating – Spectrometer
17	Determination of the frequency of the given source – AC sonometer
18	M <sub>1</sub> /M <sub>2</sub> – Tan A and Tan B method.
19	Thermocouple – Direct deflection method.
20	Comparison of the capacitance of given two capacitors – BG
21	Calibration of Ammeter – Potentiometer.
22	Characteristics of Zener diode.
23	Determination of the self inductance of the given coil – Owen's bridge
24	Verification of de – Morgan's theorem using IC's
25	Any experiment related to general physics

**Books for Reference:**

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, 2007, Sultan Chand & Sons.
2. Indu Prakash & Ramakrishna, A Text Book of Practical Physics, 2008, Kitab Mahal Agencies
3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan, Practical Physics, 2006, Rochouse & Sons
4. Relevant references from internet

### Components of Evaluation

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Continuous Internal Assessment (CIA)	:	25 marks
End semester examination	:	75 marks

#### Components of Continuous Internal Assessment

Test (Best two out of three)	:	15 marks
Attendance	:	5 marks
Assignment	:	5 marks

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### Common Question Paper pattern for all Undergraduate courses

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**Part– A** (Answer **ALL** questions) (10 x 1 =10)

- ❖ Questions 1 to 10.
- ❖ Multiple choice questions only.
- ❖ Two questions from each Unit.

**Part – B** (Answer **ALL** questions) (5 x 7 =35)

- ❖ Questions 11 to 15.
- ❖ Either–OR type questions only.
- ❖ One Either–OR type question from each Unit.

**Part – C** (Answer any **THREE** questions only) (3 x 10 =30)

- ❖ Questions 16 to 20
- ❖ One question from each Unit
- ❖ Each question may have sub divisions and problems may be asked.

Total **75**

# Department of Chemistry

## DEPARTMENT OF CHEMISTRY

### CBCS Pattern for B.Sc. Chemistry

Sem	Sub Code	Course Title	Hours	Credit
<b>I</b>	17U1CMC1	General Chemistry -I	5	5
	17U1CSM1	Industrial Chemistry	2	2
	17U1CES1	Environmental Studies	2	2
	17U2CMP1	Major Practical –I (Inorganic Qualitative Analysis)	3	0
<b>II</b>	17U2CMC2	General Chemistry – II	5	5
	17U2CSM2	Metallurgy & Food Chemistry	2	2
	17U2CMP1	Major Practical –I (Inorganic Qualitative Analysis)	3	6
	17U2CVE1	Value Education	2	2
<b>III</b>	17U3CMC3	General Chemistry - III	4	4
	17U3CNM1	Chemistry in Day today Life	2	2
	17U4CMP2	Major Practical –II (Volumetric Analysis and Organic Estimation)	2	0
<b>IV</b>	17U4CMC4	Organic and Physical Chemistry	2	2
	17U4CSM3	Polymer and Water Treatment	2	2
	17U4CMP2	Major Practical –II (Volumetric Analysis and Organic Estimation)	2	4
<b>V</b>	17U5CME1	Organic Chemistry –I (Major Elective paper- I)	5	6
	17U5CMC5	Inorganic Chemistry -I	5	5
	17U5CMC6	Physical Chemistry -I	5	5
	17U5CMC7	Bio-Molecules and Green Chemistry	3	3
	17U6CMP3	Major Practical –III (Inorganic Estimation & Organic Analysis)	3	0
	17U6CMP4	Major Practical –IV (Organic preparation & Physical chemistry)	3	0
<b>VI</b>	17U6CME2	Organic Chemistry –II (Major Elective -II)	6	7
	17U6CME3	Inorganic Chemistry – II (Major Elective -III)	5	6
	17U6CMC8	Physical Chemistry- (II)	5	5
	17U6CSM4	Analytical and Biochemistry	2	2
	17U6CMP3	Major Practical –III (Inorganic Estimation & Organic Analysis)	3	6
	17U6CMP4	Major Practical –IV (Organic preparation & Physical chemistry)	3	6

Course Code	Course Title	C	H	I	E	T
17U1CMC1	GENERAL CHEMISTRY-I	5	5	25	75	100

### UNIT I ATOMIC STRUCTURE & INTRODUCTION TO WAVE MECHANICS 15 hrs

Fundamentals of atomic particles -  $e/m$  ratio of an electron - Rutherford's atomic model – The Bohr theory of hydrogen atom – the spectrum of hydrogen atom – The Sommerfield modification - Quantum theory of radiation – Einstein photoelectric equation – particle and wave character of electron – de Broglie equation – Davisson-Germer experiment – Heisenberg's uncertainty principle – Quantum numbers and their significance – Compton effect - Stark Einstein effect - Zeeman effect – Pauli exclusion principle – Hund's rule of maximum spin multiplicity – Aufbau principle – Shapes of orbitals.

### UNIT II PERIODIC CLASSIFICATION & PERIODIC PROPERTIES 15 Hrs

Periodic table: The long form of periodic table - periodic law and electronic configuration of elements - Classification of elements on the basis of their electronic configuration – Periodic properties – atomic and ionic radii - Ionisation energy- electron affinity – Electronegativity - Different scales – Mulliken and Pauling scale - Factors affecting periodic properties - Diagonal relationship.

### UNIT III BASIC CONCEPTS OF ORGANIC CHEMISTRY 15 Hrs

Classification of organic compounds – empirical and molecular formulae – definitions and problems related to empirical and molecular formulae – the breaking and forming of bonds (homolytic and heterolytic) – types of organic reactions – reaction intermediates: carbanion, carbocation and free radical: Structure, geometry, formation and stability – basic ideas of nucleophilic and electrophilic addition and substitution reactions – elimination reactions – benzyne formation.

Basic ideas of inductive, electronic, resonance, mesomeric, hyperconjugation and steric effects (elementary idea with examples).

### UNIT IV RADIOACTIVITY AND NUCLEAR CHEMISTRY 15 Hrs

**a) Radioactivity:** Properties of  $\alpha$ ,  $\beta$ , and  $\gamma$  radiations - Types of radioactivity –Radioactive disintegration – Half life and average life: definition and relation - Radioactive equilibrium – Group displacement law - Isotopes, isobars, isotones: definition and examples only - Uses of radio isotopes in various fields.

**b) Nuclear Chemistry:** Nuclear transmutation - definition and examples – Comparison of nuclear reactions and chemical reactions – Mass defect, binding energy, binding energy curve – Meson theory of nuclear forces – Nuclear fission and fusion: Concept and applications.

## UNIT V      SOLID STATE CHEMISTRY

15 Hrs

Unit cells of simple, body centered and face centered cubic lattices – crystal planes and Miller indices. Seven crystal systems. Cubic Crystals. Examples such as NaCl, CsCl, Structure of diamond and graphite - X- ray diffraction – The Bragg's equation – discussion of the Bragg method for the structure of crystals. (NaCl & KCl only) Determination of Avogadro number through 'X'-ray diffraction of crystals – Defects in crystal system: Schotky and Frenkel defects.

### Text Book(s):

1. Bhal, B.S. and Arun Bahl, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi, 2004.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., (41<sup>st</sup> Edn.), Principles of Physical Chemistry, Vishal Publications, 2014.
3. Sathya Prakash, Tuli, Basu & Madan, Advanced Inorganic Chemistry, Vol. II, 17<sup>th</sup> Revised Edition, S. Chand and Co. Ltd., Ram Nagar., New Delhi, 1999,.
4. Puri. B.R., Sharma. L.R., Principles of Inorganic Chemistry, Shobhan Lal Nagin Chand and Co., Jalandar, 1989.

### Reference Books:

1. Khosla, B.D., Physical Chemistry, S. Chand & Co., New Delhi, 1978.
2. Gurdeep, R, Advanced Physical Chemistry, Goel Publishing House, Meerut, 1997.

Course Code	Course Title	C	H	I	E	T
17U1CSM1	INDUSTRIAL CHEMISTRY	2	2	25	75	100

**UNIT I MATCH INDUSTRY AND EXPLOSIVES 6 Hrs**

a) MATCH INDUSTRY: Introduction- Lucifier and Safety matches – Manufacture of safety matches.

b) EXPLOSIVES: Types, Primary, Secondary – Lead azide - Potassium chlorate – Ammonium nitrate – TNT.

**UNIT II PETROLEUM 6 Hrs**

Occurrence – composition of petroleum – origin – mining – refining of petroleum – fraction distillation – purification - Cracking – synthetic petrol – knocking and antiknocking – octane number – reforming – cetane number – flash point.

**UNIT III CEMENT 6 Hrs**

Cement: Types of cement – raw materials – reactions in the kiln- setting of cement – testing of cement – factors affecting quality – mortars and concrete.

**UNIT IV PAPER INDUSTRY 6 Hrs**

Paper: Introduction – manufacture of pulp - types of pulp – manufacture of paper – calendaring – uses.

**UNIT V SOAP AND DETERGENTS 6 Hrs**

Introduction of soap with examples – Types of soaps – principal groups of synthetic detergents – classification of surface active agents – anionic detergents – oxo process – Alfol process – Welsh process - biodegradability of surfactants.

**Text Book(s):**

1. Jain, J. Engineering Chemistry 15<sup>th</sup> Edition, Dhanpath Rai publishing company (PVL), New Delhi.
2. Sharma, B.K. Industrial Chemistry, GOEL Publishing House, Meerut, 1997.

**Reference Books:**

1. Ghosh, J. Fundamental concepts of Applied Chemistry, S. Chand Limited, Nagpur, 2006.
2. Sundari, K. B. Applied Chemistry, Mjp Publishers, Mumbai.

<b>Course Code</b>	<b>Course Title</b>	<b>C</b>	<b>H</b>	<b>I</b>	<b>E</b>	<b>T</b>
<b>17U1CMP1</b>	<b>INORGANIC QUALITATIVE ANALYSIS</b>	<b>6</b>	<b>3 + 3</b>	<b>50</b>	<b>50</b>	<b>100</b>

- Semi-micro qualitative analysis of mixture of salts containing two cations and two anions.

Course Code	Course Title	C	H	I	E	T
17U2CMC2	GENERAL CHEMISTRY- II	5	5	25	75	100

**UNIT I GASEOUS STATE** 15 Hrs

**Ideal gases:** Kinetic theory of ideal gases – gas laws – ideal gas equation – definition of most probable velocity, mean velocity and RMS velocity – collision diameter – collision cross section – collision frequency – mean free path.

**Real gases:** Deviation from ideal behavior – derivation of Vander waal’s equation of state – methods of liquefaction of gases – Joule Thomson effect – inversion temperature –  $C_p$ - $C_v$  relationship.

**UNIT II QUANTUM CHEMISTRY** 15 Hrs

The significance of the wave function  $\psi$  – interpretation of  $\psi^2$ . The atomic orbitals – representation of angular and radial parts of the wave functions - nodal planes and nodal spheres – ‘g’ and ‘u’ character. Derivation of Schrodinger wave equation – particle in one dimensional box – operators: Laplacian, Hermitian – eigen values – eigen functions.

**UNIT III CHEMICAL BONDING** 15 Hrs

**Chemical bond** – definition and types.

**Ionic bond:** Definition, illustration of the formation of ionic bond (NaCl, MgO, CaF<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> only) – condition for the formation of ionic bonds, Lattice energy, Born Lande equation (only the equation, derivation not needed). Born Haber cycle.

**Covalent bond:** Definition and types (single, double and triple bonds) - illustration of the formation of covalent bond (HF, H<sub>2</sub>O, NH<sub>3</sub>, O<sub>2</sub> and N<sub>2</sub> only) – factors favoring the formation of covalent bonds.

Hybridisation -  $sp$ ,  $sp^2$  and  $sp^3$  (BeCl<sub>2</sub>, BeCl<sub>3</sub>, H<sub>2</sub>O, NH<sub>3</sub>, ) VSEPR - (H<sub>2</sub>O, NH<sub>3</sub>, PCl<sub>5</sub>, ClF<sub>3</sub>, SF<sub>4</sub>, I<sub>3</sub><sup>-</sup>, SF<sub>6</sub>, IF<sub>7</sub> only). MO approach: LCAO – Homonuclear (H<sub>2</sub>, He<sub>2</sub>, O<sub>2</sub> and N<sub>2</sub> molecules only) – Heteronuclear (CO & NO only).

**Co-ordinate bond:** Definition and examples.

**UNIT IV HYDROCARBONS** 15 Hrs

**Aliphatic Hydrocarbons:** Alkanes: Preparation by Wurtz reaction and Kolbe’s electrolytic method – general properties. Alkenes: general methods of preparation – Markownikoff’s rule – peroxide effect – preparation and properties of alkadienes – 1,4- addition and 1,2- addition reactions of alkadienes – free radical addition reactions of conjugated dienes. Elimination

reactions:  $\alpha$  and  $\beta$  eliminations – mechanism of  $E_1$  and  $E_2$  reactions – factors governing  $E_1$  and  $E_2$  mechanisms – Hofmann and Saytzeff's rules.

**Aromatic Hydrocarbons:** Introduction – aromaticity and Huckel's rule – Structure of benzene.

## UNIT V      HYDROGEN, GROUP I & II ELEMENTS

15 Hrs

**a) Hydrogen:** Ortho and para hydrogen – Hydrides: Ionic or salt like hydrides - covalent hydrides, metallic or interstitial hydrides – intermediate hydrides.

**b) Group I elements:** Alkali metals – electronic structure – general properties - Chemical properties – Solubility and hydration – Stability of carbonates and bicarbonates - halides – extraction of Li and Na. Preparation, properties and uses of the following compounds: i) Sodium nitrite, ii) Potassium nitrate iii) Lithium aluminium hydride, iv) Sodium borohydride, v) Lithium carbonate - Anomalous behavior of Lithium.

**c) Group II elements:** Alkaline earth metals – Electronic structure – similarities in physical and chemical properties and gradation in them – Anomalous behavior of Be – Diagonal relationship between Be and Al – Occurrence (important minerals) of Alkaline earth metals – Extraction of Be and Mg. Study of the following compounds: 1) Plaster of paris 2) Gypsum 3) Strontium sulphate 4) Barium chromate.

### Text Book(s):

1. Glasstone, S. A., Text book of Physical chemistry East-West Press, New Delhi.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., "Principles of Physical Chemistry", Forty Sixth Edition, Vishal Publishing Co., Jalandhar, 2013.
3. Bhal, A., Bhal, B.S. and Tuli, G.D., "Essentials of Physical Chemistry", First Edition, S. Chand & Company Ltd., New Delhi, 2012.
4. Morrison, R.T., and Boyd, R.N., Organic Chemistry, Prentice-Hall of India Pvt. Ltd., New Delhi, 6<sup>th</sup> edition, 1999.
5. Lee, J. D., Concise Inorganic Chemistry, 5th edition, Elbs with Chapman and Hall, London, 2010.

### Reference Books:

1. Sharma. B.K. - Industrial Chemistry, Goel Publishing House, New Delhi, 1994.
2. Kundu. N and Jain. S.N. Physical Chemistry, S.Chand & Co, New Delhi, 1984.

Course Code	Course Title	C	H	I	E	T
17U2CSM2	METALLURGY & FOOD CHEMISTRY	2	2	25	75	100

**UNIT I PRINCIPLES OF METALLURGY 6 Hrs**

Ores and Minerals, General Methods of extraction of metals – Concentration – gravity separation, electromagnetic and froth floatation methods and leaching method – Extraction – Roasting, Calcination, Smelting – Carbon and alumino thermic reduction

**UNIT II METALLURGY - II 6 Hrs**

Refining – van Arkel- zone refining – electrolytic refining – Ellingham diagram- Extraction of following metals: Al & Cu only.

**UNIT III FOOD ADDITIVES AND FOOD FLAVOURS 6 Hrs**

Definition – direct and indirect food additives, uses and the critical limit of food additives. Food flavours: Apple, Orange & Banana

Definition – smell and taste of some common compounds. Food pigments: Definition – classification of natural and artificial food colors.

**UNIT IV FOOD DETERIORATION AND ADULTERANTS 6 Hrs**

Food deterioration: Definition of deterioration, deterioration by microorganism, water and food preservatives. Adulterants: definition, classification, injurious adulterants / contaminants in foods and their health effects, prevention of food adulterants.

**UNIT V OILS AND FATS 6 Hrs**

Sources – composition - functions of oils and fats - Role of oils and fats in cooking - changes in oil and fats while cooking - Effect of prolonged heating on nutritive value - changes undergone by oils and fats during storage - hydrogenation of oils.

**Text Book(s):**

1. Chopra, H.K and Panesar. P.S, Food Chemistry, Narosa Publishing House, 2010.
2. Ghosh, J., Fundamental concepts of Applied Chemistry, S. Chand Limited, Nagpur, 2006.

**Reference Books:**

1. Thapar, H., Food Chemistry, Pacific Books Internationals, New Delhi, 2011.
2. Swaminathan, M., Food Science and Experimental Foods, Bangalore Print. & Publishing Company, 1987.

Course Code	Course Title	C	H	I	E	T
17U3CMC3	GENERAL CHEMISTRY - III	4	4	25	75	100

**UNIT I HALOGEN COMPOUNDS AND GRIGNARD REAGENTS** 12 Hrs

**a) Aliphatic Halogen compounds:** General methods of preparation and properties - Aliphatic nucleophilic substitution – mechanism of  $S_N^1$  and  $S_N^2$  reactions – stereochemistry of  $S_N^1$  &  $S_N^2$  reactions: Walden inversion, racemization. Preparation and properties of:  $CHCl_3$ , westron & freon.

**Aromatic halogen compounds:** Preparation and properties of chlorobenzene, chlorotoluene, benzylchloride and benzalchloride.

**b) Organometallic compounds:** Preparation and synthetic utilities of Grignard reagents (Reaction with formaldehyde, higher aldehyde, ketone and epoxides)

**UNIT II ALIPHATIC OXYGEN AND SULFUR COMPOUNDS** 12 Hrs

**a) Aliphatic Alcohols:** Preparation and reactions of aliphatic alcohol, allyl alcohol, glycol and glycerol. Estimation of number of hydroxyl groups.

**b) Epoxide and Sulphur Compounds:** Preparation and properties of diethyl ether – Preparation, ring opening and reactions of epoxides - general methods of preparation and properties of thio alcohols and thioethers. Sulphonol and mustard gas.

**UNIT III ALIPHATIC ALDEHYDES AND KETONES** 12 Hrs

**Aliphatic Aldehydes and Ketones:** General methods of Preparation and properties of aldehydes and ketones. Study of following members: formaldehyde, acetaldehyde & acetone. Chemistry of acrolein and crotonaldehyde.

**Study of following reactions:** Aldol condensation, Knoevenagel condensation, Cannizaro reaction, Wittig reaction, Pinacol-pinacolone rearrangement, Darzens condensation.

**UNIT IV SURFACE CHEMISTRY & DISTRIBUTION LAW** 12 Hrs

Surface chemistry: Basics terminologies – adsorption – adsorbate adsorbent – adsorption of the gases by solid – factors influencing adsorption – types of adsorption – physical adsorption – chemical adsorption – comparison – Freundlich adsorption isotherm – Langmuir adsorption – application of adsorption.

Distribution law – thermodynamic derivation – association of the solute in one of the solvent – dissociation of the solute in one of the solvent – applications of distribution law.

(a) General characteristics of group III elements - Reactions of elements with acids, alkalies and dioxygen. Compounds of boron- borates, borax and diborane and its structure- Qualitative analysis of boron compounds. Alumina, qualitative analysis of aluminium, amphoteric behaviour of aluminates, trihalides of aluminium.

(b) General characteristics of group IV elements - Compounds of carbon- Carbides, carbon monoxide, water gas, producer gas and coal gas - Oxides of silicon, silicates and their applications and silicones.

**Text Book(s):**

1. Tewari, K. S., Mehrotra, S. N., and Vishnoi, N. K. Text book of Organic Chemistry, Vivas Publishing House Pvt Ltd. 1998.
2. Jain, M. K. and Sharma, S. C. Modern Organic Chemistry, Vishal PublishingCo, Jalandhar, Delhi, 4<sup>th</sup> edition, 2013.
3. Glasstone, S., Text book of Physical Chemistry, McMillan and Company Ltd., London, 1974.
4. Madan, R.D., Modern Inorganic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 2005.

**Reference Books:**

1. Bhal, B.S. and Arun Bahl, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi, 2004.
2. Morrison, R.T., and Boyd, R.N., Organic Chemistry, Prentice-Hall of India Pvt. Ltd., New Delhi, 6<sup>th</sup> edition, 1999.
3. Soni, P.L., Text book of Organic Chemistry, Sultan Chand and Sons, New Delhi, 1998.

Course Code	Course Title	C	H	I	E	T
17U4CMC4	ORGANIC AND PHYSICAL CHEMISTRY	2	2	25	75	100

**UNIT I STEREOCHEMISTRY-I** 6 Hrs

(a) Stereoisomerism: Definition – Geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometrical isomerism – E-Z notations.

(b) Optical isomerism: Elements of symmetry – asymmetry of the molecule – chirality – optical isomerism of compounds containing asymmetric carbon atoms – lactic and tartaric acids.

**UNIT II STEREOCHEMISTRY-II** 6 Hrs

Enantiomers and diastereoisomers – racemic and meso forms – racemisation and resolution of racemic mixtures – specification of absolute configuration by *R* and *S* notations – optical activity of compounds without asymmetric carbon atoms – allenes, spirans and biphenyl compounds (elementary idea only).

**UNIT III CONFORMATIONAL ANALYSIS** 6 Hrs

Introduction - conformational analysis of ethane, propane and *n*-butane.

Cycloalkanes: General methods of preparation and reactions of cycloalkanes. Bayer's strain theory and its modifications. Conformational analysis of cyclohexane (elementary idea only).

**UNIT IV COLLOIDAL STATE-I** 6 Hrs

Colloidal state: Distinction between true solution, colloidal dispersion and suspension – classification of colloids. Sol – types of sols – purification of colloidal solution – properties of colloids – optical, tyndall, kinetic-Brownian movement and electrical properties - Electrophoresis.

**UNIT V COLLOIDAL STATE-II** 6 Hrs

Coagulation – methods for coagulation – coagulating power and Hardy – Schulze law – Hofmeister series – Flocculation value – protection of colloids – Gold Number. Gels – preparation and properties of gels – syneresis, thixotropy, imbibitions. Emulsion – types of emulsion - Emulsifier and application of colloids.

**Text Book(s):**

1. Finar. I.L, "Organic Chemistry", Vol. I and II, 6<sup>th</sup> edn., ELBS, Singapore, 1994.
2. Morrison, R.T., and Boyd, R.N., Organic Chemistry, Prentice-Hall of India Pvt. Ltd., New Delhi, 6<sup>th</sup> edition, 1999.
3. Soni, P.L. & Dharmarha, Text Book of Physical Chemistry, Sultan Chand & Sons, New Delhi, 1991.

**Reference Books:**

1. Soni, P.L., Text book of Organic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 1998.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., "Principles of Physical Chemistry", Forty Sixth Edition, Vishal Publishing Co., Jalandhar, 2013.

Course Code	Course Title	C	H	I	E	T
17U4CSM3	POLYMER AND WATER TREATMENT	2	2	25	75	100

**UNIT I CHEMISTRY OF POLYMERS** 6 Hrs

Polymers - Classification of polymers: Linear polymers, non-linear or branched polymers, cross linked polymers, homo chain and hetero chain, homopolymers, co-polymers, block polymers and graft polymers (definition and examples only).

**UNIT II INDIVIDUAL POLYMERS** 6 Hrs

Preparation and uses of the following polymers: polyethylene, polystyrene, polyacrylonitrile, PVC and polytetrafluoro ethylene.

**UNIT III POLYMER PROCESSING** 6 Hrs

Polymer processing – plastics (thermo and thermosetting), elastomers, fibres, compounding, plasticizers, colorants, flame retardants.

**UNIT IV WATER ANALYSIS.** 6 Hrs

The importance and source of water. Classification of water pollutants: organic, inorganic, radioactive materials, thermal pollutants. Significance and experimental determination of BOD and COD.

**UNIT V WATER TREATMENT** 6 Hrs

Hardness of water – Types and determination. Removal of suspended impurities – sedimentation - sedimentation with coagulants – filtration. Removal of microorganisms using bleaching powder, chlorine, ozone and UV light.

Removal of dissolved salts; Permutit process, Ion exchange process and reverse osmosis.

**Text Book(s):**

1. Gowariker. V.R., Viswanathan. N.V and Sreedhar. J, “Polymer Science”, Wiley Eastern Ltd., New Delhi, 1986.
2. Arora, M. G., Singh, M. Industrial Chemistry, Anmol Publishing Pvt. Ltd., New Delhi, 1999.
3. Sharma, B.K. - Industrial Chemistry, Goel Publishing House, New Delhi, 1994.

**Reference Books:**

1. Billmeyer. F.W., “Textbook of Polymer Science”, 3<sup>rd</sup> edn., John Wiley and Sons, New York, 1984.
2. Vermani, O. P., Narula, A. K. Industrial Chemistry, Galgotia Publications Pvt. Ltd., New Delhi, 2000.

Course Code	Course Title	C	H	I	E	T
17U4CMP2	VOLUMETRIC ANALYSIS AND ORGANIC ESTIMATION	4	2 + 2	50	50	100

(6 hours practicals having two experiments, each experiment has 3 hours)

## I. Volumetric Analysis

### Acidimetry

- ❖ Oxalic acid Vs NaOH Vs HCl
- ❖ Oxalic acid Vs NaOH Vs Oxalic acid

### Alkalimetry

- ❖ Na<sub>2</sub>CO<sub>3</sub> Vs HCl Vs NaOH
- ❖ Na<sub>2</sub>CO<sub>3</sub> Vs HCl Vs Na<sub>2</sub>CO<sub>3</sub> + NaOH

### Permanganometry

- ❖ FAS Vs KMnO<sub>4</sub> Vs Oxalic acid
- ❖ Oxalic acid Vs KMnO<sub>4</sub> Vs FAS

### Iodometry

- ❖ K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> Vs Thio Vs Copper
- ❖ K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> Vs Thio Vs K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>

## II. Organic Quantitative Estimations

- ❖ Estimation of aniline
- ❖ Estimation of phenol
- ❖ Estimation of glycine

Course Code	Course Title	C	H	I	E	T
17U5CME1	ORGANIC CHEMISTRY-I	6	5	25	75	100

### UNIT I ALIPHATIC CARBOXYLIC ACIDS AND THEIR DERIVATIVES 15 Hrs

**a) Aliphatic carboxylic acids:** General methods of Preparation, properties and reactions of mono and di carboxylic acids - Effect of alkyl and halogen substituents on acidity - Inductive effect. Study of following members: Formic acid, acrylic acid, oxalic acid and malonic acid.

**b) Acid derivatives:** Chemistry of Acid chlorides, anhydrides, amides and esters (methods of preparation and general properties only). Inter conversion of acid derivatives.

Study of following reactions: Curtius rearrangement, Hofmann rearrangement, Lossen rearrangement, Beckmann rearrangement, Schmidt reaction, Arndt-Eistert reaction.

### UNIT II ALIPHATIC NITROGEN COMPOUNDS 15 Hrs

Chemistry of nitroalkanes, alkyl nitrites, alkyl cyanides and isocyanides. Synthetic importance of diazomethane and diazoacetic ester. Urea - preparation, reactions and estimation. Methods of preparation and properties of aliphatic amines - methods of separation and distinctions of primary, secondary and tertiary amines.

### UNIT III AROMATIC SUBSTITUTION AND ORGANO SULFUR COMPOUNDS 15 Hrs

**a) Aromatic electrophilic substitution:** Mechanism of aromatic electrophilic mono substitution. Nitration, Sulfonation, Halogenation, Friedel-Craft's alkylation, acylation and formylation of benzene – reaction and mechanism - orientation & reactivity of mono substituted benzene.

**b) Aromatic nucleophilic substitution:** Various mechanisms: unimolecular, bimolecular and benzyne mechanism – Orientation & reactivity in  $S_NAr$  reaction.

**c) Organo Sulphur compounds:** General methods of preparation and general properties – Chemistry of Aryl sulfanyl chlorides, sulfonamides, saccharin, Chloramine-T.

### UNIT IV AROMATIC NITRO & ACTIVE METHYLENE COMPOUNDS 15 Hrs

**a) Aromatic nitro compounds:** General methods of preparation of aromatic nitro compounds - Preparation and reduction products of nitrobenzene – Selective reduction – Electrophilic substitution – Nucleophilic substitution – Effect of nitro group on other nuclear substituents: effect on halogens, effect on alkyl groups, and effect on phenolic –OH groups.

**b) Active methylene Compounds:** Methods of preparation and reactions of diethyl malonate and ethyl acetoacetate. Preparation and synthetic utility of enamines and 1,3-Dithiane.

Study of following reactions: Wolff rearrangement.

**UNIT V      AROMATIC AMINO AND DIAZONIUM COMPOUNDS**

15 Hrs

**a) Aromatic amino compounds:** Structure, general methods of preparation, basicity and effect of substituents on basicity – methods of preparation, properties and reactions of aniline, nitroanilines, diphenylamine, phenylene diamines, sulphanilic acid and Sulphanilamide.

**b) Aromatic diazonium salts:** Formation and reactions of diazonium salts – Reactions in which nitrogen is eliminated - Reactions in which nitrogen is retained.

Study of: Benzidine rearrangement.

**Text Book(s):**

1. Bhal, B.S. and Arun Bahl, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi, 2004.
2. Tewari, K. S., Mehrotra, S. N., and Vishnoi, N. K. Text book of Organic Chemistry, Vivas Publishing House Pvt Ltd.1998..
3. Jain, M. K. and Sharma, S. C. Modern Organic Chemistry, Vishal PublishingCo, Jalandhar, Delhi, 4<sup>th</sup> edition, 2013.

**Reference Books:**

1. Morrison, R. T.,Boyd. Organic Chemistry, 6th Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
2. Soni, P.L., Text book of Organic Chemistry, Sultan Chand and Co. Ltd.,New Delhi, 1998.

Course Code	Course Title	C	H	I	E	T
17U5CMC5	INORGANIC CHEMISTRY –I	5	5	25	75	100

**UNIT I      GROUP V ELEMENTS** 15 Hrs

Group-V - Electronic structure and oxidation states- metallic and non-metallic character- difference between nitrogen and other elements- occurrence and extraction of As, Sb and Bi. Group V elements; Halides, oxides, oxyacids of nitrogen and phosphorus, Sodium bismuthate, tartar emetic- Inorganic fertilizers – Urea, super phosphate and triple super phosphate.

**UNIT II      GROUP VI ELEMENTS** 15 Hrs

Group- VI - Group discussion of VI group elements: Sulphur: preparation, properties and uses of persulphides, halides and oxy chlorides (thionyl chloride and sulphuryl chlorides) – structure – preparation, properties, uses and structure of H<sub>2</sub>SO<sub>4</sub>, peracids and poly sulphides – preparation, properties, structure and uses of thionic acids - chlorosulphonic acid. Selenium: Extraction, properties and uses – oxides and oxy acids.

**UNIT III      GROUP VII ELEMENTS** 15 Hrs

Group- VII - Comparative study of halogens – Halogen – oxygen compounds – preparation, properties , uses and structure of OF<sub>2</sub> ,O<sub>2</sub>F<sub>2</sub> , Cl<sub>2</sub>O , ClO<sub>2</sub> , Cl<sub>2</sub>O<sub>7</sub> ,Br<sub>2</sub>O, BrO<sub>3</sub> and I<sub>2</sub>O<sub>5</sub> – Oxyacids of halogens: introduction, oxidation state of halogens in acids- preparation, uses and structure of hypochlorous acid, chloric acid, perchloric acid and periodic acids – salts of oxyacids of halogens – bleaching powder – preparation, properties and uses. Relative strength of oxyacids of halogens.

**UNIT IV INTERHALOGENS, NOBLE GASES AND NON-AQUEOUS SOLVENTS** 15 Hrs

a) **Inter halogen compounds:** introduction – general methods of preparation, properties and structure of inter halogen compounds. Polyhalides - Pseudo halogen. Difference between halogen and pseudohalogen. Basic properties of iodine.

b) **Zero group elements:** Noble gases: Group discussion of zero group elements – preparation, properties, uses and structures of XeF<sub>2</sub>, XeF<sub>4</sub> and XeF<sub>6</sub>, XeO<sub>3</sub>, XeO<sub>4</sub> and XeO<sub>2</sub>F<sub>2</sub>,

c) **Non-aqueous solvents:** Liq ammonia.

**a) Analytical Chemistry:** Terminology and theories of volumetric analysis – indicator (metal and redox indicator) – primary standards – volumetric calculations – precautions to avoid error in titrimetric analysis – redox and complexometric titrations.

**b) Terminology and theories of gravimetric analysis:** classification – formation of precipitate – precipitation from homogeneous solution – co-precipitation – post precipitation – precipitating agents – digestion – filtration and washing – specific and selective precipitants.

Thermoanalytical techniques: Basic principles of TGA and TDA – thermal curve for  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

**Text Book(s):**

1. Puri. B.R., Sharma. L.R., Principles of Inorganic Chemistry, Shobhan Lal, Nagin Chand and Co., Jalandar, 1989.
2. Lee J. D Concise Inorganic Chemistry, 5th edition, Elbs with Chapman and Hall, London, 2010.

**Reference Books:**

1. Madan, R.D., Modern Inorganic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 2005.
2. Sathya Prakash, Tuli, Basu & Madan, Advanced Inorganic Chemistry, Vol. II , 17<sup>th</sup> Revised Edition, S. Chand and Co. Ltd, Ram Nagar, New Delhi, 1999.

Course Code	Course Title	C	H	I	E	T
17U5CMC6	PHYSICAL CHEMISTRY-I	5	5	25	75	100

**UNIT I THERMODYNAMICS I AND THERMOCHEMISTRY** 15 Hrs

**a) THERMODYNAMICS I**

Terminology of thermodynamics - First law - Reversibility and maximum work – The enthalpy of a system- Heat capacity- Relation between  $C_p$  and  $C_v$  - dependence of state function of variables- The Thermodynamics behaviour of ideal gases – Isothermal and adiabatic processes in ideal gases – The Joule Thomson effect – Joule Thomson coefficient and inversion - zeroth law of thermodynamics.

**b) THERMOCHEMISTRY**

Heat of reaction at constant volume and constant pressure – Calculation of  $\Delta E$  from  $\Delta H$  and vice versa. Kirchoff equation - Thermo-neutrality of salt solutions – Heat of reaction from bond enthalpies – Hess's law and its applications - Variation of heat of reaction with temperature.

**UNIT II THERMODYNAMICS II** 15 Hrs

Carnot cycle – efficiency of heat engine – various statements of second law- entropy – standard entropy change for various processes - Work (A) and force energy functions – Maxwell's relationships – Criteria for reversible and irreversible processes – Gibbs-Helmholtz equation – Partial molar properties – Partial molar free energy – Concept of chemical potential – Gibbs Duhem equation - variation of chemical potential with temperature and pressure – Clapeyron equation – Clapeyron - Clausius equation. Nernst heat theorem - concept of entropy – Third law of thermodynamics.

**UNIT III CHEMICAL KINETICS AND CATALYSIS** 15 Hrs

**a) Chemical Kinetics**

Introduction – rate equation – order & molecularity of reaction – pseudo unimolecular reaction – factors influencing rate of reaction – derivation of rate constant for zero, first and second order reactions – methods of determination of order of reaction – Arrhenius equation – theories of reaction rate – Collisions theory – Lindemann's theory – ARRT.

**b) Catalysis**

Definition – types of catalysis – homogeneous catalysis – acid-base enzyme catalysis – auto-catalysis – Michael-Menton equation - heterogeneous catalysis – mechanism catalytic poisoning – promoters

## UNIT IV SOLUTIONS

15 Hrs

Types of solutions – Liquid in liquid – Binary liquid solutions – Raoult's law – Vapour pressure of ideal gas – Gibb's Duhem-Margules equation – Thermodynamics of ideal solutions – Entropy change of mixing for an ideal solution – Vapour pressure curves of completely miscible binary solution – fractional distillation of binary liquid solutions – Distillation of immiscible liquids – Solubility of partially miscible liquids – Phenol-water system – Triethylamine-water system – Nicotine-water system

## UNIT V COLLIGATIVE PROPERTIES & PHASE RULE

15 Hrs

Colligative properties definition – Raoult's law – Lowering of vapour pressure – Elevations of boiling point – depression of freezing point – Osmosis – Osmotic pressure definition only.

Phase rule: Phase – component – degree of freedom – one component system (Water & sulphur system only) – Two component system (Silver & lead only) – Formation of compound with congruent melting point ( $\text{FeCl}_3\text{-H}_2\text{O}$  only) – Formation compound with incongruent melting point (Copper sulphate-water system).

### Text Book(s):

1. Glasstone. S, "Thermodynamics for Chemists", First Edition (Reprint), van Nostrand & Co., New York, 2005.
2. Rajaram, R. and Kuriacose, J.C., "Thermodynamics", Third Edition, S. Chand and Co., New Delhi, 1999.
3. Engel T. and Reid, P. "Physical Chemistry", Second South Asian Edition, Pearson Publication, New Delhi, 2011.
4. Puri, B.R., Sharma, L.R. and Pathania, M.S., "Principles of Physical Chemistry", Forty Sixth Edition, Vishal Publishing Co., Jalandhar, 2013.

### Reference Books:

1. Kapoor, K.L., "A Text Book of Physical Chemistry", Volumes 2 & 5, Fourth Edition, Macmillan India Ltd., New Delhi, 2011.
2. Laidler, K.J. "Chemical Kinetics" Sixth Edition, Pearson Education, New Delhi, 2011.
3. Rajaram, R. and Kuriacose, J.C., "Kinetics and Mechanism of Chemical Transformation", First Edition, Macmillan India Ltd., New Delhi, 2006.
4. Mc Quarrie, D.A. and Simon, J.D., "Physical Chemistry- A Molecular Approach", First South Asian Edition, Viva Books Pvt. Ltd., New Delhi, 2011.
5. Ball, D. W., "Physical Chemistry", First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.

Course Code	Course Title	C	H	I	E	T
17U5CMC7	BIO-MOLECULES AND GREEN CHEMISTRY	3	3	25	75	100

**UNIT I CARBOHYDRATES** 9 Hrs

Introduction and classification – *Monosaccharides*: preparation and properties of glucose and fructose – configuration of glucose and fructose – inter conversion of glucose and fructose – descending and ascending of sugar series – epimerization and mutarotation.

**UNIT II ALKALOIDS AND TERPENOIDS** 9 Hrs

**a) Alkaloids:** Introduction, source, classification and extraction of alkaloids – general methods for determining the structure of alkaloids - structure and synthesis of following alkaloids: coniine and nicotine.

**b) Terpenoids:** Introduction, classification, occurrence and isolation of terpenoids – isoprene rule – general methods of determining structure – synthesis, properties and structure of citral and menthol.

**UNIT III BIO-INORGANIC CHEMISTRY** 9 Hrs

Need for bio-inorganic chemistry, Porphyrin ring system – metalloporphyrin - Iron porphyrins - structure and functions of hemoglobin and myoglobin - Bohr effect - explanation for cooperativity effect. Structure and functions of chlorophyll – ionophores - sodium-potassium pump.

**UNIT IV GREEN CHEMISTRY -I** 9 Hrs

Introduction – Sustainability and cleaner production - green chemistry and eco-efficiency - environmental protection laws - Need for green chemistry – 12 principles of green chemistry – Atom economy with an example.

**UNIT V GREEN CHEMISTRY-II** 9 Hrs

Alternative approach to solvent chemistry: Utility of solvent free techniques - microwave (mw) activations – Advantages of mw exposure – Specific effects of mw – limitations - phase transfer catalysis (PTC). Green chemistry reactions: condensation, oxidation and reduction reactions. Ionic liquids: Basic idea and applications.

**Text Book(s):**

1. I.L. Finar, "Organic Chemistry", Vol. I and II, 6<sup>th</sup> edn., ELBS, Singapore, 1994.
2. Huheey, J.E., Inorganic Chemistry, Harper Collins College Publishers, 1993.
3. Madan, R.D., Modern Inorganic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 2005.
4. Sanghi, R. and Srivastava, M.M., "Green Chemistry (Environment Friendly Alternatives)", First Edition, Narosa Publishing House, New Delhi, 2003.

**Reference Books:**

1. Soni, P.L., Text book of Organic Chemistry, Sultan Chand and Sons, New Delhi, 1998.
2. Sharma, B. K. Industrial Chemistry, Goel Publishing House, Meerut, 1989.

Course Code	Course Title	C	H	I	E	T
17U6CME2	ORGANIC CHEMISTRY-II	7	6	25	75	100

**UNIT I AROMATIC HYDROXY COMPOUNDS** 18 Hrs

Preparation and properties of benzyl alcohol – *Phenols*: General methods of preparation – Acidic character and effect on substituents on acidity - Electrophilic substitution reactions – Preparation and properties of: nitrophenols, Catechol, Resorcinol, Quinol, Pyrogallol, Phloroglucinol. Study of following reactions of phenols: Fries rearrangement, Williamson ether synthesis, Claisen rearrangement, Schotten-Baumann reaction, Reimer-Tiemann reaction, Kolbe-Schmidt reaction, Gatterman synthesis, Houben-Hoesch reaction.

**UNIT II AROMATIC ALDEHYDES, KETONES AND ACIDS** 18 Hrs

**a) Aromatic aldehydes and ketones:**

General methods of preparation and properties aromatic aldehydes – Study of following members:

- i. Benzaldehyde: (benzoin condensation, claisen condensation, Perkin reaction, Gattermann reaction, Reformatsky reaction and electrophilic substitution reactions).
- ii. Unsaturated aldehyde: Cinnamaldehyde.
- iii. Phenolic aldehydes: Salicylaldehyde and vanillin.

Aromatic ketones: Acetophenone, benzophenone and quinones,

Study of: Benzilic acid rearrangement, Dienone-phenol rearrangement, Bayer-Villiger reaction.

**b) Aromatic acids:** General methods of preparation and general properties – Study of: Benzoic acid, benzoyl chloride, benzamide; aminobenzoic acids, salicylic acid, cinnamic acid, phthalic acid, phthalic anhydride and phthalimide.

**UNIT III POLYNUCLEAR HYDROCARBONS AND HETEROCYCLES** 18 Hrs

**a) Polynuclear hydrocarbons:** *Isolated systems*: Preparation and properties of diphenyl and diphenylmethane. *Condensed systems*: Naphthalene, anthracene and phenanthrene: structure, preparation, properties and uses.

**b) Heterocyclic compounds:** Chemistry of furan, thiophene, pyrrole, pyridine, quinoline, isoquinoline and indole.

**UNIT IV DYES AND TAUTOMERISM** 18 Hrs

**a) Dyes:** Definition – theory of colour and constitution - classification of dyes according to their structure and applications. Preparation of following dyes:

- i. Azo dyes: Methyl orange, congo red and Bismark brown.
- ii. Triphenylmethane dyes: Malachite green, rosaniline and crystal violet.
- iii. Phthalein dyes: Phenolphthalene and fluorescein.
- iv. Vat dye: Indigo.
- v. Anthraquinone dye: Alizarin.

**b) Tautomerism:** Definition – Keto-enol; phenol-keto; nitroso-oxime; imine-enamine tautomerism.

## UNIT V SPECTROSCOPY

18 Hrs

Introduction – Electromagnetic radiations – Electromagnetic spectrum.

**UV-Visible spectroscopy:** Introduction - types of electronic transition – absorption laws – chromophoric and bathochromic shift – hypsochromic shift – calculation of  $\lambda$  max for dyes and polyenes only.

**IR spectroscopy:** Introduction – modes of vibration – overtone and combination bands – effect of hydrogen bond – finger print region – block diagram of FT-IR instrument – absorption range of different functional groups - IR spectra of *cis*, *trans* cinnamic acid, *o*- and *p*-nitro phenol, 2-phenylpropionaldehyde, cyclic ketones.

**NMR spectroscopy:** Introduction – chemical shift – shielding's and deshielding effects – factors affecting chemical shift – solvents effect – number and splitting of signals – coupling constants – NMR spectra of ethanol and anisole.

### Text Book(s):

1. Bhal, B.S. and Arun Bahl, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi, 2004.
2. Morrison, R. T., Boyd, R. N. Organic Chemistry, 6<sup>th</sup> Edition, Prentice-Hall of India Pvt. Ltd., New Delhi.
3. Jain, M. K. and Sharma, S. C. Modern Organic Chemistry, Vishal Publishing Co, Jalandhar, Delhi, 4<sup>th</sup> edition, 2013.
4. Kalsi, P. S. Spectroscopy of Organic Compounds, 6<sup>th</sup> edition, New Age International Publishers, 2009.
5. Sharma, Y. S. Elementary spectroscopy, S. Chand & Company Ltd. 2005.

### Reference Books:

1. Tewari, K. S., Mehrotra, S. N., and Vishnoi, N. K. Text book of Organic Chemistry, Vivas Publishing House Pvt Ltd. 1998.
2. Soni, P.L., , Text book of Organic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 1998.
3. John R. Dyer, Application of Absorption Spectroscopy of Organic Compounds 3<sup>rd</sup> edition, ELBS, 1987.



## UNIT V      BONDING IN CO-ORDINATION COMPOUNDS.

15 Hrs

Crystal Field theory: Introduction, crystal field splitting in octahedral, tetrahedral & square planar arrangement of ligands - Spectro chemical series - ligand field effect and colour, crystal field stabilization energy and its application - Tetrahedral Vs Octahedral Complexes - Jahn-Teller distortion and its consequences.

Carbonyls: 18 electron rule-Bonding in carbonyls-Preparation and structure of  $\text{Ni}(\text{CO})_4$ ,  $\text{Fe}(\text{CO})_5$  and  $\text{Cr}(\text{CO})_6$

### Text Book(s):

1. Madan, R.D., Modern Inorganic Chemistry, Sultan Chand and Co. Ltd., New Delhi, 2005.
2. Puri, B.R., & Sharma. L.R., Principles of Inorganic Chemistry, Shoban Lal and Nagin Chand & Co., Jalandar, 1989.

### Reference Books:

1. Malik, Tuli & Madan, R.D., Selected Topics in Inorganic Chemistry, S. Chand & Co., New Delhi, 1988.
2. Huheey, J.E., Inorganic Chemistry, Harper Collins College Publishers, 1993.

Course Code	Course Title	C	H	I	E	T
17U6CMC8	PHYSICAL CHEMISTRY-II	5	5	25	75	100

### UNIT I ELECTROCHEMISTRY – I

15 Hrs

Electrolytic conduction – Faraday’s law of electrolysis – conductivities of ions-specific, equivalent and molar conductance – measurements of conductance of electrolytes – variation of conductance with dilution – equivalent conductance at infinite dilution – Kohlrausch’s law of independent migration of ions and its applications – Transference number and its determination by moving boundary method- applications of conductance measurements – conductometric titrations.

Theories of weak and strong electrolytes – Ostwald dilution law – Debye-Huckel theory of strong electrolytes – Activity coefficients of electrolytes – ionic strength – Debye-Huckel limiting law.

### UNIT II ELECTROCHEMISTRY – II

15 Hrs

Concept of electrochemical cells – cell diagram and terminology – convention regarding signs of cell emf – calculation of cell emf from single electrode potential – standard emf of the cell – Nernst equation – reversible and irreversible cells – thermodynamics and electromotive force – calculation of  $\Delta G$ ,  $\Delta H$ ,  $\Delta S$  and  $K$  for cell reactions – single electrode potential and cell emf measurements of single electrode potential – type of electrodes- reference electrode – calomel electrode – standard electrode potential – electrochemical series – experimental determinations of cell emf – Weston cadmium cell – types of electrochemical cells – commercial cells – primary and secondary cells – dry cell – lead storage cell – Ni-Cd cell –  $H_2O_2$  fuel cell.

### UNIT III PHOTOCHEMISTRY

15 Hrs

Definition of photochemical reactions – comparative study of thermal and photochemical reactions – laws of photochemistry – Lambert and Beer law – Growhtus-Draper law- Stark-Einstein law – quantum efficiency and its determinations – consequence of light absorption by atoms and molecules – Jablonski diagram – photophysical process – fluorescence, phosphorescence and other deactivating processes – photochemical processes – kinetics of photochemical reactions – gaseous reactions – Hydrogen-halogen reactions (Formation of HCl and HBr and decomposition of HI) – Photochemical equilibrium – flash photolysis – photosensitization, Chemiluminescence – bioluminescence.

## UNIT IV IONIC EQUILIBRIUM

15 Hrs

Acid and bases – Arrhenius concept – Lewis concept – Lowry Bronsted concept – ionic product of water – pH scale – Common ion effect – buffer solution – acid buffer- basic buffer – calculation of pH of buffer – Henderson’s Hasselbalch equation – Hydrolysis of salts – salts of weak acid & strong base – salt of weak base & strong acid – salt of weak acid weak base – Theory of acid – base indicator – action of phenolphthalein – action of methyl orange – solubility product – applications.

## UNIT V SPECTROSCOPY & GROUP THEORY

15 Hrs

**a) Spectroscopy** - Introduction – electromagnetic radiation – molecular spectra – types of molecular spectra – rotational spectra – rigid rotor – selection rule – IR spectra – selection rule – Hook’s law – simple Harmonic oscillator – mode of vibrations in H<sub>2</sub>O and CO<sub>2</sub> – electronic spectra – Franck condon principle – <sup>1</sup>H NMR spectra – principle – chemical shift – spin-spin splitting – applications to simple molecules.

**b) Group theory:** Definition – group – symmetry – element symmetry operations – principles of simple group – examples – point group for H<sub>2</sub>O and NH<sub>3</sub>.

### Text Book(s):

1. Glasstone, S., “Thermodynamics for Chemists”, First Edition (Reprint), van Nostrand & Co., New York, 2005.
2. Rajaram, R. and Kuriacose, J.C., “Thermodynamics”, Second Edition, S. Chand and Co., New Delhi, 1993.
3. Rajaram, R. and Kuriacose, J.C., “Kinetics and Mechanism of Chemical Transformation”, First Edition, Macmillan India Ltd., New Delhi, 2006.
4. Mc Quarrie, D.A. and Simon, J.D., “Physical Chemistry- A Molecular Approach”, First South Asian Edition, Viva Books Pvt. Ltd., New Delhi, 2011.
5. Banwell, C.N. and Mc Cash, E.M. “Fundamental of Molecular Spectroscopy”, Fifth Edition, Mc Graw Hill Education (India) Pvt., Ltd., New Delhi, 2013.

### Reference Books:

1. Kapoor, K.L., “A Text Book of Physical Chemistry”, Volumes 2 & 5, Fourth Edition, Macmillan India Ltd., New Delhi, 2011.
2. Laidler, K.J. “Chemical Kinetics” Sixth Edition, Pearson Education, New Delhi, 2011.
3. Ball, D. W., “Physical Chemistry”, First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.
4. Mortimer, R.G., “Physical Chemistry”, Third Edition, Academic Press – An imprint of Elsevier, London, 2009.

Course Code	Course Title	C	H	I	E	T
17U6CSM4	ANALYTICAL AND BIOCHEMISTRY	2	2	25	75	100

**UNIT I CHROMATOGRAPHY** 6 Hrs

Introduction, classification – principles and applications of: paper, thin layer, column, gas and high performance liquid chromatography (HPLC).

**UNIT II DRUG DESIGN** 6 Hrs

Drug design – A rational approach: Introduction – analogues and prodrugs – Concept of lead: narcotic, antipyretic analgesics and antirheumatic drugs – Factors affecting drug design – Drug design: the method of variation – Drug design through disjunction and conjunction.

**UNIT III ERROR ANALYSIS-I** 6 Hrs

Significant figures – rules for identifying significant figures - Errors – Definition – Absolute and relative error – Types of errors: Determinant and indeterminant errors – Precision – Definition – Expression of precision: Average deviation from the mean, standard deviation and relative standard deviation – variance, co-efficient of variance, correlation co-efficient.

**UNIT IV ERROR ANALYSIS-II** 6 Hrs

Accuracy: Definition – Difference between precision and accuracy – Statistical treatment of analytical data – confidence limits – Rejection of experimental data – Q test – F test – t test.

**UNIT V ATOMIC ABSORPTION SPECTROSCOPY** 6 Hrs

Introduction – Principle of AAS – Difference between atomic absorption and atomic emission – advantages and instrumentation of AAS – Applications: Qualitative and quantitative treatment, determination of metallic elements in medical, food and blood serum.

**Text Book(s):**

1. Gopalan. R., Subramanian. P.S. Rengarajan. K, Elements of Analytical Chemistry, Vikas Publishing House Pvt. Ltd., New Delhi, 2010..
2. Chatwal and Anand, Instrumental methods of chemical analysis, Himalaya Publishing House, Mumbai, 1998.
3. Morrison, R.T., and Boyd, R.N., Organic Chemistry, Prentice-Hall of India Pvt. Ltd., New Delhi, 6<sup>th</sup> edition, 1999.
4. Ashutosh Kaur, Medicinal Chemistry, 1<sup>st</sup> edition, 1998.
5. Jayashree Gosh, Pharmaceutical Chemistry, 1<sup>st</sup> edition, 1996.

**Reference Books:**

1. Skoog, West and Holler, Fundamental of Analytical Chemistry.
2. Verma. R.M. Analytical Chemistry, CBS Publishers & Distributors, 2008.

Course Code	Course Title	C	H	I	E	T
17U6CMP3	INORGANIC ESTIMATION AND ORGANIC ANALYSIS	6	3 + 3	50	50	100

### Organic Analysis

- ❖ Benzoic acid
- ❖ Phenol/ $\alpha$ -Naphthol
- ❖ Benzaldehyde
- ❖ Urea
- ❖ Glucose
- ❖ Thiourea
- ❖ Acetanilide
- ❖ Benzamide
- ❖ Ethyl benzoate
- ❖ Aniline
- ❖ Nitrobenzene
- ❖ Resorcinol
- ❖ Phthalic acid
- ❖ Acetophenone

### **Gravimetric Estimation**

- ❖ Estimation of Lead as Lead chromate
- ❖ Estimation of Barium as Barium chromate

Course Code	Course Title	C	H	I	E	T
17U6CMP4	ORGANIC PREPARATION AND PHYSICAL CHEMISTRY	6	3 + 3	50	50	100

#### LIST OF ORGANIC PREPARATIONS:

- Preparation of p-Bromoacetanilide
- Preparation of Aspirin
- Preparation of Nerolin.

#### LIST OF PHYSICAL CHEMISTRY EXPERIMENTS:

1. Phase rule
  - ❖ Simple eutectic
  - ❖ Compound formation
2. Rast macro method – Molecular weight determination
3. Conductometry
  - ❖ Acid Base titrations
  - ❖ Precipitation titrations
4. Potentiometry
 

Redox titrations
5. Kinetics – Ester hydrolysis
6. Critical solution temperature of (i) Phenol-water system  
(ii) Effect of impurity on CST
7. Distribution Coefficient of I<sub>2</sub> in Benzene

Course Code	Course Title	C	H	I	E	T
17U3CNM1	CHEMISTRY IN DAYTODAY LIFE	2	2	25	75	100

**UNIT I FOOD PRESERVATION AND FOOD ADDITIVES 6 Hrs**

Food preservation-preservation methods-low temperature, high temperature, chemical preservatives.

Food additives, natural and artificial coloring agents- sweetening agents, legal safe guards, adulteration in food.

**UNIT II FOOD DETERIORATION 6 Hrs**

Food deterioration: Definition of deterioration, deterioration by microorganism, water and food preservatives.

Adulterants: definition, classification, injurious adulterants/contaminants in foods and their health effects, prevention of food adulterants.

**UNIT III INDUSTRIAL CHEMISTRY 6 Hrs**

**INSECTICIDE:** Fungicides and Pesticides-definition and classification according to the methods of applications and action, preparation and use of DDT and BHC, Bordeaux mixture and dithiocarbamate.

**SOAP AND DETERGENTS:** Manufacture of Soap and Detergents - Cleansing action of soap – Disposal of Detergents waste in water resources and its effects.

**UNIT IV AGRO CHEMISTRY 6 Hrs**

Nutrients for plants – Major and minor nutrients – Role of NPK – Urea – Super Phosphate – Mixed fertilizers – Fertilizer manufacturing units in India.

**UNIT V DAIRY CHEMISTRY 6 Hrs**

Milk and Milk Products - Composition of Milk, Flavour and aroma of Milk, Physical properties of milk. Effect of heat on Milk - Milk products - cream, butter, ice cream, milk powder.

**Text Book(s):**

1. Sharma, B.K., Polymer Chemistry, Goel Publishing House, Meerut, 1989.
2. Chopra. H.K and Panesar. P.S, Food Chemistry, Narosa Publishing House, 2010.

**Reference Books:**

1. Thapar. H, Food Chemistry, Pacific Books Internationals, New Delhi, 2011.
2. Iqbal. S.A and Mido. Y, Food Chemistry, Discovery Publishing House, 2005.

### CBCS Pattern for Ancillary Chemistry

Sem	Course Code	Course Title	C	H	I	E	T
I	17U1CAC1 <i>(For I Bot)</i>	ANCILLARY CHEMISTRY – I	4	4	25	75	100
III	17U3CAC1 <i>(For II Mat, II Phy and II Zoo)</i>	ANCILLARY CHEMISTRY – I	2	2	25	75	100
II / IV	17U2CAC2/ 17U4CAC2 <i>(For I Bot, II Mat, II Phy and II Zoo)</i>	ANCILLARY CHEMISTRY – II	4	4	25	75	100
III / V	17U3CAC3/ 17U5CAC3 <i>(For II Bot, III Mat, III Phy and III Zoo)</i>	ANCILLARY CHEMISTRY – III	2	2	25	75	100
III / V	17U3CSA1/ 17U5CSA1 <i>(For II Bot, III Mat, III Phy and III Zoo)</i>	APPLIED CHEMISTRY	2	2	25	75	100
IV	17U4CAC4 <i>(For II Bot)</i>	ANCILLARY CHEMISTRY – IV	2	2	25	75	100
VI	17U6CAC4 <i>(For III Mat, III Phy and III Zoo)</i>	ANCILLARY CHEMISTRY – IV	4	4	25	75	100
II	17U2CAP1	QUALITATIVE ANALYSIS	2	2	50	50	100
IV	17U4CAP2	VOLUMETRIC ANALYSIS	2	2	50	50	100

Course Code	Course Title	C	H	I	E	T
<b>17U1CAC1</b>	<b>ANCILLARY CHEMISTRY – I</b> (For I Bot)	4	4	25	75	100

**UNIT I ATOMIC STRUCTURE** 12 Hrs

Brief introduction to structure of atom - Rutherford and Niels Bohr's model of an atom and their defects - Sommerfeld's modification of atomic structure Electronic configuration and quantum numbers - Orbitals-shapes of s, p and d orbitals. - Pauli's exclusion principle - Hund's rule of maximum multiplicity - Aufbau principle - Heisenberg's uncertainty principle.

**UNIT II INTRODUCTION TO ORGANIC CHEMISTRY** 12 Hrs

Importance of organic compounds in daily life – Classification of organic compounds. Functional groups – definition – various functional groups - General formula and examples for the following: Alcohols, Alkyl Halide, Carbonyl compounds, Carboxylic acids and Amines. Types of organic reactions – Substitution, Addition and Elimination reactions (examples only, not mechanism)

**UNIT III CHEMICAL BONDING** 12 Hrs

Types of Bonds – electrovalent, ionic, covalent, co-ordinate covalent, metallic and H-bonding. Characteristics of electrovalent and covalent compounds. VB Theory - Types of overlapping (s-s, s-p and p-p overlapping), Sigma and pi bonds, Hybridisation-  $sp^3$ ,  $sp^2$  and  $sp$  hybridisation in methane, ethylene & acetylene only.

**UNIT IV SURFACE CHEMISTRY** 12 Hrs

Definition of adsorption, occlusion, absorption, adsorbent, adsorbate – Types of adsorption: Physisorption and chemisorption – differences between physisorption and chemisorption – applications of adsorptions – factors influencing adsorption process.

**UNIT V CATALYSIS** 12 Hrs

Definition, Characteristics of catalysts - Types of catalyst (Homogeneous and heterogeneous) – Acid base catalysis – Enzyme catalysis with example only: positive, negative and auto catalysis – catalytic promoters – catalytic poison.

**Reference books:**

1. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
2. Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
3. SathyaPrakash, Tuli, Basu& Madan, 1999, Advanced Inorganic Chemistry. Vol. II , 17<sup>th</sup> Revised Edition, S. Chand and Co. Ltd., Ram Nagar., New Delhi.
4. Puri. B.R., Sharma. L.R., 1989, Principles of Inorganic Chemistry, ShobhanLal Nagin Chand and Co., Jalandar.

Course Code	Course Title	C	H	I	E	T
<b>17U3CAC1</b>	<b>ANCILLARY CHEMISTRY – I</b> (For II Mat, II Phy and II Zoo)	2	2	25	75	100

**UNIT I ATOMIC STRUCTURE – I** 6 Hrs

Brief introduction to structure of atom - Rutherford and Niels Bohr's model of an atom and their defects - Sommerfeld's modification of atomic structure and quantum numbers – Hydrogen spectra.

**UNIT II ATOMIC STRUCTURE – II** 6 Hrs

Electronic configuration and Orbitals-shapes of s, p and d orbitals. - Pauli's exclusion principle - Hund's rule of maximum multiplicity - Aufbau principle - Heisenberg's uncertainty principle.

**UNIT III INTRODUCTION TO ORGANIC CHEMISTRY** 6 Hrs

Classification of organic compounds. Functional groups – definition – various functional groups - General formula and examples for following: Alcohols, Alkyl Halide, Carbonyl compounds, Carboxylic acids and Amines. Types of organic reactions – Substitution, Addition and Elimination reactions (examples only, not mechanism)

**UNIT IV CHEMICAL BONDING** 6 Hrs

Types of Bonds – electrovalent, ionic, covalent, co-ordinate covalent, metallic and H-bonding. Characteristics of electrovalent and covalent compounds. Hybridisation- Introduction,  $sp^3$ ,  $sp^2$ , and  $sp$  hybridisation in methane, ethylene & acetylene only.

**UNIT V SURFACE CHEMISTRY** 6 Hrs

Definition of adsorption, occlusion, absorption, adsorbent, adsorbate – Types of adsorption: Physisorption and chemisorption – differences between physisorption and chemisorption – applications of adsorptions – factors influencing adsorption process.

**Reference books:**

1. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
2. Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
3. Madan, R.D., 2005, Modern Inorganic Chemistry, Sultan Chand and Co. Ltd., New Delhi.
4. SathyaPrakash, Tuli, Basu& Madan, 1999, Advanced Inorganic Chemistry. Vol. II , 17<sup>th</sup> Revised Edition, S. Chand and Co. Ltd., Ram Nagar., New Delhi.
5. Puri. B.R., Sharma. L.R., 1989, Principles of Inorganic Chemistry, ShobhanLal Nagin Chand and Co., Jalandar.

Course Code	Course Title	C	H	I	E	T
<b>17U2CAC2/ 17U4CAC2</b>	<b>ANCILLARY CHEMISTRY – II</b> <i>(For I Bot, II Mat, II Phy and II Zoo)</i>	4	4	25	75	100

**UNIT I PERIODIC TABLE AND ATOMIC PROPERTIES** 12 Hrs

Modern periodic law - Long form of periodic table –classification of elements based on valence shell electronic configuration - s, p, d,& f blocks – Periodic properties – Atomic and ionic radii – Ionization energy – Electron affinity – Electro negativity.

**UNIT II ACIDS AND BASES** 12 Hrs

Modern concepts of acids and bases – strong and weak acids and bases – acidity and basicity. Concept of pH – common ion effect – applications - buffer solutions – definition - theory of buffer action and applications – Henderson’s Equation - Strength of solutions - calculation of equivalent weights – normality- molarity – molality – mole fraction – ppm – preparation of standard solutions.

**UNIT III STUDY OF ORGANIC COMPOUNDS** 12 Hrs

Alkane: Introduction – preparation and properties of ethane. Alkene: Introduction – preparation and properties of ethylene. Alkyne: Introduction – preparation and properties of acetylene. Alcohol: Introduction – preparation properties of methanol and ethanol. Ethers: Introduction – preparation and properties of dimethyl ether.

**UNITIV CARBOHYDRATES – I** 12 Hrs

Monosaccharides: Definition – classification of carbohydrate – monosaccharides – properties and uses of glucose and fructose – configuration of glucose – Mutarotation - conversion of glucose to fructose and viceversa.

**UNIT V CARBOHYDRATES – II** 12 Hrs

Colour reactions of carbohydrates - Disaccharides: Sucrose – manufacture – properties and uses – distinction between sucrose, glucose and fructose.

Polysaccharides: Starch: Structure, properties and uses.

**Reference books:**

1. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
2. Puri. B.R., Sharma. L.R., 1989, Principles of Inorganic Chemistry, ShobhanLal Nagin Chand and Co., Jalandar.
3. Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
4. Soni, P.L., 1998, Text book of Organic Chemistry, Sultan Chand and Co. Ltd.,New Delhi.
5. Morrison, R.T., and Boyd, R.N., 1999, Organic Chemistry, Prentice-Hall of India, Pvt. Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
<b>17U3CAC3/ 17U5CAC3</b>	<b>ANCILLARY CHEMISTRY – III</b> (For II Bot, III Mat, III Phy and III Zoo)	2	2	25	75	100

**UNIT I VITAMINS** 6 Hrs

**Vitamins:** Definition, classification, sources, function and deficiency of vitamins A, B-complex, C, D, E and K (structure and synthesis not expected).

**UNIT II HARMONES** 6 Hrs

Structure, Source and importance of Androsterone, Estrosterone, Estrone, Testosterone, Progesterone-thyroxin.

**UNIT III AMINO ACIDS AND PROTEINS** 6 Hrs

Amino acids – Definition, general methods of preparation, properties and uses – Glycine and Alanine.

Proteins – Definition, Classification, general properties – colour reactions and relationship of amino acid with proteins.

**UNIT IV NUCLEAR CHEMISTRY** 6 Hrs

Fundamental particles: Nuclear isotopes, Isobars, Isotones and Isomers- Difference between chemical reactions and nuclear reactions - Group displacement law - Concept and applications of nuclear fission and fusion - Applications of radioactivity in medicine, agriculture and industry - as tracer elements in the investigation of reaction mechanism - carbon dating.

**UNIT V PHOTOCHEMISTRY** 6 Hrs

Introduction to photochemistry- Difference between thermal and photo chemical reaction statement of Grothuss-Draper Law, Stark-Einstein's Law, Quantum yield, Jablonski diagram- Phosphorescence, Fluorescence, Chemiluminescence - Definition with examples. Photosynthesis, Photosensitization.

**Reference books:**

1. Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
2. I.L. Finar, "Organic Chemistry", Vol. I and II, 6<sup>th</sup>edn., ELBS, Singapore, 1994.
3. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
4. Morrison, R.T., and Boyd, R.N., 1999, Organic Chemistry, Prentice-Hall of India, Pvt. Ltd., New Delhi.

Course Code	Course Title	C	H	I	E	T
<b>17U3CSA1/ 17U5CSA1</b>	<b>APPLIED CHEMISTRY</b> <i>(For II Bot, III Mat, III Phy and III Zoo)</i>	2	2	25	75	100

**UNIT I WATER TREATMENT** 6 Hrs

Hardness of water: Degree of hardness - Temporary and permanent hardness - disadvantages of hard water- softening of hard water using Zeolite process, demineralization process and reverse osmosis.

**UNIT II FERTILIZERS** 6 Hrs

Definition: role of various elements in plant growth-classification i) natural and chemical ii) According to nature of the elements present-functions of the following: ammonium Sulphate, urea, calcium cyanmide, super phosphate of lime, triple super phosphate, potassium Sulphate, potassium chloride, potassium nitrate.

**UNIT III CHEMISTRY OF POLYMERS** 6 Hrs

Introduction: Definition of monomer and polymers - classification of polymers based on micro structures (Chemical and Geometrical). General mechanism of polymerization- mechanism of radical polymerization

**UNIT IV INDIVIDUAL POLYMERS** 6 Hrs

General methods of preparation, properties and uses of the following polymers: polyethylene, polystyrene, polyacrylonitrile, polyesters (Kevlar), polyurethanes, poly vinyl chloride and phenol-formaldehyde resins.

**UNIT V CORROSION AND PREVENTION** 6 Hrs

Definition – Types of corrosion – Factors affecting corrosion process - Corrosion control - cathodic protection – anodic protection - Corrosion inhibitors – electroplating and passivity.

**Reference books:**

1. Sharma, B.K., 1989, Polymer Chemistry, Goel Publishing House, Meerut.
2. Mukhopathyay. R and Datta. S, Engineering Chemistry, New Age international PVL, Publishers, New Delhi.
3. Sharma, B. K., Industrial chemistry, GoelPuplisihing House, 1994.

Course Code	Course Title	C	H	I	E	T
<b>17U4CAC4/</b>	<b>ANCILLARY CHEMISTRY – IV</b> (For II Bot)	2	2	25	75	100

**UNIT I PURIFICATION OF ORGANIC COMPOUNDS** 6 Hrs

Purification techniques of organic compounds- Distillation – fractional distillation – distillation under reduced pressure – crystallization – sublimation.

**UNIT II SEPARATION OF ORGANIC COMPOUNDS** 6 Hrs

Chromatography: Definition, principles-Adsorption and partition- applications of chromatography.

A brief study of thin layer chromatography (TLC) and column chromatography.

**UNIT III BIOINORGANIC CHEMISTRY** 6 Hrs

Biological functions and toxicity of elements – chromium, copper and Arsenic - Role of alkali and alkaline earth metal ions in biological systems: Role of Na<sup>+</sup> and K<sup>+</sup> ions – Sodium pumping – Role of Mg<sup>2+</sup> and Ca<sup>2+</sup> ions.

**UNIT IV COLLOIDS** 6 Hrs

Colloidal state of matter – various types properties of colloids- Tyndall effect-Brownian movement-Lyophobic and Lyophilic sols, difference between them – Purification of colloids - dialysis – electro osmosis – electrophoresis.

**UNIT V EMULSION** 6 Hrs

Emulsion – types of emulsions with examples: oil in water and water in oil - Gels: classification and preparation by cooling of sols, double decomposition and by change of solvents. Application of colloids in the following fields: foods, medicine, industrial goods, rubber plating, chrome tanning, Cottrell precipitator and detergent action of soap.

**Reference books:**

1. Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
3. Madan, R.D., 2005, Modern Inorganic Chemistry, S. Chand and Co. Ltd., New Delhi.
4. Soni, P.L., 1998, Text book of Organic Chemistry, Sultan Chand and Sons, New Delhi.

Course Code	Course Title	C	H	I	E	T
17U6CAC4	<b>ANCILLARY CHEMISTRY – IV</b> (For III Mat, III Phy and III Zoo)	4	4	25	75	100

**UNIT I THERMODYNAMICS** 12 Hrs

Scope - Terminology used in thermodynamics - Thermodynamic properties - Zeroth law of thermodynamics - First law thermodynamics. Limitation of first law of thermodynamics. Need for the II law of thermodynamics – Spontaneous and non-spontaneous processes - Entropy - Gibb's free energy - Third law of thermodynamics.

**UNIT II ELECTROCHEMISTRY** 12 Hrs

Introduction – Difference between metallic conductor and electrolytic conductor - Faraday's law of electrolysis – specific resistance – specific conductance – Equivalent conductance – Molar conductance.

Electrochemical cell – electrode potential – standard – Hydrogen electrode - EMF – determination. Reference electrodes – calomel electrode – Nernst equation.

**UNIT III COLLOIDS** 12 Hrs

Colloidal state of matter – various types – Sols – dialysis – electro osmosis – electrophoresis. Emulsion – types of emulsions with examples. Gels: classification and preparation by cooling of sols, double decomposition and by change of solvents. Application of colloids in the following fields: foods, medicine, industrial goods, rubber plating, chrome tanning, Cottrell precipitator and detergent action of soap.

**UNIT IV ALKALOIDS** 12 Hrs

Definition, extraction of alkaloids and general properties structure and biological actions of Conine, Piperine and Nicotine. Extraction of piperine from peper.

**UNIT V TERPENOIDS & DYES** 12 Hrs

Introduction - Isoprene rule - Classification and occurrence - isolation - Structure and source of Citral, Geraniol and Menthol. (Structural discussion and synthesis are not expected).

Definition and classification- preparation of Methyl Orange, Bismark brown, crystal violet and Malachite green.

**Reference books:**

- 1 Puri, B.R., Sharma, L.R. and Pathania, M.S., 2004 (41<sup>st</sup>Edn.), Principles of Physical Chemistry, S.N. Chand and Co., New Delhi.
- 2 I.L. Finar, "Organic Chemistry", Vol. I and II, 6<sup>th</sup>edn., ELBS, Singapore, 1994.
- 3 Bhal, B.S. and ArunBahl, 2004, Advanced Organic Chemistry, S. Chand and Co. Ltd., New Delhi.

**DEPARTMENT OF CHEMISTRY**

**CBCS Pattern for M.Sc. Chemistry**

<b>Sem</b>	<b>Sub Code</b>	<b>Course Title</b>	<b>Hours</b>	<b>Credit</b>
<b>I</b>	17P1CMC1	Organic Chemistry -I	4	4
	17P1CMC2	Inorganic Chemistry -I	4	4
	17P1CMC3	Physical Chemistry -I	4	4
	17P1CME1	Analytical Chemistry-I	4	4
	17P2CMP1	Organic Chemistry Practical – I	5	0
	17P2CMP2	Inorganic Chemistry Practical– I	5	0
	17P2CMP3	Physical Chemistry Practical– I	4	0
<b>II</b>	17P2CMC4	Organic Chemistry –II	4	4
	17P2CMC5	Inorganic Chemistry -II	4	4
	17P2CMC6	Physical Chemistry –II	4	4
	17P2CME2	Bio Chemistry	4	4
	17P2CMP1	Organic Chemistry Practical – I	5	4
	17P2CMP2	Inorganic Chemistry Practical– I	5	4
	17P2CMP3	Physical Chemistry Practical– I	4	4
<b>III</b>	17P3CMC7	Organic Chemistry –III	4	4
	17P3CMC8	Inorganic Chemistry -III	4	4
	17P3CMC9	Physical Chemistry –III	4	4
	17P3CNM1	NME- Chemistry and its Applications	4	4
	17P4CMP1	Organic Chemistry Practical – II	5	0
	17P4CMP2	Inorganic Chemistry Practical– II	5	0
	17P4CMP3	Physical Chemistry Practical– II	4	0
<b>IV</b>	17P4CMC10	Organic Chemistry –IV	4	4
	17P4CMC11	Inorganic Chemistry –IV	4	4
	17P4CMC12	Physical Chemistry -IV	4	4
	17P4CME3	CSIR-NET-GATE-SET Examination Preparations (Objective pattern only)	4	4
	17P4CMP1	Organic Chemistry Practical – II	5	3
	17P4CMP2	Inorganic Chemistry Practical– II	5	4
	17P4CMP3	Physical Chemistry Practical– II	4	3
	17P4CPR1	Project & Viva-voce	0	4

Course Code	Course Title	C	H	I	E	T
17P1CMC1	ORGANIC CHEMISTRY-I	4	4	25	75	100

**UNIT I NATURE OF BONDING IN ORGANIC MOLECULES** 12 Hrs

Delocalized chemical bonding – conjugation - cross conjugation – resonance – hyperconjugation -bonding in fullerenes – tautomerism.

Aromaticity: Huckel rule- aromaticity, anti-aromaticity, homo aromaticity, in benzenoid and non-benzenoid compounds, alternant-non-alternant hydrocarbons, energy level of  $\pi$ -molecular orbitals, annulenes.

Bond weaker than covalent - addition compound, crown ethers, complexes and cryptands, inclusion compounds, cyclodextrins, catenanes and rotaxanes.

**UNIT II REACTION MECHANISM, STRUCTURE AND REACTIVITY** 12 Hrs

Electronic effects-Inductive, field, Resonance-Steric Inhibition of Resonance.

Types of mechanisms- potential energy diagrams, transition states and intermediates- kinetic and thermodynamic control, Hammond's postulate, Curtin-Hammett principle, methods of determining mechanisms, isotope effects, hard and soft acids and bases.

The Hammett equation and linear free energy relationship, substituent and reaction constants. Taft equation.

Reactive Intermediates: Carbocation, carbanion, carbene and nitrene: generation, structure and reactivity-

**UNIT III ALIPHATIC NUCLEOPHILIC SUBSTITUTION** 12 Hrs

The  $S_N^1$ ,  $S_N^2$ , mixed  $S_N^2$  and  $S_N^i$  mechanisms.

The neighbouring group participation by  $\pi$  and  $\sigma$  bonds, anchimeric assistance. Classical and non classical carbocations, phenonium ions, norbornyl system, common carbocation, rearrangements, applications of NMR spectroscopy in the detection of carbocations

The  $S_N^i$  mechanism. Nucleophilic substitution at allylic, aliphatic trigonal, vinylic carbon.

Effects of substrate structure, attacking nucleophile, leaving group, and solvent polarity on the reactivity.

**UNIT IV AROMATIC ELECTROPHILIC AND NUCLEOPHILIC SUBSTITUTION**

12 Hrs

The arenium ion intermediate, energy profile diagrams, orientation and reactivity in mono and disubstituted benzene ring - ortho/para ratio, ipso attack, orientation in other ring systems: naphthalene, anthracene, phenanthrene, pyrrole, indole, pyridine, quinoline and isoquinoline. Quantitative treatment of reactivity in substrate and electrophiles. Diazonium coupling, Vilsmeier reaction, Gattermann –Koch reaction.

Aromatic Nucleophilic substitution: The  $S_NAr$ ,  $S_N^1$  and benzyne mechanisms. Reactivity-effect of substrate structure, leaving group and nucleophile. The Von Richter, Sommelet Hauser and Smiles rearrangements.

Types of free radical reactions, free radical substitution mechanism, mechanism at aromatic substrate, neighbouring group assistance, Reactivity for aliphatic and aromatic substrates at a bridgehead. Reactivity in the attacking radicals. The effect of solvents on reactivity.

Allylic halogenation, oxidation of aldehydes to carboxylic acids, auto-oxidation, coupling of alkynes and arylation of aromatic compounds by diazonium salts, Sandmeyer reaction, Free radical rearrangement, Hunsdiecker reaction.

**Elimination Reactions**

The E<sub>2</sub>, E<sub>1</sub> and E<sub>1</sub>CB mechanism - Orientation of the double bond. Reactivity – effects of substrate structures, attacking base, the leaving group and the medium. The mechanism and orientation of pyrolytic elimination.

**Text Book(s):**

1. Clayden, J., Greeves, N., Warren, S. and Wothers, P., “Organic Chemistry”, First Edition, Oxford University Press, New York, 2006.
2. March, J., “Advanced Organic Chemistry”, Sixth Edition, John Wiley & Sons, New York, 2007.
3. Smith, M. B., “Organic Synthesis”, Second Edition, McGraw-Hill International Edition, New Delhi, 1994.
4. Skyes, P., “A Guide Book to Mechanism in Organic Chemistry”, Sixth Edition, Pearson Education Ltd., New Delhi, 2011.
5. Finar, I.L., “Organic Chemistry”, Vol. II, Sixth Edition, Pearson Education Pvt. Ltd., Singapore, 2006.
6. Mukherji, S.M., and Singh, S. P., Organic Reaction Mechanism by MacMillan India Ltd.

**Reference Books:**

1. Ahluvalia, V.K., “Chemistry of Natural Products”, First Edition, Vishal Publishing Co, Jalandhar, 2008.
2. Carrutherus, W., “Some Modern Methods in Organic Synthesis”, Third Edition, Cambridge University Press, New York, 1997.
3. Ireland, R.E., “Foundation of Modern Organic Chemistry Series- Organic Synthesis”, First Edition, Prentice – Hall of India Pvt. Ltd., New Delhi, 1975.
4. Mackie, R.K., Smith, M.M., and Aitken, R.A., “Guide Book to Organic Synthesis” Second Edition, Longman Scientific and Technical, Singapore, 1990.
5. Bruckner, R., “Advanced Organic Chemistry – Reaction Mechanism”, First Edition, Elsevier India Pvt. Ltd., New Delhi, 2005.
6. Norman, R. and Coxon, J. M. Principles of Organic Synthesis, Blackie Academic & Professional, 1988.

Course Code	Course Title	C	H	I	E	T
17P1CMC2	INORGANIC CHEMISTRY-I	4	4	25	75	100

**UNIT I IONIC BOND** 12 Hrs

Lattice energy and its determination by Born-Haber cycle and other application of BHC, Born-Lande & Born-Meyer equations, significance of Madelung constant - hardness, electrical conductivity and solubility of ionic compounds - Different types of electrostatic interaction, hydrogen bond. Partial ionic character – resultant of polarization. Fajan's rule – dipole moment determination and its applications.

**UNIT II COVALENT BOND –I** 12 Hrs

Covalent bond: Qualitative treatment of valence bond & molecular orbital theories- LCAO approximation – symmetry of M.O.'s - Sigma and Pi bonds. Calculation of s and p character – Bent's rule. Bond properties - bond order, bond energy, bond length and bond polarity. Application of MOT to homonuclear ( $H_2$ ,  $He_2$ ,  $Li_2$ ,  $Be_2$ ,  $B_2$ ,  $C_2$ ,  $N_2$ ,  $O_2$ ,  $F_2$  and their ions) and heteronuclear diatomic molecule ( $CH_4$ ,  $NH_3$ ,  $H_2O$ ,  $NO$  and  $CO$ ) and triatomic molecules like  $BeH_2$  and  $CO_2$ . Walsh diagrams for  $AB_2$  molecule. Comparison of VB & MO theories.

**UNIT III COVALENT BOND-II** 12 Hrs

Hybridization – various types of hybridization with examples. Delocalization – resonance-VSEPR theory of molecules containing only bond pairs of electrons ( $BeF_2$ ,  $BH_3$ ,  $CH_4$ ,  $PF_5$ ,  $SF_6$ ,  $IF_7$  molecules. Geometry of molecules containing both bond pair and lone pairs of electrons ( $SnCl_2$ ,  $NH_3$ ,  $H_2O$ ,  $SF_4$ ,  $ClF_3$ ,  $IF_5$ ). Application of VSEPR theory to xenon compounds.

**UNIT IV INORGANIC CHAIN, RING AND CLUSTER COMPOUNDS** 12 Hrs

Polyacids-isopolyacids and heteropoly acids of vanadium, chromium, molybdenum and tungsten. Silicates: occurrence and structure of silicates: orthosilicates, pyrosilicates, cyclic silicates, chain silicates, sheet silicates and 3 dimensional silicates. Silicones and applications. Metal Clusters: Bonding and structures of following clusters: Dinuclear Clusters:  $Cu(II)$ carboxylate, Chromium(II)acetate, and  $[M_2Cl_8]^{4-}$  where  $M = Mo$ , and  $Re$  Trinuclear Clusters:  $[M_3(CO)_{12}]$  where  $M = Fe$ ,  $Ru$ ,  $Os$  Tetranuclear Clusters:  $[M_4(CO)_{12}]$  where  $M = Co$ ,  $Rh$ ,  $Ir$  Hexanuclear Clusters:  $[Nb_6Cl_{12}]^{2+}$  and  $[Mo_6Cl_8]Cl_4$ . Poly atomic Zintl ions

**UNIT V CAGE COMPOUNDS AND INORGANIC POLYMERS** 12 Hrs

The concepts of multicentre bond as applied to electron deficient molecules-boron hydrides-metal alkyls. Preparation, properties and structure of boron hydrides-diborane - carboranes-Metallo-carboranes- higher borane, Wade's rules and styx number- boron-nitrogen compounds, borazine, boron nitride. P-N compounds-phosphazenes, polyphosphazenes-polythiazyl, S-N compounds- $S_4 N_4$ .

**Text Book(s):**

1. Gilreeth, E.S., Fundamental concepts of Inorganic Chemistry, Mcgraw Hill, India, 2015.
2. Jolly, W. L., Modern Inorganic Chemistry, Second Edition, Mcgraw Hill, New York, 1991.
3. Lee. J.D., Concise Inorganic chemistry, Fifth Edition, Wiley India Pvt, New Delhi, 2008.
4. Cotton, F.A., and Wilkinson, Advanced Inorganic Chemistry, John Wiley & Sons Ltd., London-New York, 1972.
5. James Huheey, Inorganic Chemistry, Fourth edition, Harper – Collins, New York, 1993.

**Reference Books:**

1. Coulson, C. A., Valence, Second Edition, Oxford, Clarendon, 1961.
2. Purcell, K.F., Kotz J.C., Saunders W.B., Inorganic chemistry, Saunders College Publishing, Philadelphia, 1980.
3. Emeleus, H.J., and Sharpe, A., Modern Aspects of Inorganic chemistry, Fourth Edition, Routledge and Kegan Paul, United Kingdom, 1975.
4. Day, C., Selbin, J, Theoretical Inorganic Chemistry, Second Edition, Von. Nostrand, 1980.

Course Code	Course Title	C	H	I	E	T
17P1CMC3	PHYSICAL CHEMISTRY-I	4	4	25	75	100

**UNIT I      PROPERTIES OF GASES AND LIQUIDS** 12 Hrs

Equations of states-Molecular speeds-Max Well distribution of molecular velocities- one, two and three dimensions-Energy distribution-Maxwell-Boltzmann distribution law-Principle of equipartition of energy and heat capacity-Rotation, vibration and Translational degree of freedom-Molecular collisions-Mean free path-Transport properties-Thermal conductivity-Viscosity and diffusion of gases.

Liquid State-Theory of liquids-Internal Pressure-Liquid crystals-Nematic, Cholesteric, Smectic-Theory and application in liquid crystal display.

**UNIT II      THERMODYNAMICS** 12 Hrs

Thermodynamic equations of state - derivation and application to real gases in the calculations of  $(dH/dp)_T, (dE/dv)_T$  and  $\mu_{J,T}$  etc. Thermodynamics systems of variable composition. Partial molar properties : Chemical potential: Definition - Gibbs-Duhem equation. Determination by graphical method. Variation of chemical potential with temperature and pressure. Fugacity: Definition - Determination of fugacity. Variation of fugacity with temperature and pressure. Activity: Definition –Determination of activity and activity coefficient of non-electrolytes by vapour pressure measurements. Dependence of activity on temperature and pressure. Third law of thermodynamics: absolute entropies – determination of absolute entropies – exceptions to third law.

**UNIT III      QUANTUM CHEMISTRY- I** 12 Hrs

Black Body radiation –de Broglies wave particle duality- Experimental verification of matter waves-Compton effect-Heisenberg's Unvertinity principle-The schrodinger wave equation, Postulates of Quantum mechanics, Operators – Linear operator, commuting operators, Hermitian operator. Eigen functions and Eigen values, Orthogonality and Normalisation. Discussion of solutions of Schrödinger equation to particle in a One Dimensional Box, Three Dimensional Box, The Simple Harmonic Oscillator, The Rigid rotator, The H- atom, Probability Distribution curves, Angular momentum Eigen functions and Eigen Values of angular momentum.

**UNIT IV      QUANTUM CHEMISTRY- II** 12 Hrs

Approximation methods – The Variation theorem, Linear variation principle, Application of variation method to He – atom, Perturbation theory (only Time independent, First order and non-degenerate), Application of Perturbation Theory to He-atom. Hartree Fock Self consistent Field Theory, Symmetric and Antisymmetric Wave functions, Pauli's exclusion principle of Antisymmetric wave functions, Huckel Molecular orbital theory – Huckel theory of conjugated

system-Delocalization Energy, Bond order and Charge density Application of HMO to ethylene, butadiene and cyclopropenyl system.

## UNIT V CHEMICAL EQUILIBRIUM AND PHASE RULE

12 Hrs

Chemical equilibrium: Thermodynamic derivation of equilibrium constant ( $K_p$ ) for equilibrium involving ideal gases and real gases – van't Hoff reaction isotherm. Heterogeneous equilibrium: Definition – examples - Le Chatelier and Braun Principle - thermodynamic proof - temperature, pressure and concentration dependence. Van't Hoff equation: Derivation and applications. Simultaneous equilibria: Free energy and equilibrium constant.

Basic terminologies of phase rule: - Three component system: three liquid system, one liquid and two solid systems and two liquid and one solid system – three solids system.

### Text Book(s):

1. Glasstone, S., "Thermodynamics for Chemists", First Edition, van Nostrand & Co., New York, 2005.
2. Rajaram, R. and Kuriacose, J.C., "Thermodynamics", Second Edition, S. Chand and Co., New Delhi, 1993.
3. Kapoor, K.L., "A Text Book of Physical Chemistry", Volumes 2 & 5, Fourth Edition, Macmillan India Ltd., New Delhi, 2011.
4. Mc Quarrie, D.A. and Simon, J.D., "Physical Chemistry- A Molecular Approach", First South Asian Edition, Viva Books Pvt. Ltd., New Delhi, 2011.
5. Chandra, A.K., "Introductory Quantum Chemistry", Fourth Edition, Tata-McGraw Hill Publication Co. Ltd., New Delhi, 2010.
6. Atkins, P. and de Paula, J., "Physical Chemistry", Ninth Edition, Oxford University Press, New Delhi, 2011.
7. Ball, D. W., "Physical Chemistry", First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.

### Reference Books:

1. Mortimer, R.G., "Physical Chemistry", Third Edition, Academic Press – An imprint of Elsevier, London, 2009.
2. Engel T. and Reid, P. "Physical Chemistry", Second South Asian Edition, Pearson Publication, New Delhi, 2011.
3. Berry, R.S., Rice, S.A and Ross. J, "Physical Chemistry", Second Edition, Oxford University Press, New York, 2007.
4. Puri, B.R., Sharma, L.R. and Pathania, M.S., "Principles of Physical Chemistry", Forty Sixth Edition, Vishal Publishing Co., Jalandhar, 2013.
5. Bhal, A., Bhal, B.S. and Tuli, G.D., "Essentials of Physical Chemistry", First Edition, S. Chand & Company Ltd., New Delhi, 2012.

Course Code	Course Title	C	H	I	E	T
17P1CME1	ANALYTICAL CHEMISTRY-I	4	4	25	75	100

**UNIT I      OXIDATION AND REDUCTION AND MAGNETO CHEMISTRY      12 Hrs**

Concept of oxidation and reduction potentials – periodic trends – applications of electrode potentials in the interpretation of chemical behavior. Electrode potential diagrams and their uses: Latimer diagram – Frost diagram – Pourbaix diagram – Ellingham diagram.

Magnetochemistry - magnitude of magnetic moments - experimental determination – Faraday, Guoy & NMR methods - The concept of the quenching of orbital momentum - Magnetic properties of A,E & T terms - effect of spin - orbit coupling – Temperature Independent Paramagnetism (TIP) Antiferromagnetic interactions in di and poly nuclear transition - metal complexes & solids.

**UNIT II      ELECTROANALYTICAL TECHNIQUE      12 Hrs**

Polarography-principle-diffusion current-polarographic maxima-Ilkovic equation- Half wave potential-applications. Pulse voltammetry-normal and square wave voltammetry. Cyclic voltammetry- principle and simple analytical applications-interpretation of cyclic voltammogram Amperometry - principles and applications – types of amperometric titrations with examples.

Basic principles of electrogravimetry-procedure-Coulometry-principle-coulometry at controlled potential-coulometry at constant current-coulometric titrations-advantages and its applications.

**UNIT III      THERMAL ANALYSIS      12 Hrs**

Theory and principles of DTA and TGA – factors affecting the position of DT and TG curves – application of DTA and TGA .Thermal behavior of the following compounds using DTA and TGA analysis – crystalline copper sulphate penta hydrate, calcium oxalate monohydrate, calcium acetate monohydrate, ammonium nitrate, potassium chlorate with and without catalyst, ammonium metavanadate, zinc hexafluorosilicate – complementary nature of DTA and TGA – principle and applications of DSC - determination of degree of conversion of high alumina cement – purity determination – phase transition study.

**UNIT IV      CHROMATOGRAPHY AND AAS      12 Hrs**

Gas-liquid chromatography-principles and its types - retention volume, instrumentation-carrier gas-column - preparation-stationary phase-detectors- Thermal conductivity detector (TCD)- flame ionization detector (FID)-electron capture detector (ECD) - applications of GLC. High performance liquid chromatography (HPLC)-Scope-column efficiency-instrumentation-column packing detectors.

Instrumentation- principle of atomic absorption spectroscopy (AAS)- Interferences –spectral, chemical and Ionisation - applications of AAS.(Qualitative analysis-Quantitative analysis)- multicomponent analysis - determination of metallic elements in biological materials - determination of metallic elements in industrial food products-determination of Ca, Mg, Na and K in blood serum.

## UNIT V ERROR ANALYSIS, ORD AND CD

12 Hrs

*Error Analysis*- Accuracy and Precision, Determinate and Indeterminate errors, Significant figures, Ways of expressing accuracy – Absolute and relative error, Standard deviation, Propagation of errors, The confidence limit, Tests of significance – The F and T test, Rejection of a result – The Q test, Linear least squares to plot the data, Correlation coefficient.

*Optical rotary dispersion (ORD) and Circular Dichroism (CD)*: Rotational strength of the Chromophores - Cotton effect - Selection rules - its application to D<sub>3</sub> Complexes - the use of ORD & CD in determination of the structure and configuration of the metal complexes.

### Text Book(s):

1. Donald, J., Pietrzyk and Clyde W. Frank, Analytical Chemistry, Second Edition, Academic Press, 1979.
2. Habart, H., Willard, Lynne, L., Merrit, John A. Dean and Frank, Settle, A., Instrumental Methods of Analysis, Seventh Edition, CBS Publishers, New Delhi, 1986
3. Douglas A. Skoog Donald M. West and F. James Holler, Analytical Chemistry, Sixth Edition, Saunders College Publishing, HBJ, New York, 1996.
4. Das, R.C., and Beher, B., Experimental Chemistry, Tata Mc. Graw – Hill Ltd., New Delhi, 1983.
5. Gurdeep, G., Chatwal, R., Anand, S. K., “Instrumental methods of chemical analysis”, Second Edition, Himalaya Publishing House, New Delhi, 2011.

### Reference Books:

1. Findley, A., Practical Physical Chemistry, Ninth Edition, Longmans Green Co. Ltd., London, 1973
2. Khopkar, S.M., Basic Concepts of Analytical Chemistry, New Age International (P) Limited Publishers, New Delhi, 1998.
3. Popiel, W.J., Laboratory Manual of Physical Chemistry, The English Universities Press, London, 1964.

Course Code	Course Title	C	H	I	E	T
17P2CMC4	ORGANIC CHEMISTRY-II	4	4	25	75	100

**UNIT I ADDITION TO CARBON-CARBON MULTIPLE BONDS** 12 Hrs

Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles, and free radicals, regio- and chemo- selectivity, orientation and reactivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic rings. Hydroboration. Michael reaction. Sharpless asymmetric epoxidation.

*Additio to Carbon-Heteroatom Multiple Bonds:* Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids esters, nitriles, Addition of grignard reagents. Organozinc and LiAlH<sub>4</sub>. Addition reactions of carbonyl compounds-Wittig reaction. Mechanism of condensation reaction involving enolates - Aldol, Knoevenagel, Claisen, Mannich, Benzoin, Perkin and Stobbe reactions.

**UNIT II STEREOCHEMISTRY** 12 Hrs

Elements of symmetry, chirality, molecules with more than one chiral center, *threo* and *erythro* isomers, methods of resolution, optical purity, homotopic, enantiotopic and diastereotopic atoms, groups and faces, stereospecific and stereoselective synthesis. Asymmetric synthesis-Cram's and Prelog rule. Optical activity in the absence of chiral carbon (biphenyls, allenes and spiranes), chirality due to helical shape.

Stereochemistry of the compounds containing nitrogen and sulphur.

Conformational analysis of cyclohexane, mono- and di- substituted cyclohexanes, decalins, effect of conformation on reactivity.

**UNIT III OXIDATION AND REDUCTION IN ORGANIC CHEMISTRY** 12 Hrs

*Oxidation:* Introduction, Different oxidative processes-Hydrocarbons- alkenes, aromatic rings, saturated C-H groups (activated and unactivated), Alcohols, hydrazines and sulphides.

Oxidations using ruthenium tetroxide, iodobenzene diacetate and thallium (III) nitrate.

*Reduction:* Introduction. Different reductive processes-Hydrocarbons: alkanes, alkenes, alkynes and aromatic rings - Carbonyl compounds: aldehydes, ketones, acids and their derivatives. Epoxides, Nitro, Nitroso, azo and oxime groups.

**UNIT IV REARRANGEMENTS** 12 Hrs

General mechanism – nature of migration, migratory aptitude, memory effects.

*Carbon-carbon migration:* Wagner Meerwein, pinacol-pinacolone. Benzil-Benzilic acid, and dienone –phenol rearrangement.

*Carbon-nitrogen migration:* Beckmann, Hofmann, Schmidt, Lossen and Curtius rearrangements.

*Carbon-oxygen migration:* Baeyer-Villiger and Dakin rearrangements.

Rearrangements proceeding through carbanion: Stevens, Neber, Sommelet-Hauser and Favorski rearrangement.

## UNIT V      RETROSYNTHESIS

12 Hrs

Disconnection approach: Introduction to synthons and synthetic equivalents, disconnection approach, functional group interconversion, the importance of order of events in organic synthesis, one C-X, and two-group C-X disconnections, chemoselectivity, reversal of polarity,

Protecting groups - protection of alcohol, amine, carbonyl and carboxyl groups

One group C-C disconnections - alcohols and carbonyl compounds

Two group disconnections - Diels Alder reaction, Michael additions and Robinson annulations reactions.

Ring synthesis – Longifolene and Juvabione.

### Text Book(s):

1. March, J., "Advanced Organic Chemistry", Sixth Edition, John Wiley & Sons, New York, 2007.
2. Skyes, P., "A Guide Book to Mechanism in Organic Chemistry", Sixth Edition, Pearson Education Ltd., New Delhi, 2011.
3. Finar, I.L., "Organic Chemistry", Vol. II, Sixth Edition, Pearson Education Pvt. Ltd., Singapore, 2006.
4. Clayden, J., Greeves, N., Warren, S. and Wothers, P., "Organic Chemistry", First Edition, Oxford University Press, New York, 2006.
5. Smith, M. B., "Organic Synthesis", Second Edition, McGraw-Hill International Edition, New Delhi, 1994.
6. Eliel, E.L., "Stereochemistry of Carbon Compounds", First Edition, McGraw Hill, New Delhi, 2007.
7. Warren, S. Designing Organic Synthesis (A programmed introduction to the synthon approach), John Wiley & Sons.
8. Norman, R. O. C., Coxon, J. M. Principles of Organic Synthesis, and Blackie Academic & Professional, 1988.

### Reference Books:

1. Ireland, R.E., "Foundation of Modern Organic Chemistry Series- Organic Synthesis", First Edition, Prentice – Hall of India Pvt. Ltd., New Delhi, 1975.
2. Mackie, R.K., Smith, M.M., and Aitken, R.A., "Guide Book to Organic Synthesis" Second Edition, Longman Scientific and Technical, Singapore, 1990.
3. Bruckner, R., "Advanced Organic Chemistry – Reaction Mechanism", First Edition, Elsevier India Pvt. Ltd., New Delhi, 2005.
4. House, H.O., "Modern Synthetic Reaction", Second Edition, W.A. Benjamin, Inc., London, 1972.
5. Nasipuri, M., "Stereochemistry of Organic Compounds", Third Edition, New Age International, New Delhi, 2007.
6. Ahluvalia, V.K., "Chemistry of Natural Products", First Edition, Vishal Publishing Co, Jalandhar, 2008.
7. Carrutherus, W., "Some Modern Methods in Organic Synthesis", Third Edition, Cambridge University Press, New York, 1997.
8. Warren, S. Work book for organic synthesis, The Disconnection Approach John Wiley & Sons (Asia) Pvt. Ltd.

Course Code	Course Title	C	H	I	E	T
17P2CMC5	INORGANIC CHEMISTRY-II	4	4	25	75	100

**UNIT I SOLID STATE – I** 12 Hrs

Crystallographic axis - Axial ratios-law of rational indices-Crystal systems-Elements of symmetry-Point groups and space groups-Unit cells-and space lattices-Lattice planes. Schoenflies notation- Herman-Maurgn notation- Glide planes, screw axis-molecular symmetry-Crystal symmetry- Fundamentals of X-ray diffraction-Reciprocal lattice concept, Bragg method. Debye Scherrer method- Wiesenberg's rotating crystal method-Analysis of data and determination of lattice types and unit cell dimensions in cubic system-Elementary treatment of structure factor and scattering factor. Comparison of X ray, neutron and electron diffractions.

**UNIT II SOLID STATE – II** 12 Hrs

Types of close packing- packing efficiency- co-ordination number-relative density of packing in simple cubic, CCP, HCP and BCP. Tetrahedral and octahedral holes. radius ratio rule- Unit cell structure of sodium chloride, zinc blende, wurtzite, fluorite, antiferite, rutile and cesium chloride – structure of graphite and diamond – spinels normal and inverse types and perovskite structure. Crystal defects – point, line and plane defects – colour centres – Formation of nonstoichiometric oxides.

**UNIT III ELECTRICAL PROPERTIES OF SOLIDS** 12 Hrs

Electronic structure of solids – Free electron and band theory – Band structure of metals, different types of semiconductors, insulators. P-N junction and photovoltaic effect. superconductivity – types of superconductors. High temperature superconductors. Cooper pair – Meissner effect - Hall effect-thermoelectric effects (Thomson, Peltier, and Seebeck)

**UNIT IV NUCLEAR CHEMISTRY** 12 Hrs

Quantum numbers - liquid drop and shell models of the nucleus (Magic number and nuclear isomerism). Different types of nuclear reaction – spallation, Nuclear fission and fusion and their mechanism - characteristic of mass and charge distribution of fission products. Theory of fission. Fissile and fertile isotopes. Detectors - bubble chamber, GM counter and Scintillation counter nuclear reaction cross section - Q value - threshold energy of nuclear reaction. Application of radio isotopes in various field. Carbon dating – isotope dilution analysis. Neutron activation analysis and its applications, Nuclear reactor and its components. Breeder reactor and Fast Breeder reactor-nuclear waste disposal.

**UNIT V ACID-BASE THEORY AND NON-AQUEOUS SOLVENTS**

12 Hrs

Acid-base theory Lux-Flood-Lewis-Usanovich concepts. Pearson HSAB concept-Bonding and its applications– symbiosis. Super acids (elementary idea only).

Classification of solvents, properties of ionizing solvents- levelling effect, Typical reactions in non-aqueous solvents *viz* liq. NH<sub>3</sub>, liq. SO<sub>2</sub>, liq. HF, and H<sub>2</sub>SO<sub>4</sub>. Molten solvents.

**Text Book(s):**

1. Phillips, F.C., An introduction to Crystallography, Fourth Edition, ELBS Edition, 1977.
2. Jeffe and Orchin, Symmetry in chemistry, John Wiley and Sons, Inc., New York-London-Sydney, 1965.
3. West, A.R., Solid state chemistry, Second Edition, John Wiley, New York, 2014.
4. Moore, W.J., Physical chemistry, Fourth edition, Longmans Green & Co. Ltd., 1963.
5. Kittel, Elementary Solid state physics, Eight Edition, Wiley, New York, 2012.
6. Cotton, F.A., and Wilkinson, Advanced Inorganic Chemistry, John Wiley & Sons Ltd., London-New York, 1972
7. Addison, W. E., and John C. Bailar Jr, Structural Principles of Inorganic chemistry, Hüchel, Walter, 1966.
8. Adams, D.M., Inorganic solids, Wiley & Sons, London, New York, Sydney, Toronto, 1974.
9. Phillips, F.C., An introduction to crystallography, Fourth Edition, ELBS., Longmans, Green and Co., London, 1972.
10. Lee. J.D., Concise Inorganic chemistry, Fifth Edition, Wiley India Pvt, New Delhi, 2008.

**Reference Books:**

1. Emeleus, H.J., and Sharpe, A., Modern Aspects of Inorganic chemistry, Fourth Edition, Routledge and Kegan Paul, United Kingdom, 1975,
2. Robert M. Rose and Shepard, A., Structure and properties of materials, John Wiley Eastern, 1971.
3. Rao, C.N.R., and Gopalakrishnan, Solid state chemistry, Second Edition, Cambridge University Press, UK, 1984.
4. Arnikar, H.J., Essentials of Nuclear chemistry, Second Edition, Wiley, New York, 1987.
5. Dash, U. N., Nuclear chemistry, Second Edition, Sultan Chand And Sons, 2010.
6. Friedlander, G., Kennedy, J.W., and Millerr, J.M., Nuclear and Radiochemistry, John Wiley, 1982
7. Chatwal, G. and Anand, S., Instrumental methods of chemical analysis, Himalayan Publishing House, New Delhi, 2005.

Course Code	Course Title	C	H	I	E	T
17P2CMC6	PHYSICAL CHEMISTRY-II	4	4	25	75	100

**UNIT I      GROUP THEORY** 12 Hrs

Rules of group -symmetry elements and symmetry operations – various operations with illustrations - matrix representation of symmetry operations - classification of groups - symmetry point groups - Groups and their basic properties — rotational (C), dihedral (D), tetrahedral (Td) and octahedral (Oh) point groups. Order of a group. Classes and similarity transformation - Group multiplication table ( $C_{2v}$ ,  $C_{3v}$  and  $C_{2h}$ ) –. Reducible and irreducible representations - decomposition procedure of reducible representation - Great orthogonality theorem - construction of character tables –  $C_{2v}$ ,  $C_{3v}$  and  $C_{2h}$  point groups.

**UNIT II      APPLICATIONS OF GROUP THEORY** 12 Hrs

Direct products- definition –types- triple product principle – Reduction formula- group theoretical analysis of IR and Raman active vibrations of  $H_2O$  and  $NH_3$ – Mutual exclusion principle –  $N_2F_2$ .selection rules for IR, Raman- symmetries of Molecular Orbitals -Application of group theory to electronic transitions to formaldehyde and ethylene - -selection rules – Formation of hybrid orbitals in molecules like  $BF_3$ ,  $[PtCl_4]^{2-}$  and  $CH_4$ .

**UNIT III      CHEMICAL KINETICS I** 12 Hrs

Simple collision theory – modification-Absolute reaction rate theory (ARRT)-Statistical and thermodynamics formulation- Comparison of ARRT with collision theory-Significance of entropy of activation-Relation between  $\Delta H$  and  $E_a$ -Transmission co-efficient-ARRT of termolecular reactions- Unimolecular reactions- Lindemann, Hinshelwood, RRKM and Slater treatments. Solution kinetics- ARRT of reaction in solution- primary and secondary - Salt effects.

**UNIT IV      CHEMICAL KINETICS II** 12 Hrs

(a) *Chain reactions* - general characteristics, kinetics of chain reactions - steady state approximation -  $H_2$  -  $Br_2$  – reaction, Rice - Herzfeld mechanisms for the decomposition of ethane and acetaldehyde General characteristics of branched chain reactions explosion limits -  $H_2$ - $O_2$ -reaction.

(b) *Fast reactions* - flow technique - continuous and stopped flow methods - relaxation methods - pressure - jump and temperature - jump methods.Complex reactions – opposing, consecutive and parallel reactions.

## UNIT V STATISTICAL THERMODYNAMICS

12 Hrs

Need for statistical thermodynamics – Definition of state of a system – assembly – ensemble-canonical and micro canonical ensembles – phase space – microstate – probability and distribution. Boltzman distribution law- Bose - Einstein and Fermi-Dirac distribution laws - derivation-partition function- Translational, rotational, vibrational and electronic partition functions. Thermodynamic properties from partition functions for energy, heat capacity and entropy, Helmholtz free energy, pressure and chemical potential. Sackur-Tetrode equation- Thermodynamic properties of monoatomic gases.

### Text Book(s):

1. Cotton, F.A., “Chemical Applications of Group Theory”, Third Edition, Wiley Eastern Ltd., New Delhi, 2011.
2. Ramakrishnan, V. and Gopinathan, M.S., “Group Theory in Chemistry”, Third Edition, Vishal Publication, New Delhi, 2011.
3. Atkins, P. and de Paula, J., “Physical Chemistry”, Ninth Edition, Oxford University Press, New Delhi, 2011.
4. Berry, R.S., Rice, S.A and Ross. J, “Physical Chemistry”, Second Edition, Oxford University Press, New York, 2007.
5. Laidler, K.J. “Chemical Kinetics” Sixth Edition, Pearson Education, New Delhi, 2011.
6. Rajaram, R. and Kuriacose, J.C., “Kinetics and Mechanism of Chemical Transformation”, First Edition, Macmillan India Ltd., New Delhi, 2006.

### Reference Books:

1. Ball, D. W., “Physical Chemistry”, First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.
2. Mortimer, R.G. “Physical Chemistry”, Third Edition, Academic Press – An imprint of Elsevier, London, 2009.
3. Puri, B.R., Sharma, L.R. and Pathania, M.S., “Principles of Physical Chemistry”, Forty sixth Edition, Vishal Publishing Co., Jalandhar, 2013.
4. Bhal, A., Bhal, B.S. and Tuli, G.D., “Essentials of Physical Chemistry”, First Edition, S.Chand & Company Ltd., New Delhi, 2012.

Course Code	Course Title	C	H	I	E	T
17P2CME2	BIOCHEMISTRY	4	4	25	75	100

**UNIT I BIO-INORGANIC CHEMISTRY I** 12 Hrs

Transport proteins, oxygen carriers in various bio systems. Porphyrin system-metalloporphyrins. - hemoglobin- myoglobin – structure and work functions. Bohr effect, cooperativity - Perutz mechanism, synthetic oxygen carriers. Cytochromes and their classification, Structure and work functions in respiration etc. Copper containing proteins and their classification – Blue copper proteins, role of cytochrome C oxidase and Cyt P –450. Non-heme iron proteins-rubredoxin and various ferridoxins.

**UNIT II BIO-INORGANIC CHEMISTRY II** 12 Hrs

Chlorophyll –structure-photosynthetic sequence – salient features of photosynthetic process. Corrin system, vitamin B<sub>12</sub> and B<sub>12</sub> coenzymes and their structures. Role of B<sub>12</sub> coenzymes. *In-vivo and in-vitro* nitrogen fixation – structure and function of nitrogenase. Zinc enzymes-carbonic anhydrase, carboxy peptidase and superoxide dismutase, structure and mechanism of their action, enzyme action – inhibition and poisoning. Essential and trace elements in biological system-metal ion toxicity and detoxification.

**UNIT III MEDICINAL CHEMISTRY - BASIC PERCEPTIONS** 12 Hrs

Concept of drug, lead compound and lead modification, prodrugs and soft drugs - Structure Activity Relationship (SAR), Quantitative Structure Activity Relationship (QSAR) – isosterism and bio- isosterism – Induced fit theory of drug activity – Concepts of drug receptors – elementary treatment of drug receptor interactions – Physicochemical parameters – lipophilicity, partition coefficient, steric and electronic ionization constants – Factors affecting modes of drug administration, absorption, metabolism and elimination – significance of drug metabolism in medicinal chemistry.

**UNIT IV NUCLEIC ACIDS** 12 Hrs

Introduction – Definition - Chemical and enzymatic hydrolysis of nucleic acids – Structure and function of mRNA, tRNA, rRNA – Polymorphic nature of DNA, B- and Z- DNA, multi-stranded DNA – DNA sequence determination by chemical and enzymatic methods, Genetic code – origin, salient features, wobble hypothesis – Gene expression – transcription and translation – Gene mutation and carcinogenesis.

**UNIT V NANO CHEMISTRY** 12 Hrs

**Nano material:** Introduction – definition- 0D, 1D, 2D, and 3D Nanomaterial and examples. Preparation of simple nanomaterials (nanometal, Metal oxide, semiconductor) – Chemical reduction method – Sputtering coating method – Sol-gel method and chemical vapour deposition method.

**Properties:** Size effect – Colour – Magnetic properties

**Characterization:** Principles and applications of Scanning electron microscope (SEM) – Transmission electron microscope (TEM) – Atomic force microscope (AFM).

**Carbon nano structures:** Preparation, properties and application of Single-walled carbon nanotube and Multi-walled carbon nanotubes.

**Text Book(s):**

1. Huheey, J.E. Keiter, E.A. and Keiter, R.L. Inorganic Chemistry Principles of Structure and Reactivity (4th edition): Pearson Education Inc.,2006.
2. Shriver, D.F., Atkins, P.W. and Langford, C.H. Inorganic Chemistry, 3rd edition, Oxford Univ. Press, 1999.
3. Lehninger, A.L., “Principles of Biochemistry”, Second Edition, CBS Publications, New Delhi, 2002.
4. Faber, K., “Biotransformations in Organic Chemistry”, Fifth Edition, Springer, New York, 2008.
5. Burger, A. Medicinal Chemistry, Parts I & II, Wiley, N.Y., 1970.
6. Purcell, K.F. and Kotz, J.C. Inorganic Chemistry, W.B. Saunders Company,(1977
7. Stryer, L. Biochemistry, IV Edn., Freeman and Company, New York (1995).
8. Nelson, D.L. and Cox, M.M. Lehninger Principles of Biochemistry, 5th edition Freeman and Company, New York (2011).
9. Pradeep, T Understanding nanoscience and nanotechnology.

**Reference Books:**

1. Jain, J.L., “Fundamentals of Biochemistry”, Fourth Edition, S. Chand & Company Limited, New Delhi, 2011.
2. Holum, J.R. Introduction to organic and biological chemistry, John Wiley, N.Y. 1969.
3. Charles P. Poole Jr, Frank J. Owens. Introduction to nanotechnology.
4. Taylor, J. B. and Kennewell, P.D. Introduction to Medicinal Chemistry, Ellishorwood, West Sussex, 1981.
5. Chatwal, G.R. Synthetic Drugs, Himalaya Publishing House, Bombay, 1986.
6. Hussain Reddy, K. Bioinorganic chemistry New Age Publishers New Delhi, (2009).

Course Code	Course Title	C	H	I	E	T
17P3CMC7	ORGANIC CHEMISTRY-III	4	4	25	75	100

### UNIT 1 SPECTROSCOPY-I

12 Hrs

(a) *UV Spectroscopy*: Principle- types of electronic excitation, Woodward-Fieser rules for conjugated polyenes, enones, Scott rules for some substituted aromatic compounds; factors affecting the position and intensity of  $\lambda$ -structure, solvent and shift reagents

(b) *IR Spectroscopy*: Vibrational frequency- Factors affecting the group frequencies - hydrogen bonding, electronic and steric effect, Fermi resonance –finger print region, FT-IR

(c) *ORD and CD*: Definition, deduction of absolute configuration, octant rule for ketones.

### UNIT II SPECTROSCOPY-I

12 Hrs

a)  $^1\text{H}$  *NMR spectroscopy*: Principle - TMS as internal standard-Relaxation process - Chemical shift-nmr scales; Number, intensity & position of signals - Factors affecting the chemical shift ; spin-spin coupling, coupling constant; spin-spin splitting-lanthanide shift reagents, Proton exchange, deuterium exchange and the influence of restricted rotation.

(b)  $^{13}\text{C}$  *NMR spectroscopy* : Basic principle of FT technique - Relaxation time, assignment of signals; Off-resonance decoupling- double resonance-spin tickling, Nuclear-Overhauser Effect and CIDNP; DEPT  $^{13}\text{C}$  spectra,  $^{13}\text{C}$ -  $^{13}\text{C}$  CORRELATION, INADEQUATE, COSY, HETCOR, ROESY, NOESY and TOCSY.

(c) *Mass Spectrometry*: Principle-types of ions –molecular, isotopic, metastable; Base peak; Nitrogen rule; Fragmentation modes; Retro Diels-Alder reaction, McLafferty rearrangement.

### UNIT III PERICYCLIC REACTIONS

12 Hrs

Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3- butadiene, 1,3,5 –hexatriene and allyl system. Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams.  $4n$  and  $4n+2$  systems, FMO and PMO approach. Electrocyclic reactions – *con* rotatory and *dis* rotatory ring closure - 2+2 addition of ketenes, 1,3- dipolar cycloadditions and cheletropic reactions.

Sigmatropic rearrangements - suprafacial and antarafacial shifts of H, sigmatropic shifts involving carbon moieties, 3,3- and 5,5- sigmatropic rearrangements. Claisen, Cope and aza-Cope rearrangements. Fluxional tautomerism, ene reaction.

### UNIT IV PHOTOCHEMISTRY

12 Hrs

Photochemistry:  $n$  to  $\pi^*$  and  $\pi$  to  $\pi^*$  transitions - allowed and forbidden,

Intramolecular reactions of the olefinic bond - geometrical isomerism, cyclisation reaction, rearrangement of 1,4 and 1,5 dienes.

Photochemistry of carbonyl compounds - intramolecular reactions of carbonyl compounds: Norrish type I & type II, Paterno-Buchi reaction, saturated cyclic and acyclic -  $\alpha$ ,  $\beta$  and  $\beta$ ,  $\gamma$ -unsaturated compounds.

Photochemistry of aromatic compounds - Isomerization, addition and substitution.

Miscellaneous photochemical reactions - Barton reaction, photo-Fries rearrangement, Hofmman Freytag reaction.

## **UNIT V REAGENTS**

12 Hrs

Principle, preparations, properties and applications of the following in organic synthesis:

Organometallic reagents: Organolithium compounds (PhLi & BuLi), Organocopper compounds (Lithiumorgano cuprates), Organocadmium compounds, Organomercury compounds (Mercuric acetate),

Phosphorous containing reagents: (Phosphorous ylides), Sulfur containing reagents: (dimethyl anion, diphenyl sulfide, dithioacetals, Julia reaction), Silicon containing reagents: (Peterson reaction, trimethylvinyl silane, Trimethylsilyl chloride, aryl and alkenyl silanes), Boron containing reagents: (diborane, organoborane, 9-BBN, Corey-Nicolaou reagent)

Transition metal compounds: Titanium reagents: (Tebbe reagent, Ziegler's catalyst), Organochromium compounds, Iron compounds: (Acyl iron complexes), Cobalt compounds: (Hydroformylation, Pauson-Khand reaction), Rhodium compounds: (Wilkinson catalyst), Palladium compounds: (Pd II complexes).

Other reagents: DDQ, DCC, NBS, OsO<sub>4</sub>.

### **Text Book(s):**

1. Kemp, W., "Organic Spectroscopy", Third Edition, Replica Press Pvt. Ltd., New Delhi, 2008.
2. Silverstein, R.M., Bassler, G.C. and Morrill, T.C., "Spectroscopic Identification of Organic Compounds", Sixth Edition, Wiley Ind. Ltd., Singapore, 2006.
3. Depuy, E.C.H. and Chapman, O.S., "Molecular Reactions and Photochemistry", Prentice Hall, New York, 1988.
4. Norman, R. O. C., Coxon, J. M. Principles of Organic Synthesis, and Blackie Academic & Professional, 1988.
5. March, J., "Advanced Organic Chemistry", Sixth Edition, John Wiley & Sons, New York, 2007.

### **Reference Books:**

1. Mohan, J., "Organic Spectroscopy (Principles and Applications)" Second Edition, Narosa Publishing House, New Delhi, 2004.
2. Kalsi, P. S., Spectroscopy of Organic Compounds, Wiley Easternj Ltd., New Delhi, 1993.
3. Singh, J. and Singh, J., "Photochemistry and Pericyclic Reaction", First Edition, New Age International, New Delhi, 2004.
4. Ahluwalia, V.K. and Parashar, R.K., "Organic Reaction Mechanism" Fourth Edition, Narosa Publishing House, New Delhi, 2011.
5. Kalsi, P. S. Organic Reactions and their Mechanisms, New Age International Publishers, New Delhi, 1996.

Course Code	Course Title	C	H	I	E	T
17P3CMC8	INORGANIC CHEMISTRY-III	4	4	25	75	100

**UNIT I INTRODUCTION TO CO-ORDINATION CHEMISTRY** 12 Hrs

Introduction – IUPAC nomenclature- co-ordination numbers- Isomerism- structural, geometrical and optical isomerism in square planar and octahedral complexes. Chelating ligand, chelate effect and its application, stability of complexes – complex equilibria – determination of stability constant- Spectrophotometric- Job's variation - Potentiometric methods. factors affecting stability constants. Irving-William series.

**UNIT II THEORY OF CO-ORDINATION COMPOUNDS.** 12 Hrs

Valence bond theory. Crystal field splittings in octahedral, tetrahedral, square pyramidal, trigonal bipyramidal and square planar geometries-Consequences of crystal field splitting on thermo dynamic, magnetic and spectroscopic properties. Applications of CFT, spectrochemical series-Nephelauxetic effect. Jahn-Teller effect. Inadequacy of CFT. The molecular orbital theory-octahedral, tetrahedral and square planar geometries. Experimental evidences for covalence in metal-ligand bonding.

**UNIT III ELECTRONIC SPECTRA OF COMPLEX** 12 Hrs

Atomic Term Symbol: Ground and higher states — methods of determining ground state term and complete terms –Pigeon hole diagram and Russel-Saunders microstates method for  $p^2$  and  $d^2$  configuration - term symbols for non- equivalent electrons.

A detailed survey of the electronic spectra of octahedral, tetrahedral and square planar complexes of transition metals-(i) effect of spin orbit coupling ii) Jahn-Teller distortions and its effect on the structure and spectrum, the nephelauxetic effect and the nephelauxetic series-Calculation of  $Dq, B, C$  from the spectrum. Orgel and Tanabe-Sugano diagrams and evaluation of  $10Dq$  and  $\beta$  for octahedral complexes of  $d^3, d^8$  and tetrahedral complexes of  $d^2, d^7$  configurations. Charge transfer spectra of complexes-ligand to metal, metal to ligand types and metal to metal type.

**UNIT IV NUCLEAR MAGNETIC RESONANCE** 12 Hrs

$^1H, ^{13}C, ^{19}F$  and  $^{31}P$  – NMR. Applications to inorganic compounds - NMR of paramagnetic complexes. Contact and pseudo contact interactions- structures of metal complexes-shift reagents structural problems of the compounds like  $CFCl_3, SF_4, PF_5, BrF_5, H_2PF_3, PF_3(NH_2)_2, P_4S_3$ , *mer* and *fac*-  $Rh(PPh_3)_3Cl_3$ , *cis* and *trans*- $[PtCl_2(PBu_3)(PPh_3)_3]$ . Fluxional behavior of complexes.

Electron spin resonance: Spin-Hamiltonian, ESR phenomenon - hyperfine interactions-spin-orbit coupling- ESR spectra of D and F states in octahedral fields (Zero field splitting and Kramers degeneracy)- determination of the ground states of complexes. EPR spectra of transition metal ions complexes like bis(salicylaldehyde)copper(II),  $Co_3(CO)_9Se$ ,  $[(NH_3)_5Co-O_2-Co(NH_3)_5]^{5+}$ ,  $NH_2$  radical and  $Mn^{2+}$  complexes – representative spectra of different  $d^n$  systems – evaluation of spin – orbit coupling.

**UNIT V PHOTOELECTRON AND MOSSBAUER SPECTROSCOPY**

12 Hrs

PES : Theory of XPES, UVPES – evaluation of ionisation potential – chemical identification of elements – ESCA – Koopmann's theorem – chemical shift – UPES of NH<sub>3</sub>, N<sub>2</sub>, O<sub>2</sub>, CO, H<sub>2</sub>O and HCl – vibrational fine structure and their origin – evaluation of vibrational constants from UPES – spin-spin coupling - spin-orbit coupling.

Mössbauer spectroscopy: Discovery - Nuclei suitable for Mössbauer experiment - Hyperfine interactions - isomershifts quadrupole splitting & magnetic hyperfine splitting - temperature effects - applications of Mössbauer spectroscopy to compounds & complexes of Fe & Sn.

**Text Book(s):**

1. Ballhausen, C.J., Introduction to ligand field theory, Mc GrawHill, New York, 1962.
2. Figgis, B.N., Introduction to ligand fields, John Wiley & Sons Ltd., London and New York 1966.
3. Kettle, S.F.A., Coordination compounds, Thomas Nelson and Sons, Ltd., London, 1969.
4. Thomas M.Dunnand McClure and Pearson, "Some aspects of crystal theory fields, Harper-Row, New York, 1965.
5. Ballhanusen, C.J.,andHzry.B.Grey, "Molecular orbital theory" A Lecture note Reprint Volume,W. A. Benjamin, Inc. , New York, 1965.
6. Drago, R.S., Physical methods in chemistry,W.B.Saundar, 1977.
7. Cotton, F.A., and Wilkinson, Advanced Inorganic Chemistry,John Wiley & Sons Ltd.,London-New York, 1972.
8. Cotton, F.A., "Chemical Applications of Group Theory", Third Edition, Wiley Eastern Ltd., New Delhi, 2011.
9. Lever, A.B.P., Inorganic electronic Spectroscopy, Second Edition, Elsevier, Amsterdam, Oxford, New York, Tokio 1984.
10. Sutton,D., Electonic spectra of metal complexes, Second Edition McGraw-Hill, New York, 1968.
- 11.Figgis,B.N., Transition metal chemistry, volume IX, Marcel Uekker, Inc., Basel, 1982;
12. Hill, H. A. O., Day, P., Advanced Inorganic Chemistry, Darl H. McDaniel. J. Chem. Educ. , 1969
13. Ebsworth, E. A., David W. H. Rankin, Cradock, S.,Structural methods in Inorganic chemistry, ELBS.,CrcPr I Llc., 1991.
14. Purcell, K.F., Kotz J.C., Saunders W.B., Inorganic chemistry, Saunders College Publishing, Philadelphia, 1980.
15. Mabbs, F. E., Machin, D. J., Magnetism and transition metal complexes, John Wiley & Sons, Incorporated, 1973.

**Reference Books:**

1. Sutton, D., Electronic spectra of metal complexes, Second Edition, McGraw-Hill, New York, 1968.
2. Hill and Day, Advanced Inorganic Chemistry, First edition, John Wiley & Sons Ltd., 1968.
3. Walker, S., Straughan, B. P. Spectroscopy volume I, II & III, Chapman and Hall, 1976.
4. Figgis, B.N., Transition metal chemistry, volume IX, Marcel Dekker, Inc., Basel, 1982
5. Semakova, A. A., Boris M.K., Electron spin resonance, Wiley, 1974
6. Rao, C.N.R., and Ferraro, J.R. Inorganic spectroscopy, volume I & II, Academic press, New York, 1971.
7. Carrington, A., McLachlan, A. D. Introduction to Magnetic Resonance, Harper and Row, New York, 1967.
8. Carrington, McLachlan A.D., Introduction to Magnetic Resonance: With Applications to Chemistry and Chemical Physics, Harper & Row, New York, 1979.
9. Boudreaux, F.A., and Muley, L.N., Theory and application of molecular paramagnetism, John Wiley & Sons, Inc., New York, 1976
10. Nakamoto, Infrared and Raman Spectra of Inorganic and Coordination Compounds, Wiley-Interscience, Fourth edition, 1998.
11. Vertes, A., and Burger, K., Mossbauer Spectroscopy, Elsevier, Amsterdam, 1979.
12. Gibbs, T.C., Mossbauer Spectroscopy, Chapman and Hall, London, 1977.
9. F.A. Boudreaux & L.N. Muley: Theory and application of molecular paramagnetism. John – Wiley
10. Nakamoto : Infrared and Raman Spectra of Inorganic & Coordination Compounds Wiley - Interscience IV Edn.
11. A. Vertes & K. Burger Mossbauer Spectroscopy Elsevier
12. T.C. Gibbs Mossbauer Spectroscopy Chapman - Hall

Course Code	Course Title	C	H	I	E	T
17P3CMC9	PHYSICAL CHEMISTRY-III	4	4	25	75	100

**UNIT I MOLECULAR SPECTROSCOPY - I** 12 Hrs

Electromagnetic radiation – interaction of electromagnetic radiation with matter – types of molecular spectroscopy – molecular energy levels – Einstein’s transition probability – spectral line intensity – emission and absorption spectroscopy - Microwave spectroscopy: rotation of molecules – rotational spectra of rigid rotator – selection rule - intensities of rotational lines - effect of isotopic substitution - – rotational spectra of non rigid rotator - Applications : Calculation of moment of inertia, bond length and atomic mass from microwave spectra- classification of molecules based on moment of inertia.

Infrared spectroscopy: Spectra of diatomic molecules – instrumentation – selection rule – harmonic and an harmonic oscillator - fundamental bands – P,Q and R branches – overtones – hot bands- fundamental vibrational modes of H<sub>2</sub>O and CO<sub>2</sub>.

**UNIT II MOLECULAR SPECTROSCOPY - II** 12 Hrs

Raman spectroscopy: classical and quantum theory of Raman effect - Stokes and antistokes line – experimental aspects – polarisability – selection rule – diatomic molecules – pure rotational Raman spectrum – s-branch – application – determination of internuclear distance – mutual exclusion principle – Fermi resonance – Laser Raman Spectra.

Electronic spectra of diatomic molecules- Born-Oppenheimer approximation - coarse structure – Frank-Condon principle - dissociation energy - calculation - Birge- Sponer extrapolation technique, pre-dissociation spectra- Fortrat diagram- Electronic spectra of molecules.

**UNIT III NMR SPECTROSCOPY** 12 Hrs

Nuclear magnetic moment – nuclear spin states and nmr active nuclei, mechanism of resonance absorption applied field and its interaction -chemical shift and shielding.Nuclear spins in a magnetic field– Zeeman effect -Larmor precession - resonance – bloch equation – spin-lattice and spin-spin relaxation times – nuclear shielding and chemical shift - spin-spin coupling - line width - MRI basic concept - basic principle of FT-NMR spectroscopy – <sup>13</sup>C NMR – basic principle and experimental techniques.

**UNIT IV ELECTRON SPIN RESONANCE AND PHOTOELECTRON SPECTROSCOPY** 12 Hrs

ESR – principle – presentation of spectrum- EPR spectrum of hydrogen atom -g-factor- hyperfine splitting; nuclear spin ( $I = \frac{1}{2}, 1, \frac{3}{2}, \frac{5}{2}$ )interaction with electron – epr spectra of organic radicals (Hydrogen atom, methyl radical, 1,4-benzosemiquinone radical anion, naphthalene negative ion, triphenyl methyl radical) zero field splitting - Kramer’s degeneracy-applications.

Photoelectron spectroscopy- basic principles, spectrum, X-ray PES, ESCA- Vibrational structure- Koopman’s theorem- PES of argon, oxygen and nitrogen.

## UNIT V PHOTOCHEMISTRY

12 Hrs

Introduction – Physical properties in electronically excited molecules - Jablonski diagram -. Photophysical processes in electronically excited molecules: Intersystem crossing, internal conversion, fluorescence, phosphorescence and other deactivation processes – determination of excited state dipole moment, acidity constant - Photophysical kinetics of unimolecular and bimolecular processes – delayed fluorescence – Stern-Volmer equation and its applications – photosensitisation – chemiluminescence – bioluminescence - experimental techniques – actinometry – elementary idea of photosynthesis - Laser .

### Text Book(s):

1. Banwell, C.N. and Mc Cash, E.M. “Fundamental of Molecular Spectroscopy”, Fifth Edition, Mc Graw Hill Education (India) Pvt., Ltd., New Delhi, 2013.
2. Atkins, P. and de Paula, J., “Physical Chemistry”, Ninth Edition, Oxford University Press, New Delhi, 2011.
3. Ball, D. W., “Physical Chemistry”, First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.
4. Mortimer, R.G. “Physical Chemistry”, Third Edition, Academic Press – An imprint of Elsevier, London, 2009.
5. Engel, T. and Reid, P., “Physical Chemistry”, Second South Asian Edition, Pearson Publication, New Delhi, 2011.
6. Berry, R.S., Rice, S.A and Ross. J, “Physical Chemistry”, Second Edition, Oxford University Press, New York, 2007.
7. Rohatgi - Mukerjee, K.K. “Fundamentals of Photochemistry”, Second Edition, Wiley Eastern Ltd, New York, 2011.

### Reference Books:

1. Aruldas, G. “Molecular Structure and Spectroscopy”, First Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 2005.
2. Puri, B.R., Sharma, L.R. and Pathania, M.S., “Principles of Physical Chemistry”, Forty sixth Edition, Vishal Publishing Co., Jalandhar, 2013.
3. Bhal, A., Bhal, B.S. and Tuli, G.D., “Essentials of Physical Chemistry”, First Edition, S.Chand & Company Ltd., New Delhi, 2012.

Course Code	Course Title	C	H	I	E	T
17P3CNM1	CHEMISTRY AND ITS APPLICATIONS	4	4	25	75	100

**UNIT I SMALL SCALE UNITS** 12 Hrs

Safety matches – Agarbattis - Naphthalene balls - Wax candles - Shoe polish - Gum paste - Writing /Fountain pen ink - Chalk (Rayons - Plaster of paris).

Basics of Chemistry: Periodic table – electronic configuration-classification of elements on the basis of electronic configuration - Oxidation number (Eg.  $\text{KMnO}_4$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{CO}_2$ ,  $\text{SO}_3$ ,  $\text{NH}_3$ ) – oxidation - oxidising agents with example - Reduction – Reducing agent with example.

**UNIT II CORROSION** 12 Hrs

Corrosion – definition - rusting of iron with examples – protection methods of corrosion-anodicprotection – Soaps – Detergents - Paints – acrylic emulsion paints – varnishes.

**UNIT III POLLUTION** 12 Hrs

Pollution: Introduction – pollution – definition- classification – Air pollution – air pollutants – acid rain – green house effect – ozone layer depletion – control of air pollution – water pollution – effects of impurities in water – Sewage, industrial effluents (textile/leather).

**UNIT IV POLYMERS** 12 Hrs

Monomer – polymer – definition – classification – thermoplastic – thermosetting – differences between the thermoplastics and thermosetting polymers - polymerization – addition polymer-condensation polymer (Rubber, PVC, polyethylene, nylon-66-Terylene and Bakelite).

**UNIT V WATER TREATMENT** 12 Hrs

Water: Source of water – characteristics of water – Hardness of water – Types – Temporary hardness – permanent hardness – disadvantages of hard water – Removal of hardness – Reverse osmosis – zeolite process.

**Text Book(s):**

1. Sharma, B. K., Industrial chemistry, Goel Puplishing House, 1994.
2. Charrabarth B.N., Industrial Chemistry, Oxford and IBH Publishing co. Pvt. Ltd. 1981.
3. Jain, P. C., Jain, M. Engineering chemistry, 15<sup>th</sup> edition., 1998.

Course Code	Course Title	C	H	I	E	T
17P4CMC10	ORGANIC CHEMISTRY-IV	4	4	25	75	100

**UNIT I TERPENOIDS AND FLAVONES** 12 Hrs

*Terpenoids:* Classification, nomenclature, occurrence, Isolation, general methods of structure determination, isoprene rule, Structural determination, stereochemistry and synthesis of the following representative molecules: menthol, zingiberene and abietic acid.

*Anthocyanins and flavones:* Flavonoids: general method of structural determination. General nature of anthocyanins - synthesis of flavones chalcone, and anthocyanidins. Structural elucidation of caffeine.

**UNIT II STEROIDS** 12 Hrs

Occurrence, nomenclature, basic skeleton and stereochemistry isolation, structure determination and synthesis of cholesterol, equilenin, Androsterone, Testosterone, Estrone, Progesterone, Biosynthesis of steroids.

**UNIT III HETEROCYCLES** 12 Hrs

Nomenclature, aromatic heterocycles - heteroaromatic reactivity and tautomerism in aromatic heterocycles, Non-aromatic heterocycles - conformation, stereo electronic effects, heterocyclic synthesis - cyclization reactions and cycloaddition reactions, small ring heterocycles - oxiranes, aziridines, pyridine.

Benzo- fused five membered heterocycles: Indole, benzofurans, benzothiophenes.

**UNIT IV ALKALOIDS AND PROSTAGLANDINS** 12 Hrs

*Alkaloids:* Definition, nomenclature and physiological action, occurrence, isolation, general methods of structural elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants - Structure, stereochemistry and synthesis of the following: quinine, nicotine and morphine.

*Prostaglandins:* Occurrence, nomenclature ,classification, biogenesis and physiological effects. Synthesis of PGE<sub>2</sub> and PGF<sub>2α</sub>

**UNIT V CARBOHYDRATES AND GREEN CHEMISTRY** 12 Hrs

Conformation of monosaccharides, structure and functions of some important derivatives of amino sugars, glycosides. Disaccharides: Sucrose. Polysaccharides: cellulose, starch. Carbohydrate metabolism –Kreb’s cycle, glycolysis.

Green chemistry: Importance -12 principles of green chemistry - solid state and solvent free organic reactions – using supported reagents- microwave radiations- ionic liquids.

**Text Book(s):**

1. Finar, I.L., "Organic Chemistry", Vol. II, Sixth Edition, Pearson Education Pvt. Ltd., Singapore, 2006.
2. Joule, J.A. and Mills, K., "Heterocyclic Chemistry", Fourth Edition, Blackwell Publishing Company, New York, 2004.
3. Sanghi, R. and Srivastava, M.M., "Green Chemistry (Environmental Friendly Alternatives)", First Edition, Narosa Publishing House, New Delhi, 2003.

**Reference Books:**

1. Bansal, K., "Heterocyclic Chemistry", Fourth Edition, New Age International, New Delhi, 2005.
2. Ahluwalia, V.K., "Chemistry of Natural Products", First Edition, Vishal Publishing Co, Jalandhar, 2008.
3. Desai, K. R., "Green Chemistry (Microwave Synthesis)", First Edition, Himalaya Publishing House, Mumbai, 2005.
4. Ahluwalia, A.K., "Green Chemistry (Environmentally Benign Reactions)", First Edition, Aru Books India, New Delhi, 2006.
5. Jain, R.; Sahay, A.; Soni, U.; Pimplapure, S. Heterocyclic compounds, Pragati Prakashan, First edition, 2015.

Course Code	Course Title	C	H	I	E	T
17P4CMC11	INORGANIC CHEMISTRY-IV	4	4	25	75	100

**UNIT I KINETICS AND MECHANISM OF COORDINATION COMPOUNDS** 12 Hrs

Substitution reactions - lability - inertness - substitution in octahedral complexes – Acid hydrolysis, base hydrolysis - anation reaction - square planar substitution reactions - factors affecting reactivity of square planar complexes - trans effect, theories of trans effect mechanisms of electron transfer reaction – outer and inner spheres reactions. Complementary and non-complementary reactions.

**UNIT II INORGANIC PHOTOCHEMISTRY** 12 Hrs

Excited states of coordination complexes - properties of excited states - photochemical pathways - energy transfer and charge transfer in photo chemistry - photoredox reaction - photo substitution reactions. Photoanation, photoaquation, photo rearrangement. Ruthenium polypyridyls - chromium polypyridyls. Photo chemical reactions of complex. Role of TiO<sub>2</sub> in solar energy conversion - Photochemical conversion and storage of solar energy.

**UNIT III LANTHANIDE AND ACTINIDES** 12 Hrs

The chemistry of lanthanides and actinides: Comparative study of lanthanide and actinide and comparative study of f and d block elements. Extraction of lanthanides from monazite minerals. Separation of lanthanides – Modern technique -ion exchange method, solvent extraction and paper chromatography. Lanthanide contraction and its consequence-Oxidation state; colour, spectral and magnetic properties - nuclear and non-Nuclear applications. Actinides contraction –separation of actinides-Ion-exchange methods. Applications of actinides.

**UNIT IV ORGANOMETALLIC CHEMISTRY** 12 Hrs

Introduction – EAN rule -importance of 18 and 16 electron rule in organometallics and its correlation to stability–metal carbene and carbyne complexes. Synthesis, structure and bonding in metal carbonyls, poly carbonyls, nitrosyls and dioxygen. IR study of metal carbonyls. Isolobal fragments. Synthesis, structure and bonding in  $\pi$ -complexes formed by olefin, acetylene, cyclopentadienyl complexes.

**UNIT V ORGANOMETALLIC CATALYSIS** 12 Hrs

Oxidative addition, reductive elimination, insertion reaction (migration) and  $\beta$  - elimination. Catalytic mechanism in the following reactions: Homogeneous and heterogeneous catalysis-Hydrogenation of olefins (Wilkinson's catalyst) – Tolman catalytic loops – hydroformylation

(oxo process) – acetic acid from methanol – oxidation of alkenes to aldehydes and ketones (Wacker process) – synthetic gasoline (Fischer – Tropsch and Mobile process – olefin polymerisation (Ziegler – Natta catalyst) – cyclo oligomerisation of acetylenes (Reppé's or Wilke's catalyst).

### **Text Book(s):**

1. James Huheey, Inorganic Chemistry, Fourth edition, Harper – Collins, New York, 1993.
2. Cotton, F.A., Wilkinson, G., Murillo, C.A. and Bochmann, M., “Advanced Inorganic Chemistry”, Sixth Edition, John Wiley & Sons (Asia), Singapore, 2004.
3. Basolo, F. and Pearson, R.G., “Mechanism of Inorganic Reaction”, Second Edition, Wiley, New York, 1967.
4. Emeleus, H.J., and Sharpe, A., Modern Aspects of Inorganic chemistry, Fourth Edition, Routledge and Kegan Paul, United Kingdom, 1975
5. Beck, M.T., Chemistry of complex equilibria, Ellis Horwood series in inorganic chemistry, Second. Edition, Van Nostrand, 1970.
6. Rossotti, H., The study of Ionic equilibria, Longman, London, 1978.
7. Moeller, T., Chemistry of Lanthanides and Actinides, Pergamon Press, Oxford, 1973.
8. Barnard, A.K., Theoretical basis of Inorganic Chemistry, Tata-McGrawhill, New York, 1965.
9. J.C. Bailar Ed. Comprehensive Inorganic chemistry, Vol V, Pergamon Press, Oxford, 1973.
10. William Porter Field, Inorganic Chemistry- A unified approach, Academic Press inc., Elsevier, London, 1993.
11. Geoffery, G.L., Weighton M.S., Organic Metallic photochemistry Academic, Academic, New York, 1979.

### **Reference Books:**

1. D. Benson Mechanism of inorganic reactions in solutions, McGrawHill, London, 1968.
2. Langford, C.H., and Gray, H.B., Ligand substitution processes, Benjamin, Inc. , New York, 1966.
3. Adamson, S., “Concept of Inorganic Photochemistry”, Fifth Edition, John Wiley & Sons (Asia) Pvt. Ltd., Singapore, 1975
4. C.J. Ferradi - Elements of Inorganic Photo chemistry, John Wiley & Sons, New York, 1975.

Course Code	Course Title	C	H	I	E	T
17P4CMC12	PHYSICAL CHEMISTRY-IV	4	4	25	75	100

**UNIT I ELECTROCHEMISTRY – I** 12 Hrs

Theory of strong electrolytes, Interionic attraction theory- Debye-Huckel model of ionic atmosphere- Debye-Huckel Onsager equation-derivation, verification and modifications- Wien effect – Debye Falkenhagen effect - Debye Huckel limiting law-extension- Huckel Bronsted equation- Determination of activity coefficients using Bronsted equation. - concept of activity and activity coefficient, Activities in electrolytic solutions - ionic strength -- mean molal ionic activity coefficient of strong electrolytes - calculations.

**UNIT II ELECTROCHEMISTRY- II** 12 Hrs

Electrical double layer - Theories of electrical double layers – Helmholtz model – Chapman model – Stern model - electrode processes - Kinetics of electrode processes - Butler-Volmer equation- Tafel equation - Over voltage- theories of over voltage - application of over voltage - Corrosion- principles of electrochemical corrosion- Dry and wet corrosion and its mechanism. Types of corrosion- Galvanic, aeration, stress, pitting corrosion. Polarography- theory and applications- Batteries- Nickel-Cadmium, lead-acid battery - Electrochemical energy conversions. Storage and Fuel cells: Primary and Secondary Fuel cells. H<sub>2</sub>-O<sub>2</sub> fuel cells and its advantages.

**UNIT III NON-EQUILIBRIUM THERMODYNAMICS** 12 Hrs

Introduction - Phenomenological laws and Onsager's reciprocal relations-entropy production - ion specific examples of entropy production - Prigogine's principle of minimum entropy production - entropy production in coupled phenomena-an elementary introduction to bioenergetics

**UNIT IV SURFACE CHEMISTRY** 12 Hrs

Adsorption – physisorption and chemisorption. Adsorption isotherms: BET and Gibbs adsorption isotherms. Different types of adsorption. Adsorption with dissociation – competitive adsorption – non-ideal adsorption. Thermodynamics of adsorption. Surface area determination. Kinetics and mechanism of unimolecular and bimolecular reactions – Langmuir-Hinshelwood and Langmuir-Rideal mechanisms.

**UNIT V RADIATION CHEMISTRY AND CATALYSIS** 12 Hrs

Radiation chemistry: Source of high energy – interaction of high energy radiation with matter – radiolysis of water – G-value – reactions of hydrated electrons OH and H radicals – experimental techniques : Dosimetry.

Homogeneous catalysis - acid-base catalysis – protopic and protolytic mechanism - Bronsted relationships - secondary' salt effect acidity functions - Hammett's acidity function - enzyme catalysis - Michaeli's - Menten kinetics.

**Text Book(s):**

1. Bockris, J.O.M and Reddy, AK.N., “Modern Electrochemistry 1 – Ionics”, Second Edition, Springer, New Delhi, 2006.
2. Samuel Glasstone, “Electrochemistry”, First Edition (Latest revised), East-West Press, New Delhi, 2010
3. Adamson, A.W. and Gast, A.P., “Physical Chemistry of Surfaces”, Sixth Edition, Wiley India Pvt., Ltd., New Delhi, 2012.
4. Laidler, K.J., “Chemical Kinetics” Sixth Edition, Pearson Education, New Delhi, 2011.
5. Atkins, P. and de Paula, J., “Physical Chemistry”, Ninth Edition, Oxford University Press, New Delhi, 2011.
6. Mortimer, R.G. “Physical Chemistry”, Third Edition, Academic Press – An imprint of Elsevier, London, 2009.

**Reference Books:**

1. Viswanathan, B, Venkatraman, R, Rengarajan, K. Sundaram, S and Ragavan, P.S., “Electrochemistry”, First Edition, S. Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai, 2007.
2. Ball, D.W., “Physical Chemistry”, First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.
3. Puri, B.R., Sharma, L.R. and Pathania, M.S., “Principles of Physical Chemistry”, Forty eighth Edition, Vishal Publishing Co., Jalandhar, 2015.
4. Engel, T. and Reid, P., “Physical Chemistry”, Second South Asian Edition, Pearson Publication, New Delhi, 2011.
5. Berry, R.S., Rice, S.A and Ross, J., “Physical Chemistry”, Second Edition, Oxford University Press, New York, 2007.

Course Code	Course Title	C	H	I	E	T
17P4CME3	CSIR-NET-GATE-SET EXAMINATIONS PREPARATIONS	4	4	25	75	100

**UNIT I INORGANIC CHEMISTRY - I** 12 Hrs

- Structure and bonding in homo and hetero nuclear molecules, including shapes of Molecules (VSEPR Theory).
- Transition elements and coordination compounds: structure, bonding theories, spectral and magnetic properties, reaction mechanisms.
- Inner transition elements: spectral and magnetic properties, redox chemistry, analytical applications.
- Organometallic compounds: synthesis, bonding and structure, and reactivity, Organometallics in homogeneous catalysis.

**UNIT II INORGANIC CHEMISTRY – II** 12 Hrs

- Cages and metal clusters.
- Analytical chemistry- separation, spectroscopic, electro- and thermo- analytical methods.
- Bioinorganic chemistry: photosystems, porphyrins, metalloenzymes, oxygen transport, electron- transfer reactions; nitrogen fixation, metal complexes in medicine.
- Characterisation of inorganic compounds by IR, Raman, NMR, EPR, Mössbauer, UV-vis, NQR, MS, electron spectroscopy and microscopic techniques.
- Atomic structure and spectroscopy; term symbols; many-electron systems and antisymmetry principle.

**UNIT III PHYSICAL CHEMISTRY** 12 Hrs

- Basic Principles of quantum mechanics: Postulates, particle-in-a box, harmonic oscillator and the hydrogen atom including shapes of atomic orbitals; orbital and spin angular momentum tunneling.
- Approximate methods of quantum mechanics: Variational principle; perturbation theory up to second order in energy; applications.
- Atomic structure and spectroscopy; term symbols; many-electron systems and antisymmetry principle.
- Chemical bonding in diatomics; elementary concepts of MO and VB theories; Huckel theory for conjugated  $\pi$ -electron systems.
- Chemical applications of group theory; symmetry elements; point groups; character tables; selection rules.
- Molecular spectroscopy: Rotational and vibrational spectra of diatomic molecules; electronic spectra; IR and Raman activities – selection rules; basic principles of magnetic resonance.
- Chemical thermodynamics: Laws, state and path functions and their applications; thermodynamic description of various types of processes; Maxwell's relations; spontaneity and equilibria; temperature and pressure dependence of thermodynamic

- quantities; Le Chatelier principle; elementary description of phase transitions; phase equilibria and phase rule; thermodynamics of ideal and non-ideal gases, and solutions.
- h. Statistical thermodynamics: Boltzmann distribution; kinetic theory of gases; partition functions and their relation to thermodynamic quantities – calculations for model systems.
  - i. Electrochemistry: Nernst equation, redox systems, electrochemical cells; Debye-Huckel theory; electrolytic conductance – Kohlrausch's law and its applications; ionic equilibria; conductometric and potentiometric titrations.
  - j. Chemical kinetics: Empirical rate laws and temperature dependence; complex reactions; steady state approximation; determination of reaction mechanisms; collision and transition state theories of rate constants; unimolecular reactions; enzyme kinetics; salt effects; homogeneous catalysis; photochemical reactions.
  - k. Colloids and surfaces: Stability and properties of colloids; isotherms and surface area; heterogeneous catalysis.
  - l. Solid state: Crystal structures; Bragg's law and applications; band structure of solids.

#### **UNIT IV ORGANIC CHEMISTRY-I**

12 Hrs

- a. IUPAC nomenclature of organic molecules including regio- and stereoisomers.
- b. Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.
- c. Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes.
- d. Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic or radical species. Determination of reaction pathways.
- e. Common named reactions and rearrangements – applications in organic synthesis.

#### **UNIT V ORGANIC CHEMISTRY-II**

12 Hrs

- a. Organic transformations and reagents: Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereo-selective transformations.
- b. Concepts in organic synthesis: Retrosynthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups.
- c. Pericyclic reactions – electrocycloaddition, cycloaddition, sigmatropic rearrangements and other related concerted reactions. Principles and applications of photochemical reactions in organic chemistry.
- d. Synthesis and reactivity of common heterocyclic compounds containing one or two heteroatoms (O, N, S).
- e. Structure determination of organic compounds by IR, UV-Vis,  $^1\text{H}$  &  $^{13}\text{C}$  NMR and Mass spectroscopic techniques.

## Reference Books:

1. UGC-CSIR NET/SET (JRF&LS) Chemical Sciences Arihant publications.
2. UGC-CSIR NET/SET (JRF&LS) Chemical Sciences Upkars.
3. Adi Chemistry Online materials
4. E.S.Gilreeth-Fundamental concepts of Inorganic Chemistry McGraw Hill
5. Modern Inorganic Chemistry-William Jolly.
6. Concise Inorganic chemistry J.D.Lee ELBS IV edition.
7. Advanced Inorganic Chemistry Cotton & Wilkinson wiley.
8. Coulson. Valence Oxford Clarendon.
9. Inorganic chemistry Keilts Purcell & J.C. Kotz W.B.Saunders.
10. Modern Aspects of Inorganic chemistry Emeleus and Sharpe
11. C.Day and J.Selbin-Theoretical Inorganic Chemistry-II Edition.
12. James Huheey Inorganic Chemistry IV edn. Harper - Collins
13. Atkins, P. and de Paula, J., "Physical Chemistry", Ninth Edition, Oxford University Press, New Delhi, 2011.
14. Ball, D. W., "Physical Chemistry", First Indian Edition, Cengage Rearing India Pvt., Ltd., New Delhi, 2009.
15. Mortimer, R.G., "Physical Chemistry", Third Edition, Academic Press – An imprint of Elsevier, London, 2009.
16. Engel T. and Reid, P. "Physical Chemistry", Second South Asian Edition, Pearson Publication, New Delhi, 2011.
17. Berry, R.S., Rice, S.A and Ross. J, "Physical Chemistry", Second Edition, Oxford University Press, New York, 2007.
18. Puri, B.R., Sharma, L.R. and Pathania, M.S., "Principles of Physical Chemistry", Forty Sixth Edition, Vishal Publishing Co., Jalandhar, 2013.
19. Clayden, J., Greeves, N., Warren, S. and Wothers, P., "Organic Chemistry", First Edition, Oxford University Press, New York, 2006.
20. March, J., "Advanced Organic Chemistry", Sixth Edition, John Wiley & Sons, New York, 2007.
21. Smith, M. B., "Organic Synthesis", Second Edition, McGraw-Hill International Edition, New Delhi, 1994.
22. Skyes, P., "A Guide Book to Mechanism in Organic Chemistry", Sixth Edition, Pearson Education Ltd., New Delhi, 2011.
23. Ahluvalia, V.K., "Chemistry of Natural Products", First Edition, Vishal Publishing Co, Jalandhar, 2008.
24. Finar, I.L., "Organic Chemistry", Vol. II, Sixth Edition, Pearson Education Pvt. Ltd., Singapore, 2006.
25. Carrutherus, W., "Some Modern Methods in Organic Synthesis", Third Edition, Cambridge University Press, New York, 1997.

26. Ireland, R.E., "Foundation of Modern Organic Chemistry Series- Organic Synthesis", First Edition, Prentice – Hall of India Pvt. Ltd., New Delhi, 1975.
27. Mackie, R.K., Smith, M.M., and Aitken, R.A., "Guide Book to Organic Synthesis" Second Edition, Longman Scientific and Technical, Singapore, 1990.
28. Bruckner, R., "Advanced Organic Chemistry – Reaction Mechanism", First Edition, Elsevier India Pvt. Ltd., New Delhi, 2005.
29. Principles of Organic Synthesis, R. Norman and J. M. Coxon, Blackie Academic & Professional, 1988.
30. Mukherji, S.M., and Singh, S. P., Organic Reaction Mechanism by MacMillan India Ltd.

### PG Chemistry Major Practicals

Course Code	Course Title	C	H	I	E	T
<b>17P2CMP1</b>	Organic Chemistry Practical– I	<b>4</b>	<b>5 + 5</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P2CMP2</b>	Inorganic Chemistry Practical– I	<b>4</b>	<b>5 + 5</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P2CMP3</b>	Physical Chemistry Practical– I	<b>4</b>	<b>4 + 4</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P4CMP1</b>	Organic Chemistry Practical– II	<b>3</b>	<b>5 + 5</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P4CMP2</b>	Inorganic Chemistry Practical– II	<b>4</b>	<b>5 + 5</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P4CMP3</b>	Physical Chemistry Practical– II	<b>3</b>	<b>4 + 4</b>	<b>50</b>	<b>50</b>	<b>100</b>
<b>17P4CPR1</b>	Project & Viva-voce	<b>4</b>	<b>0</b>	<b>40</b>	<b>60</b>	<b>100</b>

# Department of Botany

**DEPARTMENT OF BOTANY**  
**CBCS PATTERN FOR B.Sc., BOTANY**  
**(2017 - 18 Onwards)**

Semester	Sub Code	Course Title	Hours	Credits
I	17U1BMC1	Cryptogams	5	5
	17U1BSM1	Horticulture	2	2
	17U1BES1	Environmental Studies	2	2
		Practical	3	*
II	17U2BMC2	Anatomy and Embryology	5	5
	17U2BSM2	Biodiversity	2	2
	17U2BVE1	Value Education	2	2
	17U2BMP1	Practical -I	3	6
III	17U3BMC3	Cell biology and Biochemistry	4	4
		Practical	2	*
IV	17U4BMC4	Ecology	2	2
	17U4BSM3	Crop Diseases	2	2
	17U4BMP2	Practical - II	2	4
V	17U5BME1	Phanerogams #	5	6
	17U5BMC5	Genetics, Breeding and Biostatistics **	5	5
	17U5BMC6	General Microbiology **	5	5
	17U5BMC7	Applied Microbiology **	3	3
		Practical	6	*
VI	17U6BME2	Elective – Physiology #	6	7
	17U6BME3	Elective – Biotechnology **	6	7
	17U6BMC8	Molecular Biology and Bioinformatics **	4	4
	17U6BSM4	SBE - Forestry	2	2
	17U6BMP3	Practical – III #	3	6
	17U6BMP4	Practical - IV **	3	6

\* Exams will be conducted at the end of every academic year.

\*\* These subjects will have practical exams in the paper practical IV.

# Subjects mentioned here will have practical exam in the paper practical III.



Course code	Course Title	C	H	I	E	T
17U1BSM1	HORTICULTURE	2	2	25	75	100

#### Unit I

6 Hrs

Introduction, importance, divisions of horticulture. Soil profile. Fertility of soil, organic and inorganic matters.

#### Unit II

6 Hrs

Garden tools – pick – axe, hoe, crow bar, pruning shears and secateurs. Green house – types, dimensions (sizes) and their accessories.

#### Unit III

6 Hrs

Gardening – types. Ornamental garden and its components. Symmetrical and asymmetrical gardens. Kitchen garden.

#### Unit IV

6 Hrs

Propagation methods - cuttings (drumstick), grafting (sapota) and layering – air (pomegranate) and ground (*Nerium*). Cultural practices of jasmine.

#### Unit V

6 Hrs

Cultural Practices of mango. A brief account on value addition, e.g., ground nut and tomato. Jams, pickles and ketch-up – a brief account.

#### REFERENCES

1. Manibhushan Rao, K, Text book of Horticulture, 1991, Mac Millan India Ltd., New Delhi.
2. Kumar, N., Introduction to Horticulture, 2010, Oxford & IBH Publishing Company Pvt. Ltd., New Delhi.

Course code	Course Title	C	H	I	E	T
17U2BMC2	ANATOMY AND EMBRYOLOGY	5	5	25	75	100

**Unit I Anatomy 20 Hrs**

Plant tissues – meristems, characteristics. Classification based on origin, position, plane of cell division and function. Apical meristem – organization. Theories – Histogen, Tunica Corpus and Korper-Kapper. Root apex – structure, concept of Quiscent center. Permanent tissues - simple - parenchyma, collenchyma and sclerenchyma; complex tissues - components of xylem and phloem.

**Unit II 15 Hrs**

Primary structure of dicot and monocot stem. Internal structure of dorsiventral and isobilateral leaf. Primary structure of dicot and monocot root. Nodal anatomy – uni – *Justicia*; tri - *Azadirachta* and multilacunar – *Aralia*.

**Unit III 15 Hrs**

Secondary structure of dicot stem and root. Anomalous secondary growth in *Aristolochia*, *Boerhaavia* and *Dracaena*.

**Unit IV Embryology 15 Hrs**

Parts of a typical dicot flower – Structure of mature anther - types and functions of tapetum. Types and structure of ovule - orthotropous, anatropous and camphylostropous. Types of embryo sac – monosporic, bisporic and tetrasporic. Development of *Polygonum* type of embryo sac. Pollination types - anemophily, hydrophily and entomophily.

**Unit V 10 Hrs**

Double fertilization, syngamy, triple fusion and significance. Structure and development of dicot embryo (*Capsella*). Endosperm types – nuclear, cellular and helobial.

**REFERENCES**

1. Fahn, A, Plant Anatomy, 1967, Pergamon Press.
2. Cutter, Plant Anatomy, 1969, Experiment and Interpretation, Edward Arnold Publication.
3. Maheswari, Embryology of Angiosperms, 1974, Vikas publishing house.
4. Bhojwani, Embryology of Angiosperms, 1974, Vikas publishing house.
5. Easu, K, Anatomy of seed plants, 1979, Wiley Easter.
6. Pandey, P. B, Plant Anatomy, 2005, S. Chand & Co Ltd., New Delhi.

**PRACTICALS**

1. Primary structure: Transverse section of dicot and monocot stem.
2. Primary structure: Transverse section of dicot and monocot root.
3. Transverse section of dorsiventral and isobilateral leaves.
4. Secondary and anomalous structure - dicot stem.
5. Transverse section of monothealous and dithealous anther.
6. Dissection of dicot embryo and pollinium.
7. Dissection of cellular endosperm.
8. Observation of slides: Shoot and root apical meristem, types of ovule, embryo sac and morphology of pollens.

Course code	Course Title	C	H	I	E	T
17U2BSM2	BIODIVERSITY	2	2	25	75	100

**Unit I** **6 Hrs**

Introduction, concepts, definition, scope and constraints of biodiversity; levels – genetic, species and ecosystem. Biodiversity resources – agro, marine and coastal.

**Unit II** **5 Hrs**

Wealth - Hotspots. Endemism. Endemic centers in Tamil Nadu. Endemic plants of Tamil Nadu.

**Unit III** **6 Hrs**

Causes for the loss of biodiversity. Threatening factors – climatic, anthropogenic; processes and rate of extinction. IUCN categories. Red data book.

**Unit IV** **6 Hrs**

Conservation – *In situ* – biosphere reserves, national parks and wildlife sanctuaries. Medicinal plant conservation areas (MPCAs). *Ex situ* – theme parks, botanical gardens and seed banks.

**Unit V** **7 Hrs**

Organizations – International level – WWF, UNESCO, CITES and CBD; National level – NBA and BMC. National biodiversity strategies and action plan (NBSAPs). Local biodiversity register.

**REFERENCES**

1. Jeffries, M. J., Biodiversity and Conservation, 1997. Routledge, New York.
2. Biodiversity booklet published by CPR (2004). Environmental Education Centre, Chennai.
3. MOEF (2004). Hand book of Forest Conservation Act, 1980. Guidelines and Clarifications. Ministry of Environment and Forest, Govt. of India, New Delhi.
4. Krishnamurthy, K. V., An advanced text book on Biodiversity, 2009, Principles and Practices, Oxford & IBH Publication Pvt. Ltd., New Delhi.
5. Sharma, P. D., Ecology and Environment, 2009, Rastogi Publication, New Delhi.
6. WWW. IUCN. ORG.

**DEPARTMENT OF BOTANY**  
**CBCS PATTERN FOR ANCILLARY B.Sc., BOTANY SYLLABUS**  
**(2017 - 18 Onwards)**

Semester	Sub Code	Course Title	Hours	Credits
I	17U1BAC1	Algae, Bryophytes and Pteridophytes	4	2
		Practical	2	-
II	17U2BAC2	Plant Physiology	4	2
	17U2BAP1	Practical	2	2
III	17U3BAC3	Plant Anatomy	2	1
	17U3BSA1	SBE – Horticulture	2	2
		Practical	2	-
IV	17U4BAC4	Gymnosperms and Angiosperms	2	1
	17U4BNM1	NME – Plants and Human Welfare	2	1
	17U4BAP2	Practical	2	2

Total number of **theory** papers and marks = 6 x 100 = **600** (Int. 25 + Ext 75)

Internal 25 = Test 15 + Assignment 05/Seminar 05/

Quiz 05 marks + Attendance 05 marks.

Total number of **practical** papers and marks = 2x100 = **200** (Int. 50+ Ext. 50)

**Grand total of marks = 800**



Course code	Course Title	C	H	I	E	T
17U2BAC2	PLANT PHYSIOLOGY	4	5	25	75	100

### Unit I

10 Hrs

Diffusion, osmosis, imbibitions and plasmolysis. Absorption of water - active and passive mechanisms. Transpiration – types. Mechanism of stomatal movement - starch and sugar hypothesis and significance.

### Unit II

5 Hrs

Absorption of minerals (Carrier concept and Cytochrome pump theory). Translocation of Sugar - Munch's Mass flow hypothesis.

### Unit III

20 Hrs

Photosynthesis-Light reaction: Cyclic and Noncyclic photophosphorylation. CO<sub>2</sub> assimilatory pathways (C<sub>3</sub>). Respiration-substrate-RQ-Aerobic respiration - Glycolysis, Krebs cycle and ETS.

### Unit IV 15 Hrs

Photorespiration - Dual action of Rubisco - C<sub>2</sub> cycle (Glycolate cycle). HMP pathway and its significance. Biological nitrogen fixation - symbiotic.

### Unit V 10 Hrs

Plant growth hormones - structure and Physiological role of Auxin. A brief account on Photoperiodism and Vernalization.

## REFERENCES

1. Noggle and Fritz – Introductory Plant Physiology.
2. Bidwell – Plant Physiology.
3. Jain – Fundamentals of Plant Physiology.

## PRACTICALS

1. Determination of osmotic potential of potato by Chardakov's method.
2. Determination of photosynthetic rate using Wilmott's bubbler.
3. Effect of sodium bicarbonate on photosynthetic rate.
4. Imbibition rate of various seeds.

Course code	Course Title	C	H	I	E	T
17U3BAC3	PLANT ANATOMY	2	2	25	75	100

**Unit I** **6 Hrs**

Meristem - types, classification and theories - Histogen and Tunica-Corpus.

**Unit II** **6 Hrs**

Tissues - definition, types - simple - paranchymatous and sclerenchymatous and complex - xylem and phloem.

**Unit III** **6 Hrs**

Primary anatomical structures of a typical dicot stem and root, monocot stem and root.

**Unit IV** **6 Hrs**

Vascular cambium - structure and function, seasonal activity, secondary growth in Dicot stem and root. Wood - sap wood and heart wood.

**Unit V** **6 Hrs**

Leaf anatomy: A typical dicot leaf E.g, *Nerium* and monocot leaf E.g, Grass.

**REFERENCES**

1. Esau - Plant Anatomy
2. Fahn - Plant Anatomy
3. B.P.Pandey - Plant Anatomy

**PRACTICALS**

1. Shoot and Root apex.
2. Primary structure of root and stem.
3. Secondary structure of normal root and stem.
4. Leaf- *Nerium* and Grass.

Course code	Course Title	C	H	I	E	T
17U3BSA1	HORTICULTURE	2	2	25	75	100

### Unit I

6 Hrs

Introduction, importance, divisions of horticulture. Soil profile. Fertility of soil, organic and inorganic matters.

### Unit II

6 Hrs

Garden tools – pick-axe, hoe, crow bar, pruning shears and secateurs. Green house – types, dimensions (sizes) and their accessories.

### Unit III

6 Hrs

Gardening – types. Ornamental garden and its components. Symmetrical and asymmetrical gardens. Kitchen garden.

### Unit IV

6 Hrs

Propagation methods - cuttings (drumstick), grafting (sapota) and layering – air (pomegranate) and ground (*Nerium*). Cultural practices of jasmine.

### Unit V

6 Hrs

Cultural Practices of mango. A brief account on value addition, e.g., ground nut and tomato. Jams, pickles and ketch-up – a brief account.

### REFERENCE

Kumar, N., Introduction to Horticulture, 2010, Oxford and IBH publishing company, Pvt Ltd, New Delhi.



Course code	Course Title	C	H	I	E	T
17U4BNM1	PLANTS AND HUMAN WELFARE	2	2	25	75	100

### Unit I

6 Hrs

Introduction, vernacular names, botanical names, morphology of useful parts and uses of the following: Cereals and millets - Rice, Maize and Pearl millet. Legumes - Black gram and Red gram. Fruits - Gooseberry and Mango; Vegetables - Bhendi and Onion.

### Unit II

6 Hrs

Plants and plant products of Industrial value; fibre - cotton and jute, timber - teak and rose wood, rubber - *Hevea*, fatty oils e.g., sesame; essential oils - khus oil and lemongrass. Dyes – *Acacia* and Indigo. Sugar – sugarcane. Gums - gum arabic. Resins - *Abies*.

### Unit III

6 Hrs

Medicinal plants - Introduction, vernacular names, botanical names, morphological useful parts and uses of the following - Turmeric, *Aloe vera*, Tulsi, *Adadhoda*.

### Unit IV

6 Hrs

Spices and Condiments - Introduction, vernacular names, botanical names, morphological useful parts and uses of the following – clove, black pepper, cardamom, garlic and curry leaf.

### Unit V

6 Hrs

Beverages - Introduction, vernacular names, botanical names, morphology of useful parts and uses of the following - e.g Tea, Coffee and Cocoa.

### REFERENCE

Pandey, B. P., Economic Botany, 1978, S. Chand & Company Ltd., New Delhi.

**DEPARTMENT OF BOTANY**  
**CBCS PATTERN FOR M.Sc., BOTANY**  
**(2017 - 18 Onwards)**

Semester	Sub Code	Course Title	Hours	Credits
I	17P1BMC1	Cryptogams	6	5
	17P1BMC2	Phanerogams	6	5
	17P1BMC3	Mycology & Pathology	6	5
	17P1BMP1	Practical I	4	2
	17P1BMP2	Practical II	4	2
	17P1BMP3	Practical III	4	2
II	17P2BMC4	Developmental Botany	6	5
	17P2BMC5	Environmental Biology	6	5
	17P2BMC6	Biochemistry	6	5
	17P2BMP4	Practical I	4	2
	17P2BMP5	Practical II	4	2
	17P2BMP6	Practical III	4	2
III	17P3BMC7	Genetics, Cell and Molecular Biology	6	5
	17P3BMC8	Microbiology	6	5
	17P3BME1	Forestry and Economic Botany	6	5
	17P3BNM1	NME Food Science	4	4
	17P3BMP7	Practical I	4	2
	17P3BMP8	Practical II	4	2
VI	17P4BME2	Plant Physiology	6	6
	17P4BME3	Biotechnology	6	5
	17P4BMC9	Biostatistics and Bioinformatics	6	5
	17P4BMP9	Practical I	4	3
	17P4BMP10	Practical II	4	3
	17P4BMP11	Practical III	4	3

Total number of **theory** papers and marks : 13 x 100 = **1,300** (Int. 25 + Ext. 75)

Internal 25 = Test 15 + Assignment 05 + Seminar 05 marks.

Total number of **practical** papers and marks : 11 x 100 = **1,100** (Int. 50 + Ext. 50)

**Grand total of marks** : **2,400**



## **PRACTICALS**

1. Critical examination of algal samples of different classes like Cynaophyceae, Chlorophyceae, Phaeophyceae, Rhodophyceae etc.,
2. Cultivation and maintenance of at least three fresh water algae.
3. Micropreparation of all the classes of lichens.
4. Critical examination and identification of bryophytes and pteridophytes at class level.
5. Study of fossil (*Rhynia*, *Lepidodendron*, *Lepidophyllum* and *Lepidocarpon*).
6. Students must be taken for field study.



## **PRACTICALS**

1. Observation of morphological features of plants discussed in the syllabus.
2. Dissection and description of the families in the syllabus.
3. Students to be practiced computer aided taxonomy- construction of phylogenetic tree using UPGMA, PARISMONY etc.,
4. Students to be taken for study trips.
5. Submission of herbarium/plant photo album, field reports and records for evaluation.

Course code	Course Title	C	H	I	E	T
17P1BMC3	MYCOLOGY AND PLANT PATHOLOGY	6	6	25	75	100

**Unit I Mycology 20 Hrs**

General features - occurrence and distribution. Classification of fungi by Alexopoulos and Mims (1979). General characteristics of Gymnomycota, Mastigomycota and Amastigomycota. Thallus organization - modifications of mycelium - cell structure and fruit bodies.

**Unit II 15 Hrs**

Fungal nutrition - mode of nutrition (saprophytic & parasitic) - nutritional requirement - culture media - natural substrates of fungi - biotrophic, semi - biotrophic and necrotrophic. Mode of growth - culture of fungi - homothallism and heterothallism in fungi - homokaryons and heterokaryon.

**Unit III 20 Hrs**

Reproduction and life cycles – para-sexual cycle - reduction in sexuality - fungal genetics. Spore dispersal mechanism. Physiological specialization. Economic importance of fungi in baking, brewing and pharmaceutical industries. Deterioration of wood, paper and leather.

**Unit IV Plant pathology 15 Hrs**

Classification of diseases. Symptoms of plant diseases. Stages in disease development – deposition, penetration and infection. Dissemination of pathogens. Defense mechanism of plants. Disease control – cultural, biological and chemical methods (copper fungicide and organo phosphorous). Disease forecasting.

**Unit V 20 Hrs**

Symptom, etiology, disease cycle and control measures of the following diseases:

Fungal - paddy blast and red rot of sugarcane. Bacterial - angular leaf spot of cotton and citrus canker. Viral - leaf curl of papaya and yellow mosaic disease of bhendi. Mycoplasma - little leaf of brinjal.

**REFERENCES**

**MYCOLOGY**

1. Burnet, J. H., The Fundamentals of Mycology, 1971, ELBS Publications, London.
2. Alexopoulos, C. J and Mims, C. W., Introductory Mycology, 1979, Wiley Eastern Ltd., New York.
3. Bessey, E. A., Morphology and Taxonomy of Fungi, 1979, Vikas Publishing House, New Delhi.
4. Bold, H. C. *et al.*, Morphology of Plants and Fungi, 1980, Harper and Row Publishing, New York.

5. Sharma, P. D., The Fungi, 1987, Rastogi and Co., Meerut.
6. Mehrotra, R. S and Aneja, K. R., An Introduction of Mycology, 1990, Wiley Eastern, New Delhi.
7. Alexopoulos, C. J., Mims, C. W and Black well, M, Introductory mycology (4<sup>th</sup>ed), 1996, John Wiley sons Inc., USA.
8. Carlile, M. J., Watkims, S. C and Graham, The Fungi, 2001, Academic press, a Harcourt Science and Technology Campus. London, UK.
9. Vashista, B. R and Sinha, A. K., Botany for Degree Students – Fungi, 2007, S. Chand and Co.

### **PATHOLOGY**

1. Singh, R. S., Plant Diseases, 2003, Oxford & IBH publications, New Delhi. Pp. 686.
2. Mehrotra, R. S and Aggarwal, A., Plant Pathology, 2003, Tata McGraw- Hill Publishing Company Ltd. Pp. 846.
3. Singh, R. S., Plant Diseases, 2005, Oxford & IBH Publications, New Delhi. Pp. 720.
4. Arumugam, N. Kumaresan, V and Regland, A., Fungi & Plant pathology. 3<sup>rd</sup> edition, 2016, SARAS Publications. Nagarkoil. Pp. 1- 468,

### **PRACTICALS**

#### **Mycology**

1. Isolation of fungi from various sources.
2. Culture of fungi - Pure culture
3. Slide culture techniques.
4. Isolation of fungi from cow dung.
5. Observation of fruit bodies and other structure of fungi.

#### **Pathology**

1. Observation of symptoms of plant diseases.
2. Herbarium preparation.
3. Observation of stages of pathogenic fungi in the infected plant.
4. Protocol for controlling of fungal pathogens.

Course code	Course Title	C	H	I	E	T
17P2BMC4	DEVELOPMENTAL BOTANY	6	6	25	75	100

**Unit I Embryology-Pre-fertilization events 20 Hrs**

Flower –Definition. Structure of tetra-sporangiate anther. Development of anther wall layers (epidermis, endothecium, middle layers, tapetum); microsporogenesis and microgametogenesis. Pollen wall layers – pollen kit. Pollinium. Structure, types and development of ovule. Megasporogenesis. Megagametogenesis. Embryosac development and its types. Pollination – types.

**Unit II Fertilization and post fertilization changes 20 Hrs**

Self incompatibility – homomorphic and heteromorphic. Causes and methods to overcome incompatibility. Pollen – pistil interaction, types of stigma and style, events on stigmatic surface, pollen tube growth. Entry of pollen tube into the ovule and embryosac. Double fertilization and triple fusion. Structure and development of dicot embryo (*Capsella*) and monocot embryo (*Najas*). Endosperm and its types. Components of seeds and fruits. Classification, importance and dormancy of seeds. Seed germinations – epigeal and hypogeal. Apomixis – Nonrecurrent, recurrent and adventives. Polyembryony.

**Unit III Anatomy 15 Hrs**

**Tissues - Meristem:** Types and theories on meristems – shoot apical meristem - Histogen theory and Tunica corpus. Root apical meristem - Korper-kappe theory. Permanent tissue: simple and complex. Secondary structure of dicot stem and root. Anomalous secondary structure – *Boerhaavia*, *Bougainvillaea*, *Amaranthus*, *Mirabilis* and *Dracaena*.

**Unit IV Morphogenesis 15 Hrs**

Concept of morphogenesis as a package of development; components – cell division, division planes, their importance; cellular determinants of division planes – cytoskeleton, Pre Prophase Band in orienting karyokinesis and cell plate. Xylogeny – role of light and gravity, role of auxins and enzymes, cambium activity and lignifications (Experiments in *Syringa vulgaris*). Differences in phloem ontogeny.

**Unit V Development of organs 20 Hrs**

Vegetative meristem: Phyllotaxy, zone of foliar inhibition in apices, signals involved foliar inhibition. Development of angiosperm leaf with specific reference to petiole, lamina and leaf tip. Reproductive meristem – Determinate growth and differentiation. ABC model for ontogeny of flower. Polarity and development: Polarity in cuttings, unicellular coenocytes, eggs, spores and transport. Regulation of development: General nature of developmental process, environmental controls, nucleocytoplasmic interactions, genes and development.

## REFERENCES

1. Donald Alexander Johansen, Plant Embryology, 1950, California Botanica Company, MASS, U.S.A.
2. Sant Saran Bhojwani and Bhatnagar, S.P., Embryology of Angiosperms, 2008, Vikas Publishing Ltd., Delhi.
3. Nair, P. K. K., Pollen morphology of angiosperms, 1970, Vikas Publishing Ltd., New Delhi.
4. Elizabeth Cutter, Plant Anatomy, 1969, Edward Arnold Publication, London.
5. Fahn, A, Plant Anatomy, 1967, Pergamon Press.
6. Katherine Esau, Anatomy of seed plants, 1979, Wiley Eastern Ltd. New Delhi.
7. Burgess, Plant Cell and Development, 1985, Jeremy Cambridge University Press, Sydney.
8. Graham C. F and Wareing P. F., Developmental control in plants and animals, 1984, Blackwell Scientific Publications, Edinburgh.
9. Mascarenhas, A. F., Handbook of Plant Tissue Culture, 1988, IARI, New Delhi.
10. Kalyan Kumar De, Plant Tissue Culture, 1992, New central book agency (P) Ltd. New Delhi.

## PRACTICALS

1. Dissection of mono and dithecous anthers.
2. Pollen morphology observations.
3. Germination of pollens from different species.
4. Haploid production and embryo culture.
5. Dissection of pollinium and embryo – dicot and monocot.
6. Study of root apex, stem apex of living aquatic specimens.
7. Primary structure of stem and root.
8. Secondary structure of stem and root.
9. Leaves – isobilateral and dorsiventral.
10. Nodes – uni, tri and multilacunar.
11. Vegetative division in onion root tips (Mitosis), reproductive divisions (Meiosis).
12. Callus induction in paddy grains / onion leaf on MS media.
13. Callus maintenance by application of chemical pressure.
14. Differentiation - root (Auxin) and shoot (Cytokinin).



## REFERENCES

1. Nwankiti, O. C, Geography of Man and his Environment, 1981, Nigel Smith Books. Ashtead, UK.
2. Odum, E.P., Fundamentals of Ecology, III Edition, 1991, Saunders & com.
3. Dash, M.C., Fundamentals of Ecology, 1993, Tata McGraw Hill, New Delhi.
4. Subrahmanyam, N.S. and Sambamurty, A.V.S.S, Ecology, 2000, Narosa Publishing House. New Delhi.
5. Agarwal, K.C., Fundamentals of Environmental Biology, 2001, Nidhi Publishers. Bikaner, India.
6. Krishnamurthy, K.V., An advanced text book on Biodiversity, 2003, Principles and Practice. Oxford and IBH publishing Co. Pvt. Ltd. New Delhi.
7. Kumar, U and Asija, M.J., Biodiversity Principle and Conservation, 2003, Saraswati Purohit for Student edition, Jodhpur.
8. Kaushik, A and Kaushik, C.P., Perspectives in Environmental Studies (4<sup>th</sup> Ed.), 2004.
9. Asthana, D.K. and Asthana, M., A text book of Environmental studies, 2006, S. Chand & Co. Ltd. New Delhi.
10. Sharma, P.D., Ecology and Environment, 2009, Rastogi publications.
11. Rajagopalan, R, Basics of Environmental studies, 2009, Oxford University Press.
12. Pawan Kumar, B. and Mona Saad, A. Z., Eco-toxicology & Eco-technology, 2013, Discovery Publishing house.
13. Hussain, M., Environment and Ecology: Biodiversity, Climate Change and Disaster Management for Civil Services Examination, 2015, Access publishing.

## PRACTICALS

1. Morphological and anatomical features by typical xerophytes phylloclade - *Opuntia*, cladode - *Casuarina*, succulent - *Bryophyllum* and hydrophytes - *Hydrilla*.
2. Vegetation study by quadrat method.
3. Vegetation study by line transect.
4. Estimation of dissolved O<sub>2</sub> in water samples by Winkler's method.
5. Comparison of chemical characteristics – moisture content, carbonate content, nitrate content, base deficiency and pH of the soil samples using rapid tests.
6. Estimation of CO<sub>2</sub> in water samples.
7. Biodiversity - Marking locations in India and world map – Hot spots, mega diversity centers.
8. Marking locations of endemic species, biosphere reserves, vegetation, climate, national parks and, wild life sanctuaries.
9. Visit to RS & GIS centers.
10. Field visit to natural ecosystem and identification of trophic levels, food webs and food chain, plant diversity-species & community.
11. Field visit to study the biotic components of pond ecosystem.

Course code	Course Title	C	H	I	E	T
17P2BMC6	BIOCHEMISTRY	6	6	25	75	100

**Unit I** **20 Hrs**

Carbohydrates: Classification, mono, oligo and polysaccharides - structure, physical and chemical properties: Aldoses and ketoses, mutarotation. Monosaccharides - Trioses, Tetroses, Pentoses and Hexoses. Gluconeogenesis (synthetic pathways).

**Unit II** **20 Hrs**

Amino acids and proteins - Essential and Non-essential amino acids. Classification of amino acids - (based on structure). Physical and Chemical properties of amino acids. Proteins – Classification. Four levels of structural organization (Primary, Secondary, Tertiary and Quaternary). Urea cycle. Synthesis of aromatic amino acids.

**Unit III** **20 Hrs**

Lipids – Classification - simple, complex and derived. Functions, saturated and unsaturated fatty acids, Triacylglycerols. Structure, properties and Functions of phospholipids, glycolipids.  $\alpha$  – oxidation and  $\beta$ -oxidation of fatty acids. Biosynthesis of long chain fatty acids - Palmitate.

**Unit IV** **15 Hrs**

Enzymes - Nomenclature, IUB system of enzyme classification, properties, enzyme kinetics.  $K_m$  value, Michaelis- Menton constant, Lineweaver- Burk model, Active sites - Salient features, enzyme Inhibition, coenzymes, Mechanism of enzyme action - Lock and Key model and induced fit model. Regulation of enzyme action.

**Unit V** **15 Hrs**

Nucleic acids - Chemistry of DNA and RNA - e.g. mRNA and tRNA. Biosynthesis of purine and pyrimidine ribonucleotides. Types, structures and biological significance of vitamins and alkaloids.

**REFERENCES**

1. Zubay, G, Biochemistry, 1998, Macmillan Publishing Co, New York.
2. Lehninger, A. L., Nelson D. L and Cox, M. M., Principles of Biochemistry, 1993, Worth Publishers, New York.
3. Stryer, Biochemistry 1994, Freeman & Co, New York.
4. Jain, J. L., Fundamentals of Biochemistry (5<sup>TH</sup>Edn). 2001, S.Chand & Company, New Delhi.

## **PRACTICALS**

1. Estimation of glucose.
2. Estimation of protein.
3. Estimation of Lipid.
4. Estimation of DNA.
5. Estimation of RNA.
6. Paper chromatography.
7. Thin layer chromatography.
8. Column chromatography.
9. Determination of pKa value.
10. Nitrate reductase activity.
11. Agarose gel electrophoresis.
12. Qualitative test for carbohydrate, protein and lipid.
13. Estimation of starch.
14. Amylase activity.
15. Isoelectric point.

### DETAILS OF EXAMINATION PATTERN

Continuous Internal Assessment (CIA) Parameters	CIA	External Exam	Total
	25	75	100
Two tests & average will be taken	15	-	-
Seminar/Assignment/Quiz	5	-	-
Attendance	5	-	-

### MARKS DISTRIBUTION

Year	Semester	Papers	Marks	Total
I	I & II	6 x	100 =	600
II	III & IV	3 x	100 =	300
III	V & VI	8 x	100 =	800
<b>TOTAL</b>				<b>1,700</b>
<b>Practicals</b>		4 x	100 =	400
<b>GRAND TOTAL</b>				<b>2,100</b>

### QUESTION PAPER BLUE PRINT FOR THEORY PAPERS (EXTERNAL)

Part A* (multiple choice objective type) Two questions from each unit	10 x 1	10
Part B (Either or) Two questions from each unit	5 x 7	35
Part C (Essay) Answer any three questions (3/5) One question from each unit	3 x 10	30
<b>Grand Total</b>		<b>75</b>

\* Question bank has to be prepared by asking a minimum of 20 questions from each unit (20x5=100 questions per paper).

# Department of Zoology

**B.Sc. Zoology (with Botany and Chemistry ancillaries)**

Semester	Sub. Code	Subject	C	H	I	E	T
I	17U1ZMC1	Life and Diversity of Invertebrates (Core-1)	5	5	25	75	100
	17U1ZMP1	Major Practical 1	-	3	25	75	100
	17U1ZSM1	Applied Entomology (SBE)	2	2	25	75	100
	17U1ZAC1	Fundamentals of Invertebrates and Chordates	2	4	25	75	100
	17U1ZAP1	Anc. Zoo. Practical. 1	-	2	25	75	100
	17U1ZES1	Environmental Studies	2	2	25	75	100
II	17U2ZMC2	Life and Diversity of Vertebrates (Core-2)	5	5	25	75	100
	17U2ZMP1	Major Practical 1	6	3	25	75	100
	17U2ZSM2	Medical Zoology (SBE)	2	2	25	75	100
	17U2ZAC2	Economic Zoology (Anc. Chem)	2	4	25	75	100
	17U2ZAP1	Anc. Zoo. Practical 1	2	2	25	75	100
	17U2ZVE1	Value Education	2	2	25	75	100
III	17U3ZMC3	Biochemistry & Biochemical Techniques	4	4	25	75	100
	17U3ZMP2	Major practical 2	-	2	25	75	100
	17U3ZAC3	Essentials of Physiology & Microbiology (II AC)	1	2	25	75	100
	17U3ZAC1	Essentials of Invertebrates and Chordates (II AB)	1	2	25	75	100
	17U3ZSA1	Fisheries Science Chem. SBE	2	2	25	75	100
	17U3ZAP2	Anc. Zoo. Practical. 2	-	2	25	75	100
	17U3ZAP1	Anc. Zoo. Practical. 1	-	2	25	75	100
	17U3ZNM1	Economic Zoology	2	2	25	75	100
IV	17U4ZMC4	Cell & Molecular Biology	2	2	25	75	100
	17U4ZMP2	Major practical 2	4	2	25	75	100
	17U4ZSM3	Ornamental fish culture	2	2	25	75	100
	17U4ZAC4	Molecular Biology & Immunology (Chem)	1	2	25	75	100

	17U4ZAP2	Anc. Zoo. Practical 2 (Chem)	2	2	25	75	100
	17U4ZAC2	Applied Zoology (Bot)	2	4	25	75	100
	17U4ZAP1	Anc. Zoo. Practical 1 (Bot)	2	2	25	75	100
	17U4ZNM2	Essentials of Zoology	2	2	25	75	100
V	17U5ZMC5	Molecular Biology & Genetics	5	5	25	75	100
	17U5ZMC6	Biodiversity & Conservation Biology	5	5	25	75	100
	17U5ZMC7	Animal Physiology & Animal behaviour	3	3	25	75	100
	17U5ZME1	Organic Evolution	6	5	25	75	100
	17U5ZMP3	Major practical 3	-	3	25	75	100
	17U5ZMP4	Major practical 4	-	3	25	75	100
	17U5ZSA2	Sericulture & Moriculture	2	2	25	75	100
	17U5ZAC3	Fundamentals of Physiology & Microbiology	1	2	25	75	100
	17U5ZAP2	Anc. Zoo Practical 2	-	2	25	75	100
VI	17U6ZMC8	Microbiology & Immunology	5	5	25	75	100
	17U6ZME2	Biophysics, Biostatistics & Bioinformatics	6	5	25	75	100
	17U6ZME3	Biotechnology	7	6	25	75	100
	17U6ZSM4	Animal Farming	2	2	25	75	100
	17U6ZMP3	Major practical 3	6	3	25	75	100
	17U6ZMP4	Major practical 4	6	3	25	75	100
	17U6ZAC4	Molecular Biology, Immunology & Biotechnology	2	4	25	75	100
	17U6ZAP2	Anc. Zoo. Practical. 2	2	2	25	75	100

Marks Theory Paper : (Internal 25 and External 75)

Practical Paper: (Internal 50 and External 50)

### **Question Pattern**

#### **External**

**Max. Marks - 75**

Part - A Answer all the questions 10 X 1 = 10 marks

2 Multiple Choice questions (MCQ) from each unit

Part - B Answer all the questions 5 X 7 = 35 marks

Either or type of questions - 2 questions from each unit

Part - C Answer three questions 3 X 10 = 30 marks

1 question from each unit

#### **Internal**

**Maximum marks – 25**

1. Test 15 marks

2. Quiz/Assignment/Seminar/Field report 5 marks

3. Attendance 5 marks

75% - 80% (3 marks)

80% - 90% (4 marks)

90% - 100% (5 marks)

Course Code	Course Title	C	H	I	E	T
17U1ZMC1	LIFE AND DIVERSITY OF INVERTEBRATES	5	5	25	75	100

**Unit -1** **15 Hrs**

Protozoa - General characters and classification up to classes with examples –*Amoeba*: locomotion, nutrition, reproduction - Life history of *Plasmodium* - Brief account on parasitic protozoans:*Entamoeba*, *Trypanosoma* and *Leishmania*.

Porifera - General characters and classification up to classes - Structure of simple sponge – General characters of *Olyntus*- Canal system in sponges.

**Unit -2** **15 Hrs**

Coelenterata - General characters and classification up to classes with examples - Organization of Polyps and Medusa - Polymorphism in Hydrozoa - Corals and Coral reefs.

General characters and affinities of ctenophora.

Helminthes - General characters and classification up to classes with examples -*Taenia solium*: Scolex –*Wucheria*: General features, Elephantiasis – Parasitic adaptation in helminthic worms.

**Unit -3** **15 Hrs**

Annelida - General characters and classification up to classes with examples - Earth worm: General characteristic features, Metamerism, Nervous system and Excretory system – Leech:Coelom, Nephridia.

**Unit -4** **15 Hrs**

Arthropoda - General characters and classification up to classes with examples – Cockroach: Digestive system and circulatory system - Peripatus as a connective link- Appendages of prawn - Mouthparts of insects and larval forms of insects - Types of metamorphosis in insects and role of hormones in brief.

**Unit -5** **15 Hrs**

Mollusca - General characters and classification up to classes with examples - Torsion in gastropods.

Echinodermata - General characters and classification up to classes with examples - Star fish: water vascular system - Echinoderm larvae and their significance.

**Text book:**

1. Nair, N.C., S. Leelavathy, N. Soundarapandian, T. Murugan, and N. Arumugam. 2006. A text book of Invertebrates, Saras Publication, Nagercoil.

**Reference books:**

1. Kotpal, R.L. 2012. Modern Text Book of Zoology Invertebrates, Rastogi Publications, Meerut.
2. Parker & Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors, New Delhi.
3. Jordan, E.L. and P.S.Verma. 2013. Invertebrate Zoology, S. Chand & Co. Ltd. New Delhi.
4. Hickman C. P. Jr., Hickman & L.S. Roberts. Integrated principles of zoology, Mosby college publication. St. Louis.
5. Iyer, E.K., And T.N. Ananthkrishnan, Manual of zoology Vol. I, Invertebrata, Part I and II S.Viswanathan (Printers and Publishers) Pvt. Ltd. Madras.

Course Code	Course Title	C	H	I	E	T
17U2ZMC2	LIFE AND DIVERSITY OF VERTEBRATES	5	5	25	75	100

### **Unit – 1 Prochordata & Agnatha**

**15 Hrs**

General characters and classification of Prochordates up to classes with examples - Geological time scale-General characters of Urochordates – Ascidian: feeding mechanism, Ascidian tadpole larva and retrogressive metamorphosis in Ascidia – Salient features of Amphioxus – Affinities of Amphioxus - General characters of Agnatha - Migration of Petromyzon.

### **Unit – 2 Pisces**

**15 Hrs**

General characters and outline classification of fishes – Shark: Circulatory system and reproductive system – Accessory respiratory organs – Parental care in fishes – Migration of fishes – Evolutionary significance of Dipnoi.

### **Unit – 3 Amphibia & Reptilia**

**15 Hrs**

General characters and outline classification of Amphibians - Frog: Respiratory system- Parental care in amphibians-Metamorphosis in amphibians-Neoteny in amphibians.

General characters and classification of Reptiles in brief - Calotes: Digestive system - Poisonous snakes: Types of venom, biting mechanism and venomous snakes of south India-Identification of poisonous and non poisonous snakes.

### **Unit – 4 Aves**

**15 Hrs**

General characters and outline classification of Aves - Pigeon: Digestive system and reproductive system – Bird migration – Flight adaptation in birds – Flightless birds – Evolutionary significance of Archaeopteryx.

### **Unit 5 Mammalia**

**15 Hrs**

General characters and outline classification of Mammalia – Characters and examples of Prototheria, Metatheria and Eutheria – Rabbit: Digestive system and Sense organs – Adaptation in aquatic mammals.

## **TEXT BOOK**

1. Thangamani, A., S. Prasanakumar, L.M. Narayanan and N. Arumugam. 2005. A text book of Chordates. Saras publication, Nagercoil.

## **REFERENCE BOOKS**

1. Kardong, K.V. (2005) Vertebrates Comparative Anatomy, Function and evolution. IV Edition. McGrawHill Higher Education.
2. Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw-Hill Companies.
3. Young, J.Z. (2004). The life of vertebrates. III Edition. Oxford university press.
4. Hall B.K. and Hallgrimsson B. (2008). Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers, Inc.
5. A Text Book of Zoology, Vertebrates, Vol-II, Jeffery Parker and W.A. Haswel, Edited by Marshall and Williams, CBS Publication, New Dehli.
6. Chordate Zoology, 1982, P.S Dhami and J.K.Dhami, R.Chand and Co., New Dehli.
7. A Text Book of Zoology, 1984, R.D. Vidyarthi, R. Chand and Co., Dehli. 4. Modern Text Book of Zoology, Vertibrates. R. L. Kotpal, 3rd edn. Rastogi Publications, Meerut.

Course Code	Course Title	C	H	I	E	T
17U1ZSM1	APPLIED ENTOMOLOGY	2	2	25	75	100

**Unit – 1** **6 Hrs**

Sericulture – Types of silk worm – Life history of mulberry silk worm *Bombyx mori* – Mountage – Diseases of silk worm: pebrine, muscardine and flacherie.

**Unit – 2** **6 Hrs**

Moriculture – Cultivation of mulberry trees, harvesting and storage methods, Role of Central Silk Board in sericulture.

**Unit – 3** **6 Hrs**

Apiculture – Different species of honey bees – Life history of bees – Newton’s bee hive – Uses of honey.

**Unit – 4** **6 Hrs**

Lac culture – Lac insect classification – Life history of lac insects – Cultivation of lac – Harvesting and processing of lac – Composition and uses of lac.

**Unit – 5** **6 Hrs**

Forensic Entomology – Insects of forensic importance – Corpse feeders – Maggots – Life cycle analysis – Role of insects in crime investigation.

**Text book(s):**

1. Tomer, B. S. 2011. Economic Zoology. Emkay publications, Delhi.
2. Arumugam, N., S. Murugan, J. Johnson Rajeshwar, and R. Ramprabhu, 2005. Applied Zoology. Saras publication, Nagercoil.

**Reference books**

1. Johnson, M and M. Kesary. 2008. Sericulture.
2. Ravindranathan, K.R. 2005. A text book of economic zoology. Dominant publishers and distributors, New Delhi.
3. Shukla, G. S. and V.B. Upadhyay. 2011. Economic Zoology. Rastogi Publications, Meerut, New Delhi.
4. Vasantharaj David,B. and Kumaraswamy, T. (1996). Elements of Economic Entomology. Popular book depot, Chennai.

Course Code	Course Title	C	H	I	E	T
17U2ZSM2	MEDICAL ZOOLOGY	2	2	25	75	100

**Unit – 1** **6 Hrs**

Science of diseases – Communicable and non-communicable diseases – Vectors: Biological (Mosquito) and Mechanical (Musca) vectors – Endemic, epidemic and pandemic diseases.

**Unit – 2** **6 Hrs**

Vector borne diseases – Dengue, Rabies, Plaque and kala-azar (Transmitting vectors, mode of transmission, symptoms and prophylaxis).

**Unit – 3** **6 Hrs**

Protozoan diseases – Amoebiasis, Malaria, Pyorrhoea, Trypanosomiasis (Life cycle of causative organism, pathogenicity and prophylaxis).

**Unit – 4** **6 Hrs**

Helminthic diseases – Fascioliasis, Taeniasis, Ascariasis and Ancylostomiasis (Mode of infection, pathogenesis and prophylaxis).

**Unit – 5** **6 Hrs**

Ectoparasites: Head louse, bed bug, ticks and mites – General characters - Medicinal importance and control measures.

**Text book**

1. Rathinaswamy, S. K. 1986. A hand book of medical entomology and elementary parasitology. Vishwanathan (Printers & Publishers), Pvt. Ltd. Ananda Book Depot, Madras.

**Reference books**

1. Ghai O.P. and Piyush gupta, 1999. Essential preventive medicine (1<sup>st</sup>). Vikas publishing house Pvt Ltd .
2. Kotpal, R.L. 2012. Modern Text Book of Zoology Invertebrates, Rastogi Publications, Meerut.
3. Park I.E. and Park K. (2007).Text Book of Social and Preventive Medicine. M/s Banarsidas Bhanot publishers, Jabalpur.

Course Code	Course Title	C	H	I	E	T
17U1ZMP1	LAB COURSE-I	6	6	25	75	100

### **Mountings**

Body Setae of Earth worm  
Mouth parts of Cockroach  
Salivary glands of Cockroach  
Placoid scales of Shark  
Brain of frog

### **Dissections**

Digestive system of Cockroach  
Nervous system of Cockroach  
V cranial nerve of Frog  
Reproductive system of cockroach

### **Invertebrata**

Amoeba, Euglena, Paramecium entire, Paramecium conjugation, Trypanosoma, Elphidium, Noctiluca, Spicules, Obelia medusa, Polyp, Physalia, Porpita, Pennatula, Adamsia, Fungia, Tape worm entire, Scolex, Cercaria, Liver fluke, Planaria, Ascaris, Dracunculus, Chaetopterus, Arenicola, Aphrodite, Leech, Sacculina, Albunea, Scolopendra, Limulus, Scorpion, Aplysia, Vaginulus, Pinctada, Octopus, Nautilus, Chiton, Dentalium, Star fish, Bipinnaria larva.

### **Vertebrata**

Amphioxus entire, Balanoglossus, Ascidian, Doliolum, Petromyzon, Narcine, Trygon, Chimaera, Hippocampus, Echeneis, Exocoetes, Cynoglossus, Rhacophorus, Uraeotyphlus, Axolotle, Draco, Chameleon, Typhlops, Bungarus, Naja, Viper, Enhydrina, Eudynamus, King fisher, Ant eater, Loris and Pteropus,  
Pectoral and pelvic girdles of reptile, bird and mammal.  
Edible fishes (Catla, Mrigal, Roghu, Cat fish), Macrobrachium, Cyprinus, Artemia, Daphnia, Rotifer, Debeaker, poultry breeds.  
Pests of Paddy (*Tryporyza incertulas*, *Baliothrips biformis*), Sugarcane (*Chilo infescatellus*, *Holotrichia consanguinea*) and cotton (*Pempheres offinis*, *Oxycareus laetus*).

### **Reference books**

1. Jayasurya, N. C. Nair, N. Soundarapandian, N. Arumugam, S. Leelavathy and T. Murugan. 2013. Practical Zoology Vol 1 Invertebrata. Saras publication, Nagercoil.
2. Jayasurya, A. Thangamani, N. Arumugam, S. Prasanakumar and L. M. Narayanan. 2013. Practical Zoology Vol 2 Chordata. Saras publication, Nagercoil.
3. Sinha, J., A. K. Chatterjee and P. Chattopadhyay. 2011. Advanced practical zoology. Books and Allied (P) Ltd., Kolkata.

Course Code	Course Title	C	H	I	E	T
<b>17U1ZAC1</b>	<b>FUNDAMENTALS OF INVERTEBRATES AND CHORDATES</b>	2	4	25	75	100

**Unit- 1** **12 Hrs**

General characters and outline classification of invertebrates up to phylum. Life cycle of Plasmodium - Canal system in sponges - Corals and coral reefs.

**Unit- 2** **12 Hrs**

Parasitic adaptation in helminthic worms – metamerism - mouth parts and metamorphosis in insects.

**Unit- 3** **12 Hrs**

Torsion in mollusc – economic importance of mollusc – Water vascular system in star fish – General characters and outline classification of vertebrates up to phylum.

**Unit- 4** **12 Hrs**

General characters of Hemichordates, Eurochordates and Cephalochordates with examples – Parental care in fishes– migration of fishes.

**Unit- 5** **12 Hrs**

Neoteny in Amphibians – poisonous snakes of south India (Cobra and krait) - identification of poisonous and non poisonous snakes – flight adaptations in birds – Egg laying and pouched mammals – Adaptive radiation in mammals.

**Text book**

1. Thangamani, A., Prasanakumar, S., Narayanan, L. M. and Arumugam, N. 2005. A text book of Chordates. Saras publication, Nagercoil.

**Reference Books**

1. Kotpal, R.L. Modern Text Book of Zoology Invertebrates, Rastogi Publication, Meerut.
2. Parker & Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors. New Delhi.
3. E.L. JORDEN & P.S. VERMA, Invertebrate Zoology, S. Chand & Co. Ltd. New Delhi.
4. Hickman C. P. Jr., Hickman & L.S. Roberts. Integrated principles of zoology, Mosby college publication. St. Louis.
5. Iyer, E.K., And T.N. Ananthakrishnan, Manual of zoology Vol. I, Invertebrata, Part I and II S.Viswanathan (Printers and Publishers) Pvt. Ltd. Madras.
6. A Text Book of Zoology, Vertebrates, Vol-II, Jeffery Parker and W.A. Haswel, Edited by Marshall and Williams, CBS Publication, New Dehli.
7. Chordate Zoology, 1982, P.S Dhami and J.K.Dhami, R.Chand and Co., New Dehli.
8. A Text Book of Zoology, 1984, R.D. Vidyarthi, R. Chand and Co., Dehli.

9. Modern Text Book of Zoology, Vertebrates. R. L. Kotpal, 3rd edn. Rastogi Publications, Meerut.
10. Chordate Zoology, E.L. Jordon. S. Chand & Co., New Dehli.

Course Code	Course Title	C	H	I	E	T
17U2ZAC2	ECONOMIC ZOOLOGY	2	4	25	75	100

**Unit – 1** **12 Hrs**

Apiculture - Types of honey bees - Bee colony - Newton bee hives - Management of an apiary- Uses of honey - Bee wax and Bee venom.

Lac culture - Life history and rearing of lac insects - uses of lac.

**Unit – 2** **12 Hrs**

Sericulture - Types of silk worm - Lfe history of silk worm - Rearing of silk worm - Silk glands - Diseases of silk worm (Pebrine, muscardine and flacherie) - Role of Central Silk Board in Sericulture.

**Unit – 3** **12 Hrs**

Poultry - Breeds of poultry - Housing and management – Nutrition - Diseases and control - Dairy farming – Principles of economically important cattle.

**Unit – 4** **12 Hrs**

Pisciculture - Types of culturable fishes (fin fishes and shell fishes) - polyculture of carps - economic importance of fishes.

Vermiculture – Species – method – vermiwash - uses of vermi compost.

**Unit – 5** **12 Hrs**

Pests of paddy (*Tryporyza incertulas*, *Baliothrips biformis*), sugarcane (*Chilo infescatellus*, *Holotrichia consanguinea*) and cotton (*Pempherus offinis*, *Oxycarenius laetus*) - Cultural, chemical and biological methods of pest control – Integrated pest management.

**Text book(s):**

1. Tomer, B.S. 2011. Economic Zoology. Emkay publications, Delhi.
2. Arumugam, N., S. Murugan, J. Johnson Rajeshwar, and R. Ramprabhu, 2005. Applied Zoology. Saras publication, Nagercoil.

**Reference Books**

1. Arumugam, N. 2008. Aqua culture. Saras publication, Nagercoil.
2. Ravindranathan, K.R. 2005. A text book of economic zoology. Dominant publishers and distributors, New Delhi.
3. Vasantharaj David, B. and Kumaraswamy, T. 1996. Elements of Economic Entomology. Popular book depot, Chennai.

Course Code	Course Title	C	H	I	E	T
17U2ZAP1	ANCILLARY ZOOLOGY PRACTICAL -I	2	4	25	75	100

### Mountings

Earth worm	Body Setae
Cockroach	Mouth parts and Salivary glands
Honey Bee	Mouth parts
House fly	Mouth parts
Frog	Brain

### Dissection

Cockroach – Digestive system  
Reproductive system

### Virtual Dissection

Frog Arterial system  
Fifth cranial nerve  
Urinogenetal system

### Spotters

Trypanosoma, Obelia, Ephyra, Taenia, Ascaris, Dracunculus, Leech, Appendages of prawn, Albunea, Star fish, Trochophore larva, Nauplius, Glochidium, Bipinnaria, Amphioxus (entire), Placoid scale, Feather of bird, Axolotle larva, Frog – Osteology, Poisonous snakes of south India.

(Note: Mounting and dissections are to be done by using live specimen or virtual method or slides and preserved specimens from archives).

### Reference books:

1. Jayasurya, N. C. Nair, N. Soundarapandian, N. Arumugam, S. Leelavathy and T. Murugan. 2013. Practical Zoology Vol 1 Invertebrata. Saras publication, Nagercoil.
2. Jayasurya, A. Thangamani, N. Arumugam, S. Prasanakumar and L. M. Narayanan. 2013. Practical Zoology Vol 2 Chordata. Saras publication, Nagercoil.
3. Sinha,J., A. K. Chatterjee and P. Chattopadhyay. 2011. Advanced practical zoology. Books and Allied (P) Ltd., Kolkata.

# Department of Computer Science

**B.Sc. Computer science Syllabus (CBCS Pattern) with effect from JUNE 2017 onwards.**

Semester	Sub Code	Course Title	Hours	Credits
I	17U1DMC1	Programming in C	6	4
	17U1DMC2	Digital Electronics	5	4
	17U1DAC1	Discrete Mathematics	5	3
	17U1DMP1	LAB-1: C Programming Lab	3	2
	17U1DSM1	LAB-2 :SBE Office Automation Lab	3	2
	17U1DES1	Environmental Studies	2	2
II	17U2DMC3	OOPS with C++	6	5
	17U2DMC4	Computer Organization and Architecture	5	4
	17U2DAC2	Microprocessors 8086/88 And Its Applications	5	4
	17U2DMP2	LAB- 3: C++ Programming Lab	3	1.5
	17U2DSM2	LAB- 4: SBE Microprocessors Lab	3	1.5
	17U2DVE1	Value Education	2	2
III	17U3DMC5	Data Structures and Computer Algorithms	5	5
	17U3DMC6	Visual Programming	4	4
	17U3DMC7	Operating systems	4	4
	17U3DAC3	Financial Accounting	3	3
	17U3DAC4	Statistics and Numerical Methods	4	3
	17U3DMP3	LAB -5 : Visual Programming Lab	4	2
	17U3DSM3	LAB – 6 : SBE Data Structures Lab	4	2
	17U3DNM1	NME - Computer fundamentals	2	2

IV	17U4DMC8	Computer Networks	4	4
	17U4DMC9	Linux programming	5	4
	17U4DMC10	Programming in JAVA	4	4
	17U4DMC11	Computer Security	5	4
	17U4DAC5	Resource Management Technique	4	2
	17U4DMP4	LAB-7: JAVA Programming Lab	3	2
	17U4DSM4	LAB-8: SBE LINUX Programming Lab	3	2
	17U4DNM2	Introduction to Internet	2	2
V	17U5DMC12	RDBMS	5	4
	17U5DMC13	Software Engineering	5	4
	17U5DMC14	Web Designing	5	4
	17U5DMC15	Dot net Technologies	5	4
	17U5DME1	<b>Elective –I :</b> A. Client/ Server computing B. Android Programming C. Multimedia Technology D. Programming in ASP	4	4
	17U5DMP5	LAB-9: Web Programming Lab	3	3
	17U5DSM5	LAB-10: SBE RDBMS Lab	3	3
		Extension activity		1
VI	17U6DMC16	Data Mining	5	5
	17U6DMC17	Management Information systems	4	4
	17U6DME2	<b>Elective- II :</b> E. PHP Programming F. Cryptography & Network Security G. Information Security H. Computer Graphics	5	4
	17U6DMP6	LAB – 11: Dot net Programming Lab	7	2
	17U6DMP7	Project and Viva-Voce	7	5
	17U6DSM6	Part- IV SBE Desktop Publishing (DTP)	2	2
		Extension Activity		1

Course Code	Course Title	C	H	I	E	T
17U1DMC1	PROGRAMMING IN C	4	6	25	75	100

### UNIT I: Overview of C

(20 hours)

History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

### UNIT II: Managing I/O Operations

(15 hours)

Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

### UNIT III: Arrays

(15 hours)

One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions.

### UNIT IV: User-defined functions

(20 hours)

Need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields.

### UNIT V: Pointers

(20 hours)

Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. Files: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

**Text Book:**

1. E.Balagurusamy, Programming in ANSI C, 6<sup>th</sup> Edition, 2005, Tata McGraw Hill Publishers.

**Chapters:**

Unit I: 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13)

Unit II: 4 – 6

Unit III: 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10)

Unit IV: 9 (Except 9.20), 10

Unit V: 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)

**Reference Books:**

1. Gottfried, Programming with C, Schaum's Outline Series, , 2006, Tata McGraw Hill.
2. Ashok N.Kamthane, Programming with ANSI and Turbo C, 2006, Pearson Education.
3. H. Schildt, C: The Complete Reference, 4th Edition, 2000, TMH Edition.
4. Kanetkar Y., Let us C, 1999, BPB Pub., New Delhi.

Course Code	Course Title	C	H	I	E	T
17UIDMC2	DIGITAL ELECTRONICS	4	5	25	75	100

**Unit – I: Numbers Systems and Discrete Logic (15 hours)**

Why Binary– binary to decimal – decimal to binary – octal – hexadecimal – ASCII code – Excess-3 Code – Gray Code – transistor inverter – OR gates – AND gates – Boolean Algebra – NOR gates – NAND gates.

**Unit – II: Circuit Analysis and Design (15 hours)**

Boolean Law and theorems –sum of product method – K-Map truth tables – Pairs, Quads, Octets – K-Map simplifications – Don't care – product of sum method – product of sum simplifications.

**Unit – III: Data Processing and Arithmetic circuits (15 hours)**

Multiplexers – De-multiplexers – 1-of- 16- Decoders – BCD-to-Decimal Decoders – 7 segment decoders – Encoders – Exclusive-OR gates – parity generators-checkers – Binary Addition – Binary Subtraction – 2's & 1's complement representation – Complement Arithmetic – Arithmetic building blocks.

**Unit – IV: Flip-Flops, Clocks and timers (15 hours)**

RS flip-flop – D Flip-Flop – JK Flip-Flop – JK Master Slave Flip-Flop – Schmitt Trigger – 555 Timer Astable – 555 Timer Monostable – 555 Timer Schmitt Trigger.

**Unit – V: Shift Registers and Counters (15 hours)**

Types of Registers – Serial in serial out – serial in parallel out – parallel in serial out – parallel in parallel out– Ring counter – Ripple Counter – Synchronous Counter – MOD counters – Preset-able counters.

**Text Book:**

1. Albert Paul Malvino & Donald P. Leach , Digital Principles and Applications , Fourth Edition, 2005, Tata McGraw-Hill Edition

**Chapters:**

- Unit I: 1, 4
- Unit II: 2
- Unit III: 3.1 to 3.8, 5.1 to 5.7
- Unit IV: 8.1, 8.3,8.6,8.7,8.8, 9.3,9.4
- Unit V: 10, 11.1,11.3,11.5,11.6

**Reference Book:**

1. M.Morris Mano, Digital Logic and Computer Design, 2005, PHI

Course Code	Course Title	C	H	I	E	T
17UIDAC1	DISCRETE MATHEMATICS	3	5	25	75	100

**UNIT I: The Foundations: Logic and Proofs (15 hours)**

Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers – Rules of inference.

**UNIT II: Relations (15 hours)**

Relations and their properties – Representing relations – Closures of relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering - Exclude Lattices)

**UNIT III: Counting (15 hours)**

The basic of counting - The pigeonhole principle – Permutation and Combinations – Applications of recurrence relations – Solving recurrence relations – Divide and Conquer algorithms and recurrence relations. (All theorems and Results statement only)

**UNIT IV: Graphs (15 hours)**

Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices ) – shortest path problems.

**UNIT V: Matrices (15 hours)**

Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors.

**Text Books:**

1. Kenneth.H.Rosen, Discrete Mathematics and its applications, Seventh Edition, McGrawHill Publishing company.
2. M.Venkataraman , N.Sridharan and N.Chandrasekaran , Discrete Mathematics , 2009 , The National Publishing company

**Chapters:**

Unit I - 1: Sections: 1.1, 1.2, 1.3, 1.4, 1.6 → *Textbook 1*

Unit II - 9: Sections: 9.1, 9.3, 9.4, 9.5, 9.6 → *Textbook 1*

Unit III - 6: Sections: 6.1, 6.2, 6.3

8: Sections: 8.1, 8.2, 8.3

(Pages: 527 -529 only)

(Exclude algorithms and relations, on page 507 and its related problems) → *Textbook 1*

Unit IV - 10: Sections: 10.1, 10.2, 10.3, 10.4, 10.6) → *Textbook 1*

Unit V - 6 : Sections :6.1 to 6.5, and 6.7) → *Textbook 2*

**Reference Books:**

1. Alan Doerr, Levassure – “Applied Discrete Mathematical Structures for Computer Science”.

2. Trembly and Manohar – “Discrete Mathematical Structures with Application to Computer Science”.

Course Code	Course Title	C	H	I	E	T
17U1DMP1	C PROGRAMMING LAB	2	3	50	50	100

### Cycle-1

1. Write a C Program to find the sum of digits
2. Write a C Program to check whether a given number is Armstrong or not
3. Write a C Program to check whether a given number is Prime or not
4. Write a C Program to generate the Fibonacci series
5. Write a C Program to display the given number is Adam number or not
6. Write a C Program to print reverse of the given number and string
7. Write a C Program to find minimum and maximum of 'n' numbers using array
8. Write a C Program to arrange the given number in ascending order
9. Write a C Program to add, subtract and multiply two matrices
10. Write a C Program to calculate NCR and NPR

### Cycle-2

1. Write a C Program to find the grade of a student using else if ladder
2. Write a C Program to implement the various string handling function
3. Write a C Program to create an integer file and displaying the even numbers only
4. Write a C Program to calculate quadratic equation using switch-case
5. Write a C Program to implement the various string handling function
6. Write a C Program to generate student mark list using array of structures
7. Write a C Program to create and process the student mark list using file
8. Write a C Program to create and process pay bill using file
9. Write a C Program to create and process inventory control using file
10. Write a C Program to create and process electricity bill using file

Course Code	Course Title	C	H	I	E	T
17U1DSM1	SBE – OFFICE AUTOMATION LAB	2	3	50	50	100

### **WORD**

1. Open a word document to prepare your **Resume** by performing the following operations.
  - (a) Formatting the Text- Alignment & Font style
  - (b) Page setup (margin alignment, page height & width)
2. Create a student mark sheet using table, find out the total & average marks and display the result.
3. Design an invitation of your course inauguration function using different fonts, font sizes, bullets and Word Art/ Clip Art
4. Mail Merge Concept
  - (a) Prepare an invitation and to be sent to specific addresses in the data source.

### **EXCEL:**

1. Create suitable work sheet with student mark details and use Data sort to display results and make out a suitable chart.
2. Prepare salary bill in a worksheet showing Basic Pay, DA, HRA, Gross salary, PF, Tax and Net salary using suitable Excel Functions.

### **POWER POINT:**

1. Create a power point presentation to explain various aspects of your college using auto play.
2. Create a power point presentation to explain the sales performance of a company over a period of five years. Include slides covering the profile of the company, year wise sales and graph with gridlines, legends and titles for axes. Use Clip Art and animation features.

### **ACCESS:**

1. Create a table for storing marks of 10 students. The fields of the table are given below: Reg. No., Name, Mark1, and Mark2, Mark3, Test average (Best Two /2), Assignment, Seminar and Total marks (Test average + Assignment + Seminar) The fields 'Mark1', 'Mark2', 'Mark3' should not allow the user to enter a mark greater than 25 and should display proper message in such case. Similar constraint for the field 'Assignment' is 5 marks and for the field 'Seminar', it is 10 marks.
2. Create a table showing names of authors of at least 10 different books, title of books, the prices of these books, name of publishers and year of publication. Also create Select, Action and Cross-tab queries to display the records from this table meeting the criteria used in these queries.
3. Create a form to enter the data directly into this form. The fields required are: Basic Pay, DA, HRA, Gross salary, PF, Income tax and Net salary.
4. Create a report that displays the customer name, address, phone number, Item code, product quantity of the customers whose orders have been pending for over a month.

Course Code	Course Title	C	H	I	E	T
17U2DMC3	OOPS WITH C++	5	6	25	75	100

**UNIT I: (20 hours)**

Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.

**UNIT II: (20 hours)**

Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.

**UNIT III: (20 hours)**

Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.

**UNIT IV: (15 hours)**

Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.

**UNIT V: (15 hours)**

Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

**Text Book:**

1. E. Balagurusamy , Object Oriented Programming with C++ , Sixth Edition-2013 , McGraw Hill Education (India) Private Limited , New Delhi.

**Chapters:**

- Unit I – 1 (Except 1.3, 1.4), 2 (Only 2.6),  
3 (Except 3.20, 3.21, 3.22), 4  
Unit II – 5 (Except 5.18, 5.19), 6 (Except 6.8, 6.9, 6.10)  
Unit III – 7, 8  
Unit IV – 9, 10  
Unit V – 11 (Except 11.8), 12 (Only 12.2, 12.3 and 12.4 )

**Reference Books:**

1. Herbert Schildt, C++ - The Complete Reference, 1998, TMH
2. Paul Deitel, Harvey Deitel, C++ How to Program, Ninth edition (2014) PHI
3. Ashok N.Kamthane, Object Oriented Prog., with ANSI & Turbo C ++, Pearson Education
4. Poornachandra Sarang ,Object-Oriented Programming With C++ , 2<sup>nd</sup> Edition, PHI

Course Code	Course Title	C	H	I	E	T
17U2DMC4	COMPUTER ORGANIZATION AND ARCHITECTURE	4	5	25	75	100

**UNIT I: Basic Computer Organization (15 hours)**

Instruction Codes – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Control Memory – Address Sequencing.

**UNIT II: CPU (15 hours)**

General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Program control.

**UNIT III: Computer Arithmetic (15 hours)**

Hardware Implementation and Algorithm for Addition, Subtraction, Multiplication, Division – Booth Multiplication Algorithm – Floating Point Arithmetic.

**UNIT IV: I/O and Memory Organization (15 hours)**

I/O Interface – Asynchronous Data Transfer – Modes of I/O Transfer – Priority Interrupt – Direct Memory Access - Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.

**UNIT V : Advanced Processing (15 hours)**

RISC, CISC Characteristics - Parallel Processing – Pipe Lining – vector processing – array processors – Multi processors – Interconnections structures.

**Text Book:**

M. Morris Mano, Computer System Architecture, Third Edition , 2003 , Prentice Hall of India.

**Chapters:**

Unit I: 5.1 to 5.5, 7.1 to 7.2,

Unit II: 8.1 to 8.5, 8.7,

Unit III: 10.1 to 10.5

Unit IV: 11.2 to 11.6, 12.1 to 12.6 &

Unit V: 8.8, 9.1, 9.2, 9.6, 9.7, 13.1, 13.2

**Reference Books:**

1. A. S. Tanenbaum, Structured Computer Organization, PHI.
2. M.Morris Mano , Digital Logic & Computer Design, 2006,PHI.
3. Alan B.Marcovitz, Introduction to Logic design, 2nd edition,2005, TMH.

Course Code	Course Title	C	H	I	E	T
17U2DAC2	MICROPROCESSORS 8086 / 8088 AND ITS APPLICATIONS	4	5	25	75	100

**UNIT I: Software Architecture (15 hours)**

Internal architecture – Software model- data types – segment registers- data registers- pointers and index Registers- status registers – generating a memory address – addressing mode.

**UNIT II: 8086/8088-Microprocessor Programming (15 hours)**

The instruction set – data transfer instructions- arithmetic instructions – logic Instructions- shift instructions- rotate instructions- compare instructions- jump Instructions – the loop and loop handling instructions – string and string handling Instructions.

**UNIT III: Memory Interfaces (15 hours)**

Minimum –mode and maximum-mode systems minimum system mode interface- system Clock – bus cycle – control signals – read and write bus cycles – memory interface Circuits.

**UNIT IV: I/o Interface of the 8088/8086 Microprocessors (15 hours)**

Minimum-mode interface- maximum-mode interface- I/O data transfers- I/O instructions- Eight byte wide output ports with isolated I/O – eight byte wide input port using isolated I/O.

**UNIT V: Interrupt Interface of the 8088/8086 (15 hours)**

Types of interrupts – interrupt instructions- enabling/disabling of interrupt – external Hardware interrupt interface – block diagram of the 8249a (interrupt controller) – Software interrupts.

**Text Book:**

1. Walter A.Triebel, Avtar Sing - The 8088 and 8086 microprocessors (programming, interfacing, software, hardware and Applications) – Edition – 1995- Prentice Hall Of India.

**Reference Books:**

1. Douglas v.hall – Microprocessor and interfacing– McGraw-Hill.
2. Bary Brey – Introduction to Microprocessor and Microcomputer- PHI.

Course Code	Course Title	C	H	I	E	T
17U2DMP2	C++ PROGRAMMING LAB	1.5	3	50	50	100

### Cycle- 1

1. Printing Prime numbers between two given numbers.
2. Printing 3 digit numbers as a series of words. (*Ex. 543 should be printed out as Five Four Three*).
3. Finding area of geometric shapes using function overloading.
4. Inline functions for simple arithmetic operations.
5. Demonstrating the use of Pre-defined Manipulators.
6. Demonstrating the use of friend function.
7. Creating student mark list using array of objects,
8. Demonstrating constructor overloading.
9. Overloading the unary – operator.
10. Demonstrating single inheritance.
11. Demonstrating the use of “**this**” pointer.
12. Designing our own manipulator.
13. Demonstrate function templates.
14. Demonstrate class templates.

### Cycle- 2

1. Overloading the binary + operator.
2. Demonstrating Multiple inheritance.
3. Demonstrating Multilevel inheritance.
4. Demonstrating Hierarchical inheritance.
5. Demonstrating Virtual functions.
6. Processing mark list using binary file.
7. Count number of objects in a file.
8. Demonstrating the use of Command-line arguments.

<b>Course Code</b>	<b>Course Title</b>	<b>C</b>	<b>H</b>	<b>I</b>	<b>E</b>	<b>T</b>
<b>17U2DSM2</b>	<b>SBE – MICROPROCESSORS LAB</b>	<b>1.5</b>	<b>3</b>	<b>50</b>	<b>50</b>	<b>100</b>

1. Write an assembly language program to perform 8 bit, 16 bit and 32 bit addition.
2. Write an assembly language program to perform 8 bit, 16 bit and 32 bit subtraction.
3. Write an assembly language program to perform 8 bit, 16 bit multiplication and 8 bit division.
4. Write an assembly language program to perform 8 bit addition using AAA.
5. Write an assembly language program to perform 8 bit subtraction using AAS.
6. Write an assembly language program to perform 8 bit multiplication using AAM.
7. Write an assembly language program to perform DAA.
8. Write an assembly language program to perform DAS.
9. Write an assembly language program to perform logical operation.
10. Write an assembly language program to perform shift instruction.(left & right)
11. Write an assembly language program to perform rotate instruction.(left & right)
12. Write an assembly language program to perform factorial computation.
13. Write an assembly language program to perform sum of N natural numbers.
14. Write an assembly language program to perform Block transfer of data using loop.(Byte)
15. Write an assembly language program to perform Block transfer of data using loop.(Word)
16. Write an assembly language program to perform Block transfer of data using repeat.(Byte)
17. Write an assembly language program to perform Block transfer of data using repeat.(Word)
18. Write an assembly language program to perform Block transfer of data using jump.
19. Write an assembly language program to perform initialize the string using loop.(Byte)
20. Write an assembly language program to perform initialize the string using loop.(Word)

**B.Sc. IT Syllabus (CBCS Pattern) with effect from JUNE 2017 onwards.**

Semester	Sub Code	Course Title	Hours	Credits
I	17U1FMC1	Fundamentals of Information Technology	6	6
	17U1FMC2	Programming in C	5	3
	17U1FAC1	Digital Electronics	5	3
	17U1FMP1	LAB-1: C programming Lab	3	1.5
	17U1FSM1	LAB-2: Office Automation Lab	3	1.5
	17U1FES1	Environmental Studies	2	2
II	17U2FMC3	Object Oriented Programming with C++	6	6
	17U2FMC4	Multimedia Technology	5	3
	17U2FAC2	Discrete Mathematics	5	3
	17U2FMP2	LAB- 3: C++ Programming Lab	3	1.5
	17U2FSM2	LAB-4: Multimedia Lab	3	1.5
	17U2FVE1	Value Education	2	2
III	17U3FMC5	Operating systems	4	4
	17U3FMC6	Visual Programming	5	4
	17U3FMC7	LINUX Programming	4	4
	17U3FAC3	Data Structures and Computer Algorithms	4	4
	17U3FAC4	Computerized Accounting	3	2
	17U3FMP3	LAB-5: LINUX Programming Lab	4	2
	17U3FSM3	LAB- 6: Visual Programming	4	2
	17U3FNM1	Non major Elective(NME) Introduction to Internet	2	2
IV	17U4FMC8	Programming in JAVA	5	4
	17U4FMC9	Data Communication & Computer Networks	4	4
	17U4FMC10	Web Programming Using PHP and MySQL	4	4
	17U4FMC11	Computer Organization	4	4
	17U4FAC5	Numerical Methods	3	2
	17U4FMP4	LAB-7: Web Programming Lab	4	2
	17U4FSM4	LAB-8: JAVA Programming Lab	4	2
	17U4FNM2	PC Software	2	2
V	17U5FMC12	Relational Database Management Systems	5	4
	17U5FMC13	Information Security	5	4
	17U5FMC14	Software Engineering	5	4
	17U5FMC15	Dot Net Technologies	5	4
	17U5FME#	<b>Elective – I</b>	4	4

		1. Programming in ASP 2. Cloud computing 3. Cryptography and Network Security 4. Client /Server computing		
	17U5FMP5	LAB-9: RDBMS Lab	3	3
	17U5FSM5	LAB-10: Dot net Programming Lab	3	3
		Extension activity		1
VI	17U6FMC16	Android Programming	5	5
	17U6FMC17	Data Mining and Data Warehousing	5	4
	17U6FME2#	<b>Elective – II</b> 5. PHP Programming 6. Mobile Computing 7. WAP and XML 8. Management Information systems	4	4
	17U6FMP6	LAB-11: Open source Lab	7	2
	17U6FMP7	Project and Viva-voce	7	5
	17U6FSM6	Part- IV SBE Animation Techniques Using FLASH	2	2
		Extension Activity		1

Course Code	Course Title	C	H	I	E	T
17U1FMC1	INTRODUCTION TO INFORMATION TECHNOLOGY	6	6	25	75	100

**Unit I: (20 hours)**

Introduction to Computers - Generation of Computers - Classification of Digital Computer - Anatomy of Digital Computer.

**Unit II : (20 hours)**

Architecture of Computer - CPU and Memory - Secondary Storage Devices - Input Devices - Output Devices.

**Unit III : (20 hours)**

Introduction to Computer Software - Programming Language - Operating Systems - Introduction to Database Management System - Data Mining and On-line Analytical Processing.

**Unit IV: (15 hours)**

Computer Networks - WWW and Internet - Email - Intranets - Mobile Computing and Business on the Internet.

**Unit V : (15 hours)**

Introduction to Multimedia - Multimedia Applications - Computers at Home, Education, Entertainment, Science, Medicine and Engineering - Introduction to Computer Security - Computer Viruses, Bombs, Worms.

**Text Book:**

1. Alexis Leon And Mathews Leon, Fundamentals of Information Technology , Vikas Publishing House Pvt. Ltd, 2009.

**Reference Book:**

1. Dennis P. Curtin ,Kim foley, KunalSen and Cathleen Morin, Information Technology – The Breaking Wave, Tata-McGraw Hill Publications, 2005.

Course Code	Course Title	C	H	I	E	T
17U1FMC2	PROGRAMMING IN C	3	5	25	75	100

**UNIT I: Overview of C (15 hours)**

History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

**UNIT II: Managing I/O Operations (15 hours)**

Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops

**UNIT III: Arrays (15 hours)**

One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays – Initialization. Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions

**UNIT IV: User-defined functions (15 hours)**

Need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields

**UNIT V: Pointers (15 hours)**

Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers – pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. Files: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

**Text Book:**

1. E.Balagurusamy, Programming in ANSI C, 3<sup>rd</sup> Edition, 2005, Tata McGraw Hill Publishing Company.

**Chapters:**

Unit I: 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13)

Unit II: 4 – 6

Unit III: 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10)

Unit IV: 9 (Except 9.20), 10

Unit V: 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)

**Reference Books:**

1. Gottfried , Programming with C, Schaum's Outline Series, , 2006 Tata McGraw Hill
2. Ashok N.Kamthane , Programming with ANSI and Turbo C , 2006, Pearson Education
3. H. Schildt, C: The Complete Reference, 4th Edition, 2000 ,TMH Edition
4. Kanetkar Y., Let us C, 1999, BPB Pub., New Delhi

Course Code	Course Title	C	H	I	E	T
17UIFAC1	DIGITAL ELECTRONICS	3	5	25	75	100

**Unit - I :** (15 hours)

Numbers Systems and Discrete Logic Why Binary– binary to decimal – decimal to binary – octal – hexa decimal – ASCII code – Excess-3 Code – Gray Code – transistor inverter – OR gates – AND gates – Boolean Algebra – NOR gates – NAND gates.

**Unit – II:** (15 hours)

Circuit Analysis and Design Boolean Law and theorems –sum of product method – K-Map truth tables – Pairs, Quads, Octets – K-Map simplifications – Don't care – product of sum method – product of sum simplifications.

**Unit – III:** (15 hours)

Data Processing and Arithmetic circuits Multiplexers – De-multiplexers – 1-of- 16- Decoders – BCD-to-Decimal Decoders – 7 segment decoders – Encoders – Exclusive-OR gates – parity generators-checkers – Binary Addition – Binary Subtraction – 2's & 1's complement representation – Complement Arithmetic – Arithmetic building blocks.

**Unit – IV:** (15 hours)

Flip-Flops, Clocks and timers RS flip-flop – D Flip-Flop – JK Flip-Flop – JK Master Slave Flip-Flop – Schmitt Trigger – 555 Timer Astable – 555 Timer Monostable – 555 Timer Schmitt Trigger.

**Unit – V:** (15 hours)

Shift Registers and Counters Types of Registers – Serial in serial out – serial in parallel out – parallel in serial out – parallel in parallel out– Ring counter – Ripple Counter – Synchronous Counter – MOD counters – Presetable counters.

**Text Book:**

Albert Paul Malvino & Donald P. Leach, Digital Principles and Applications, Fourth Edition, Tata McGraw-Hill Edition, 2005

Unit I: Chapters: 1, 4

Unit II: Chapters: 2

Unit III: Chapters: 3.1 to 3.8, 5.1 to 5.7

Unit IV: Chapters: 8.1, 8.3,8.6,8.7,8.8, 9.3,9.4

Unit V: Chapters: 10, 11.1,11.3,11.5,11.6

**Reference Book:**

M.Morris Mano, Digital Logic and Computer Design, PHI, 2005

<b>Course Code</b>	<b>Course Title</b>	<b>C</b>	<b>H</b>	<b>I</b>	<b>E</b>	<b>T</b>
<b>17UIFMP1</b>	<b>C PROGRAMMING LAB</b>	<b>1.5</b>	<b>3</b>	<b>50</b>	<b>50</b>	<b>100</b>

### Cycle-1

11. Write a C Program to find the sum of digits
12. Write a C Program to check whether a given number is Armstrong or not
13. Write a C Program to check whether a given number is Prime or not
14. Write a C Program to generate the Fibonacci series
15. Write a C Program to display the given number is Adam number or not
16. Write a C Program to print reverse of the given number and string
17. Write a C Program to find minimum and maximum of 'n' numbers using array
18. Write a C Program to arrange the given number in ascending order
19. Write a C Program to add, subtract and multiply two matrices
20. Write a C Program to calculate NCR and NPR

### Cycle-2

11. Write a C Program to find the grade of a student using else if ladder
12. Write a C Program to implement the various string handling function
13. Write a C Program to create an integer file and displaying the even numbers only
14. Write a C Program to calculate quadratic equation using switch-case
15. Write a C Program to implement the various string handling function
16. Write a C Program to generate student mark list using array of structures
17. Write a C Program to create and process the student mark list using file
18. Write a C Program to create and process pay bill using file
19. Write a C Program to create and process inventory control using file
20. Write a C Program to create and process electricity bill using file

Course Code	Course Title	C	H	I	E	T
17U1FSM1	SBE – OFFICE AUTOMATION LAB	2	3	50	50	100

### **WORD**

1. Open a word document to prepare your **Resume** by performing the following operations.
  - (c) Formatting the Text- Alignment & Font style
  - (d) Page setup (margin alignment, page height & width)
2. Create a student mark sheet using table, find out the total & average marks and display the result.
3. Design an invitation of your course inauguration function using different fonts, font sizes, bullets and Word Art/ Clip Art
4. Mail Merge Concept
  - (a) Prepare an invitation and to be sent to specific addresses in the data source.

### **EXCEL:**

1. Create suitable work sheet with student mark details and use Data sort to display results and make out a suitable chart.
2. Prepare salary bill in a worksheet showing Basic Pay, DA, HRA, Gross salary, PF, Tax and Net salary using suitable Excel Functions.

### **POWER POINT:**

1. Create a power point presentation to explain various aspects of your college using auto play.
2. Create a power point presentation to explain the sales performance of a company over a period of five years. Include slides covering the profile of the company, year wise sales and graph with gridlines, legends and titles for axes. Use Clip Art and animation features.

### **ACCESS:**

1. Create a table for storing marks of 10 students. The fields of the table are given below: Reg. No., Name, Mark1, and Mark2, Mark3, Test average (Best Two /2), Assignment, Seminar and Total marks (Test average + Assignment + Seminar) The fields 'Mark1', 'Mark2', 'Mark3' should not allow the user to enter a mark greater than 25 and should display proper message in such case. Similar constraint for the field 'Assignment' is 5 marks and for the field 'Seminar', it is 10 marks.
2. Create a table showing names of authors of at least 10 different books, title of books, the prices of these books, name of publishers and year of publication. Also create Select, Action and Cross-tab queries to display the records from this table meeting the criteria used in these queries.
3. Create a form to enter the data directly into this form. The fields required are: Basic Pay, DA, HRA, Gross salary, PF, Income tax and Net salary.
4. Create a report that displays the customer name, address, phone number, Item code, product quantity of the customers whose orders have been pending for over a month.

Course Code	Course Title	C	H	I	E	T
17U2FMC3	OBJECT ORIENTED PROGRAMMING WITH C++	6	6	25	75	100

**UNIT I: (20 hours)**

Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User-defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.

**UNIT II: (20 hours)**

Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.

**UNIT III: (20 hours)**

Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance - Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.

**UNIT IV: (15 hours)**

Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.

**UNIT V: (15 hours)**

Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

**Text Book:**

1. E. Balagurusamy, Object Oriented Programming with C++, Sixth Edition-2013, McGraw Hill Education (India) Private Limited, New Delhi.

Unit I – Chapter 1 (Except 1.3, 1.4), Chapter 2 (Only 2.6),

Chapter 3 (Except 3.20, 3.21, 3.22), Chapter 4

Unit II – Chapter 5 (Except 5.18, 5.19), Chapter 6 (Except 6.8, 6.9, 6.10)

Unit III – Chapter 7, Chapter 8

Unit IV – Chapter 9, Chapter 10

Unit V – Chapter 11 (Except 11.8), Chapter 12 (Only 12.2, 12.3 and 12.4 )

**Reference Books:**

1. Herbert Schildt, C++ - The Complete Reference, 1998, TMH.
2. Paul Deitel, Harvey Deitel, C++ How to Program, Ninth edition (2014) PHI.
3. Ashok N.Kamthane, Object Oriented Prog., with ANSI & Turbo C ++, Pearson Education.
4. Poornachandra Sarang ,Object-Oriented Programming With C++ , 2<sup>nd</sup> Edition, PHI.

Course Code	Course Title	C	H	I	E	T
17U2FMC4	Multimedia Technology	3	5	25	75	100

**Unit – I: Multimedia Introduction (15 hours)**

Definitions – CD-ROM and the Multimedia Highway – Where to use Multimedia. Introduction to Making Multimedia – The stages of a Project – what you need. Hardware – Macintosh Verses Windows – Connections – Memory and Storage devices – Input devices – Output hardware.

**Unit-II: Basic Tools (15 hours)**

Basic software tools-Text Editing and Word processing Tools-OCR software-Painting and Drawing Tools-3D Modeling and animation Tools-Image Editing Tools-Sound Editing Tools-Animation , video and digital movie tools. Multimedia authoring tools-Making Instant multimedia-types of authoring tools-card and page-based authoring tools-Icon and object-based authoring tools-time-based authoring tools-Class platform authoring notes.

**Unit-III: Text, Sound and Images (15 hours)**

Text: The power of meaning –about fonts and faces-using text in multimedia-computers and text-font editing and design tools-hypermedia and hypertext. Sound: The power of sound-multimedia system sounds-digital audio-making MIDI audio-audio file formats-MIDI versus digital audio-adding sound to your multimedia project-production tips. Images: before you start to create-making still images-color-image file formats.

**Unit-IV: Animation and Video (15 hours)**

Animation: The power of motion-principles of animation-Animation by computer-making animations that work. Video: using video-how video works-broadcast video standards-analog video-digital video-video recording and tape formats-shooting and editing video.

**Unit-V: Planning (15 hours)**

Planning and cost: The process of making multimedia-scheduling-estimating-RFP’s and bid proposals. Designing and producing: Designing-producing.

**Text Book:**

Tay Vaughan - Multimedia making it Work-6<sup>th</sup> Edition-Tata McGraw-Hill.

**Reference Books:**

1. David Hillman-Multimedia Technology and Applications-Galgotia Publications Pvt. Ltd.
2. Judith Jaffcoats – “Multimedia in practice – Technology operations, PHI, 1998.

Course Code	Course Title	C	H	I	E	T
17U2FAC2	DISCRETE MATHEMATICS	3	5	25	75	100

**Unit-I: Set Theory**

**(15 hours)**

Introduction – Sets - Notation and Description of Sets – Subsets - Venn-Euler Diagrams - operations on sets - Properties of set operations - verification of the Basic Laws of Algebra by Venn diagram - The principle of Duality.

**Unit-II: Relations**

**(15 hours)**

Cartesian product of two sets - Relations - Representation of Relations - operations on Relations - Equivalence Relation. Functions and Operators - one-to-one, onto functions - Special types of functions - invertible functions - composition of functions.

**Unit-III: Mathematical Induction**

**(15 hours)**

Techniques of Proof - Mathematical induction Recurrence Relation and Generating Functions: Recurrence – An introduction - Polynomials and their evaluations - Recurrence Relations - Solution of finite order Homogeneous Relations - Solution of finite order Non-Homogeneous Relations - Generating Functions.

**Unit-IV: Matrix Algebra**

**(15 hours)**

Introduction - Matrix Operations - Inverse of a square matrix - Elementary operations and Rank of a matrix - Simultaneous equations - Eigen Values and Eigen Vectors.

**Unit-V: Logic**

**(15 hours)**

Introduction - TF Statements – Connectives - Atomic and Compound statements - Well Formed Formulae - Truth table of a formula – Tautology - Tautological implications and equivalence of formulae - Lattices - Some properties of Lattices.

**Text Book:**

Dr. M.K.Venkatraman, Dr.N.Sridharan, N.Chandrasekaran – “Discrete Mathematics” - The National Publishing Company - 2003.

**Reference Books:**

1. Alan Doerr,Levassure – “Applied Discrete Mathematical Structures for Computer Science”.
2. Trembly and Manohar – “Discrete Mathematical Structures with Application to Computer Science”.

Course Code	Course Title	C	H	I	E	T
17U2FMP2	C++ PROGRAMMING LAB	1.5	3	50	50	100

### Cycle- 1

1. Printing Prime numbers between two given numbers.
2. Printing 3 digit numbers as a series of words. (*Ex. 543 should be printed out as Five Four Three*).
3. Finding area of geometric shapes using function overloading.
4. Inline functions for simple arithmetic operations.
5. Demonstrating the use of Pre-defined Manipulators.
6. Demonstrating the use of friend function.
7. Creating student mark list using array of objects,
8. Demonstrating constructor overloading.
9. Overloading the unary – operator.
10. Demonstrating single inheritance.
11. Demonstrating the use of “**this**” pointer.
12. Designing our own manipulator.
13. Demonstrate function templates.
14. Demonstrate class templates.

### Cycle- 2

1. Overloading the binary + operator.
2. Demonstrating Multiple inheritance.
3. Demonstrating Multilevel inheritance.
4. Demonstrating Hierarchical inheritance.
5. Demonstrating Virtual functions.
6. Processing mark list using binary file.
7. Count number of objects in a file.
8. Demonstrating the use of Command-line arguments.

Course Code	Course Title	C	H	I	E	T
17U2FSM2	MULTIMEDIA LAB	1.5	3	50	50	100

### Photoshop

1. Invitation
2. Greeting Card
3. Logo Design
4. Poster Design
5. Action Setting
6. Merging Multiple Images
7. Artistic Effect
8. Lighting Effect
9. Grayscale to RGB
10. GIF Animation

### Flash

1. Microscopic Effect
2. Bouncing Ball
3. Moving an Object
4. Advertisement
5. Mask Effect
6. Snow Falling Effect

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**M.Sc. Computer Science Syllabus(CBCS Pattern) with effect from June 2017 onwards**

Semester	Sub Code	Course Title	Hours	Credits
I	17P1DMC1	Mathematical Foundations of Computer Science	5	4
	17P1DMC2	Design and Analysis of Algorithms	5	4
	17P1DMC3	Web Technologies	5	4
	17P1DMC4	Linux Programming	5	4
	17P1DMP1	Web Technologies Lab	5	4
	17P1DMP2	LINUX Programming Lab	5	4
II	17P2DMC5	OOAD & UML	5	4
	17P2DMC6	Advanced JAVA Programming	5	4
	17P2DME#	<u>Elective-I:</u> A. Advanced Computer Architecture B. System Software and Operating System C. Computer Network	5	4
	17P2DME#	<u>Elective-II:</u> D. Data Structures and Algorithms in C++ E. Multimedia Technology F. Programming in ASP	5	4
	17P2DMP3	Advanced JAVA Programming Lab	5	4
	17P2DMP4#	Lab Based on the paper selected in Elective -II	5	4
III	17P3DMC7	Relational Database Management System	6	4
	17P3DMC8	Software Engineering	5	4
	17P3DME3	<u>Elective-III:</u> G. Dot net technology H. WAP and XML I. PHP Scripting Language	5	4
	17P3DNM1	Introduction to Internet	4	4
	17P3DMP5	RDBMS Lab	5	4
	17P3DMP6#	Lab Based on the paper selected in Elective -III	5	4
IV	17P4DMC9	Network Security	5	
	17P4DME4#	<u>Elective-IV:</u> J. Web Services K. Digital Image Processing L. Data mining and data warehousing	5	
	17P4DPR1	Project & Viva-Voce	20	

Course Code	Course Title	C	H	I	E	T
17P1DMC1	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	4	5	25	75	100

**Unit - I: Mathematical Logic (15 hours)**

Statements and Notation – Connectives - Normal forms.

**Unit - II: Calculus (15 hours)**

The theory of inference for the statement calculus - The Predicate Calculus-Inference theory and Predicate Calculus

**Unit - III: Lattices and Boolean algebra (15 hours)**

Grammars and Languages - Polish Expressions and their Compilation. Lattice as Partially Ordered Sets.

**Unit - IV: Boolean Algebra (15 hours)**

Boolean Functions-Representation and Minimization of Boolean Functions.

**Unit - V: Graph Theory (15 hours)**

Finite - State Machines. Basic concepts of Graph Theory.

**Text Book:**

J.P. Tremblay and R. Manohar – “Discrete Mathematical Structures with Applications to Computer Science” - McGraw Hill Book Company.

**Reference Books:**

1. Alan Doerr – “Discrete Mathematics for Computer Science “.
2. Seymour Lipschutz, Marc Lipson – “Discrete Mathematics for Computer Science” - Schaum’s Outlines Discrete Mathematics - Second Edition Tata McGraw – Hill Publication.

Course Code	Course Title	C	H	I	E	T
17P1DMC2	DESIGN AND ANALYSIS OF ALGORITHMS	4	5	25	75	100

**Objectives :**

To study the concepts of algorithms and analysis of algorithms using divide and conquer, greedy method, dynamic programming, backtracking, and branch and bound techniques

**UNIT I: (15 hours)**

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis.

Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs

**UNIT II: (15 hours)**

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding The Maximum And Minimum – Merge Sort – Quick Sort – Selection - Strassen’s Matrix Multiplication.

**UNIT III: (15 hours)**

The Greedy Method: General Method - Container Loading - Knapsack Problem -Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

**UNIT IV: (15 hours)**

Dynamic Programming: The General Method – Multistage Graphs – All- Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees -String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. Basic Traversal and Search Techniques:

Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

**UNIT V: (15 hours)**

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets –Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: The Method - 0/1 Knapsack Problem.

**Text Book:**

1. Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint 2009.

**References:**

1. Langsam, Augenstein, Tenenbaum, Data Structures Using C - PHI
2. V.Aho, Hopcroft, Ullman , Data structures and Algorithms, LPE
3. S.E. Goodman, ST.Hedetniem Introduction to design and Analysis of Algorithms – TMH

Course Code	Course Title	C	H	I	E	T
17P1DMC3	WEB TECHNOLOGY	4	5	25	75	100

**UNIT I: (15 hours)**

Introduction – History of the Internet – Services and Accessibility – Uses – Protocols – Internet Standards – HTML – Introduction – HTML Document – Head Section – Body Section – HTML Forms – Java Script – Introduction – Language Elements – Objects of Java Script – Other Objects – Arrays.

**UNIT II: (15 hours)**

Dynamic HTML - CSS – Document Object Model – Event Handling – Filters and Transitions – Data Binding

**UNIT III: (15 hours)**

Web Servers and Servlets - Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues

**UNIT IV: (15 hours)**

Introduction to JSP - The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

**UNIT V: (15 hours)**

JSP Application Development - Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods- Error Handling and Debugging -Sharing Data Between JSP pages, Requests, and Users -Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

**Text Books:**

1. N P Gopalan, J Akilandeswari, Web Technology – A Developers Perspective –Prentice Hall of India Pvt. Ltd., New Delhi, 2008 (Units I and II).
2. Marty Hall and Larry Brown Pearson, Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES Pearson Education India (Units III, IV and V)

**Reference Book:**

1. J Jaworski, Mastering Javascript, BPB Publications, 1999

Course Code	Course Title	C	H	I	E	T
17P1DMC4	LINUX PROGRAMMING	4	5	25	75	100

**Unit I:** (15 hours)

Linux Introduction and Installation: Linux-Advantages-Red Hat Linux-New Features-Installation procedures and Methods. Using Desktop-GNOME-KDE-Linux Commands Accessing and Running Applications

**Unit II:** (15 hours)

Installing Red Hat Linux Applications, Running Window Application, Running Window, DOS and Macintosh Applications –Tools for using Internet and Web.

**Unit III:** (15 hours)

Administration: Understanding System Administration: Root login-super user-GUI tools, commands and Log files-Configuring Hardware-File System and Disk Management-Monitoring performances.

**Unit IV:** (15 hours)

Setting Up and Supporting users: Creating user accounts – Setting user defaults –Creating Desktops-Modifying and Deleting Accounts.

**Unit V:** (15 hours)

Security Issues: Hacker versus Cracker-Password Protection- Protection from break-in-Filtering Network Access-Firewalls-Detecting Instructions – Encryption techniques

**Text Book:**

1. Christopher Negus “Red Hat Linux 9 Bible”, WILEY- Dreamtech India Pvt.Ltd, New Delhi, First Edition, 2003

**Reference Book:**

1. Thomas Schenk, “Red Hat Linux System Administration”, Techmedia, New Delhi,2003.

Course Code	Course Title	C	H	I	E	T
17P2DMC5	OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML	4	5	25	75	100

**Unit I: (15 hours)**

Structured approach to system construction : SSADM/SADT - An overview of object oriented systems development & Life cycle

**Unit II: (15 hours)**

Various object oriented methodologies – Introduction to UML

**Unit III: (15 hours)**

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

**Unit IV: (15 hours)**

Object oriented design – Design axioms – Designing classes – Layering the software design :- data access layer, User interface layer, Control/business logic layer

**Unit V: (15 hours)**

UML - Examples on: Behavioral models – Structural models – Architectural models from real world problems.

**TEXT BOOK(s):**

1. **Bahrami Ali**, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. **Booch Grady, Rumbaugh James, Jacobson Ivar**, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (Unit: -5 covered here).

Course Code	Course Title	C	H	I	E	T
17P2DMC6	ADVANCED JAVA PROGRAMMING	4	5	25	75	100

**Unit 1: (15 hours)**

Servlet Overview – Servlet life cycle - The Java Web Server – Simple Servlet – Servlet Packages – Using Cookies - Session Tracking - Security Issues – using JDBC in Servlets – HTML to Servlet Communication - applet to servlet communication.

**Unit 2: (15 hours)**

Java Beans: The software component assembly model- The java bean development kit-developing beans – notable beans – using infobus - Glasgow developments - Application Builder tool-JAR files-Introspection-Bound Properties-Persistence-customizers - java beans API.

**Unit 3: (15 hours)**

EJB: EJB architecture- EJB requirements – design and implementation – EJB session beans-EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB-Variable in Perl- Perl control structures and operators – functions and scope

**Unit 4: (15 hours)**

RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol

**Unit 5: (15 hours)**

JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Introducing Java Transactions.

**Text Book(s):**

1. James McGovern, Rahim , Adatia, Yakor Fain, 2003, “J2EE 1.4 Bible”, Wiley-dreamtech India Pvt. Ltd, New Delhi
2. Herbert Schildt, 2002, “ Java 2 Complete Reference, 5th Edition”, Tata McGraw Hill, New Delhi.
3. Jamie Jaworski, 1999, “Java 2 Platform – Unleashed” , First Edition, Techmedia-SAMS.

**Reference books:**

1. K. Moss, 1999, Java Servlets, Second edition, Tata McGraw Hill, New Delhi.
2. D. R. Callaway, 1999, Inside Servlets, Addison Wesley, Boston
3. Joseph O'Neil, 1998, Java Beans from the Ground Up, Tata McGraw Hill, New Delhi.
4. T. Valesky, T.C. Valesky, 1999, Enterprise JavaBeans, Addison Wesley.
5. Cay S Horstmann & Gary Cornell, 2013, Core Java Vol II Advanced Features, 9th Edition, Addison Wesley.

Course Code	Course Title	C	H	I	E	T
17P2DME1	ADVANCED COMPUTER ARCHITECTURE	4	5	25	75	100

**UNIT I: (15 hours)**

Parallel computer models :- The state of computing - Multiprocessors and multicomputers – Multivector and SIMD computers.

**UNIT II: (15 hours)**

Program and Network properties:- Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

**UNIT III: (15 hours)**

Processors and memory hierarchy :- Advanced processor Technology – Super scalar and vector processors – Linear Pipeline Processors – Nonlinear pipeline Processors.

**UNIT IV: (15 hours)**

Multiprocessors and Multicomputers:- Multiprocessor System interconnects – Message Passing Mechanisms – SIMD Computer Organizations – The Connection Machine CM 5 – Fine-Grain Multicomputers.

**UNIT V: (15 hours)**

Software for Parallel Programming:- Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

**Text Book**

Kai Hwang, “Advanced Computer Architecture “McGraw-Hill International Edn., Singapore , 1993.

Chapters 1.1-1.3, 2, 4.1, 4.2, 6.2, 7.1, 7.4, 8 4, 8.5, 10.1, 10.2, 10.3

**Reference Books:**

1. Kai Hwang and Faye A.Briggs, “Computer Architecture and Parallel Processing”, McGraw-Hill International Editions, Singapore , 1985.

2. Michael J.Quinn, “Parallel Computing, Theory and Practice”, McGraw-Hill International Edn., Singapore , 1994.

Course Code	Course Title	C	H	I	E	T
17P2DME2	SYSTEM SOFTWARE AND OPERATING SYSTEMS	4	5	25	75	100

**Unit - I: System Software : (15 hours)**

System Programs - Assembler, Compiler, Interpreter, Operating System. Machine Structure - Instruction Set - Addressing Mode. Assembler: Basic Assembler Functions - Machine Dependent and Machine Independent Assembler Features. Assembler Design - Two Pass Assembler with Overlay Structure, One Pass Assembler and Multi pass Assembler.

**Unit - II: Loaders and Linkers (15 hours)**

Basic Loader Functions - Machine Dependent and Machine Independent Loader Features. Loader Design - Linkage Editor, Dynamic Linking and Bootstrap Loaders.

**Unit - III: Operating System (15 hours)**

File system - CPU Scheduling - Memory Management - Virtual Management.

**Unit - IV: Scheduling (15 hours)**

Disk and Drum Scheduling - Deadlocks-Concurrent Processes.

**Unit - V: Case Studies (15 hours)**

Disk Operating System (DOS) - WINDOWS.

**Text Books:**

1. L.L.Beck – “System Software An Introduction to Systems Programming” - Addison Wesley Publications-1998.
2. James L.Peterson, Abraham Silberschaz - “ Operating System Concepts “ - Addison Wesley Publications- 1985.

**Reference Books:**

1. D.M.Damdhare - “Introduction To System Software” - Harvey.M.Deital - Addison Wesley - 1984.
2. Andrew S.Tannenbaum – “Operating System - Design and Implementation” - Prentice Hall - 1987.
3. Charles Gowley, Irwin - “Operating System” – 1997.
4. D.M. Dhamdhare – “System Programming and Operating Systems“ - Tata McGraw Hill - Second Edition - 1997.

Course Code	Course Title	C	H	I	E	T
17P2DME3	COMPUTER NETWORKS	4	5	25	75	100

**Unit 1: (15 hours)**

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media

**Unit-2: (15 hours)**

Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

**Unit 3: (15 hours)**

Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

**Unit 4: (15 hours)**

Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

**Unit 5: (15 hours)**

Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP - Network Security: Cryptography.

**Text book:**

A. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

**Reference Books:**

- 1) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
- 2) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.
- 3) D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, NewDelhi.
- 4) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

Course Code	Course Title	C	H	I	E	T
17P2DME4	DATA STRUCTURES AND ALGORITHMS IN C++	4	5	25	75	100

**UNIT1:Programming Techniques: (15 hours)**

Classes- Constructor Syntax and Accessors - Interface and Implementation - Pointers – Templates - Class Templates, Function Templates - Object, Comparable-Function Objects - Separate Compilation of Class Templates - Algorithm Analysis - Mathematical Background - Model - Running-Time Calculations - General Rules Logarithms in the Running Time - Limitations of Worst-Case Analysis.

**UNIT 2: Lists, Stacks, Queues, Trees: (15 hours)**

Abstract Data Types (ADTs) - The List ADT - Simple Array Implementation of Lists- Simple Linked Lists - vector and list in the STL - Iterators - Example: Using erase on a List - const\_iterators - Implementation of vector - Implementation of list - The Stack ADT - Implementation of Stacks - Applications - The Queue ADT - Queue Model- Array Implementation of Queues -Applications of Queues- Trees Preliminaries - Implementation of Trees - Tree Traversals with an Application - Binary Trees - An Expression Trees - Binary Search Trees - findMin and findMax - AVL Trees -Single Rotation - Double Rotation - Splay Trees .

**UNIT 3: Hashing and Priority Queues: (15 hours)**

Hashing - General Idea - Hash Function - Separate Chaining - Hash Tables without Linked Lists - Linear Probing - Quadratic Probing - Double Hashing - Rehashing - Hash Tables in the Standard Library - Hash Tables with Worst-Case - Perfect Hashing - Cuckoo Hashing - Hopscotch Hashing -Priority Queues (Heaps) - Model - Simple Implementations - Binary Heap - Structure Property - Heap-Order Property - Basic Heap Operations - Other Heap Operations - Applications of Priority Queues -The Selection Problem - Leftist Heaps - Skew Heaps - Binomial Queues .

**UNIT 4: Sorting, DisjointSets: (15 hours)**

Sorting - Insertion Sort Algorithm - STL Implementation of Insertion Sort - A Lower Bound for Simple Sorting Algorithms -Shellsort - Worst-Case Analysis of Shellsort -Heapsort - Mergesort - Quicksort - Actual Quicksort Routines - Analysis of Quicksort - A Linear-Expected-Time Algorithm for Selection - A General Lower Bound for Sorting - Decision - Linear-Time Sorts: Bucket Sort and Radix Sort - External Sorting.

The Disjoint Sets Class - Equivalence Relations -The Dynamic Equivalence Problem

**UNIT 5: Graph and Algorithm Design Techniques : (15 hours)**

Graph Algorithms - Definitions - Representation of Graphs - Topological Sort - Shortest-Path Algorithms - Unweighted Shortest Paths - Dijkstra’s Algorithm - Graphs with Negative Edge Costs - Acyclic Graphs - All-Pairs Shortest Path - Shortest Path - Network Flow Problems - Minimum Spanning Tree - Prim’s Algorithm - Kruskal’s Algorithm - Applications of Depth-First Search - Undirected Graphs - Biconnectivity - Euler Circuits - Directed Graphs.

Algorithm Design Techniques - Greedy Algorithms - A Simple Scheduling Problem -Huffman Codes - Divide and Conquer Method.

**Text Book:**

MARK ALLEN WEISS – “Data Structures and Algorithm Analysis in C++” – Pearson Publishing Company Fourth edition.

**References:**

1. Seymour Lipschutz: “Theory & Problems of Data Structures”, Schaum’s Outline Series (McGraw-Hill)
2. Ellis Horowitz, Sartaj Sahni – Fundamentals of Data Structures (CBS Publications)
3. E Horowitz and S. Sahani, Fundamentals of Computer Algorithm, Galgotia Publications, 1991.

Course Code	Course Title	C	H	I	E	T
17P2DME5	MULTIMEDIA TECHNOLOGY	4	5	25	75	100

**Unit - I:** (15 hours)

Introduction to making multimedia – Multimedia skills and training – Hardware peripherals.

**Unit - II:** (15 hours)

Basic tools – Making Instant Multimedia – Multimedia Authoring tools

**Unit - III:** (15 hours)

Text – Sound - Images.

**Unit - IV:** (15 hours)

Animation – Video

**Unit - V:** (15 hours)

Planning and Costing – Designing and Producing.

**Text Book:**

1. Tay Vaughan – “Multimedia Making it Work” — 8<sup>th</sup> edition — Osborne McGraw hill.

**Reference Books:**

1. John Villamil, Casanova Lous Molina- Multimedia production-Planning and Delivery — PHI.
2. Multimedia in Practice – Technology and Applications – PHI – 1998.

Course Code	Course Title	C	H	I	E	T
17P2DME6	PROGRAMMING IN ASP	4	5	25	75	100

**Unit I:** (15 hours)

Introduction to ASP – Active Server Pages Model – ASP File – the process of serving an Active Server Page – Using Scripting Languages – Setting the Primary Scripting Language – Including other files – Understanding objects.

**Unit II:** (15 hours)

Understanding components – Working with users – working with HTML forms – retrieving form data – using text boxes and text areas.

**Unit III:** (15 hours)

Cookies – working with cookies – applications of cookies – addressing the drawbacks of using cookies – using cookies in ASP applications. Working with connections and data sources – creating connections with OLEdb and ODBC – connecting to Microsoft SQL server – connecting to a Microsoft access database.

**Unit IV:** (15 hours)

About the connection object – executing a SQL statement with the connection object – understanding session and connection pooling – working with record sets – retrieving a record set – record set cursor and locking types – understanding ADO cursors – paging through a record set.

**Unit V:** (15 hours)

Working with the command object – creating stored procedures – executing stored procedures with the connection object – executing stored procedures with the command object – retrieving parameter information.

**Text Book(s):**

1. Ivan Bayross, Practical ASP –BPB Publications, 2000.
2. Scot Johnson, Special Edition Using Active Server Pages –Prentice Hall of India Private Limited 2001.

**Reference Book:**

1. Russell Jones, Mastering Active Server Pages 3, Sybex Publishers.