

**CURRICULUM AND SYLLABUS (R 2018)**  
**CHOICE BASED CREDIT SYSTEM**  
**(Applicable to the batches admitted from July, 2018)**

**M.Sc – CHEMISTRY (I – IV SEMESTERS)**

**SEMESTER- I**

Sl No.	CATEGORY	SUB.CODE	SUBJECT	Total Contact Hrs	L	T	P	C
<b>THEORY</b>								
1.	MC	P18MCCH101	Core 1: Quantum Chemistry, Group Theory And Electrochemistry	6	4	2	0	4
2.	MC	P18MCCH102	Core 2: Solid State, Bonding And Polymeric Inorganic Compounds	6	4	2	0	4
3.	MC	P18MCCH103	Core 3: Organic Reaction Mechanism And Stereochemistry	6	4	2	0	4
<b>PRACTICAL</b>								
4.	MC	P18MCCH1L1	Core 4: Organic Chemistry - Practical – I	6	0	0	6	3
5.	MC	P18MCCH1L2	Core 5: Inorganic Chemistry- Practical – II	6	0	0	6	3
<b>Total Credits</b>				<b>30</b>	<b>12</b>	<b>6</b>	<b>12</b>	<b>18</b>

**SEMESTER - II**

Sl No.	CATEGORY	SUB.CODE	SUBJECT	Total Contact Hrs	L	T	P	C
<b>THEORY</b>								
1.	MC	P18MCCH201	Core 6: Principles of Molecular Spectroscopy	5	4	1	0	4
2.	MC	P18MCCH202	Core 7: Coordination Chemistry And Bio-Inorganic Chemistry	5	4	1	0	4
3.	MC	P18MCCH203	Core 8: Conformational Analysis, Reagents and Organic Synthesis	5	4	1	0	4
4.	MC	P18MCCH204	Core 9: Green Chemistry	5	4	1	0	4
5.	ME	P18MECH011	Major Elective – I - Industrial Chemistry	4	4	0	0	4

PRACTICAL								
6.	MC	P18MCCH2L1	Core 10: Physical Chemistry - Practical – I II	6	0	0	6	3
7.	EEC	P18PRCH2P1	Internship Program	0	0	0	0	1
<b>Total Credits</b>				<b>30</b>	<b>20</b>	<b>4</b>	<b>6</b>	<b>24</b>

### SEMESTER - III

SI No.	CATEGORY	SUB.CODE	SUBJECT	Total Contact Hrs	L	T	P	C
<b>THEORY</b>								
1.	MC	P18MCCH301	Core 11: Chemical Thermodynamics, Equilibria And Quantum Mechanics	5	4	1	0	4
2.	MC	P18MCCH302	Core 12: Analytical Chemistry	5	4	1	0	4
3.	MC	P18MCCH303	Core 13: Applications of Spectroscopy and Magnetism	5	4	1	0	4
4.	MC	P18MCCH304	Core 14: Physical Methods in Chemistry	5	4	1	0	4
5.	ME	P18MECH023	Major Elective – II - Food Chemistry	4	4	0	0	4
<b>PRACTICAL</b>								
6.	MC	P18MCCH3L1	Core 15: Gravimetric Analysis and Inorganic Preparation Practical – IV	6	0	0	6	3
7.	EEC	P18PRCH2P1	Audit Course	0	0	0	0	1
<b>Total Credits</b>				<b>30</b>	<b>20</b>	<b>4</b>	<b>6</b>	<b>24</b>

### SEMESTER - IV

SI No.	CATEGORY	SUB.CODE	SUBJECT	Total Contact Hrs	L	T	P	C
<b>THEORY</b>								
1.	MC	P18MCCH401	Core 16: Chemical Kinetics, Surface Chemistry	5	4	1	0	4
2.	MC	P18MCCH402	Core 17: Nuclear Chemistry And Photochemistry	5	4	1	0	4
3.	MC	P18MCCH031	Major Elective - III	4	4	0	0	4
4.			Open Elective	2	2	0	0	2
5.		P18MCYO001	Stress Management by Yoga	2	2	0	0	1

		P18PRCH3T1	Term Paper	0	0	0	0	1
<b>PRACTICAL</b>								
6.	MC	P18MCCH4L1	Core 18: Analytical practical - V	6	0	0	6	3
7.	EC	P18PRCH4P1	Core 19: Project	6	0	0	6	8
<b>Total Credits</b>				<b>30</b>	<b>16</b>	<b>2</b>	<b>12</b>	<b>27</b>

### CHOICES FOR CORE ELECTIVES

SUB. CODE	SUBJECT	L	T	P	C
<b>ELECTIVE - I</b>					
P18MECH011	<b>Industrial Chemistry</b>	4	2	0	4
P18MECH012	Textile Chemistry	4	2	0	4
P18MECH013	Dairy Chemistry	4	2	0	4
<b>ELECTIVE – II</b>					
P18MECH021	Biological Chemistry	4	2	0	4
P18MECH022	Medicinal Chemistry	4	2	0	4
P18MECH023	<b>Food Chemistry</b>	4	2	0	4
<b>ELECTIVE – III</b>					
P18MECH031	<b>Polymer &amp; Plastics</b>	4	0	0	4
P18MECH032	Spectroscopic techniques	4	0	0	4
P18MECH033	Pharmaceutical chemistry	4	0	0	4

## Open Elective

S.No.	Sub.Code	Subject	Total No.Hours	L	T	P	C
1.	P18OEBA001	Advertising and Sales Management	2	2	0	0	2
2.	P18OEBA002	BPO Management	2	2	0	0	2
3.	P18OEBA003	Call Centre Management – Voice & Non Voice	2	2	0	0	2
4.	P18OEBA004	Customer Relationship Management	2	2	0	0	2
5.	P18OEBA005	Entrepreneurship Development	2	2	0	0	2
6.	P18OEBA006	Advanced Human Resource Management	2	2	0	0	2
7.	P18OEBA007	Logistics & Supply Chain Management	2	2	0	0	2
8.	P18OEBA008	Office Management	2	2	0	0	2
9.	P18OEVC001	Photography & Videography	2	2	0	0	2
10.	P18OEEN001	Soft Skills	2	2	0	0	2
11.	P18OEEN002	Mass Media and Communication	2	2	0	0	2
12.	P18OESC001	Computer Applications	2	2	0	0	2
13.	P18OESC002	Multimedia	2	2	0	0	2
14.	P18OESC003	Advanced Excel	2	2	0	0	2
15.	P18OESC004	Web Designing	2	2	0	0	2
16.	P18OESC005	Photoshop	2	2	0	0	2
17.	P18OESC006	Flash	2	2	0	0	2
18.	P18OESC007	Computer Hardware and Networking	2	2	0	0	2
19.	P18OESC008	Computer Programming	2	2	0	0	2
20.	P18OESC009	Office Automation Tools	2	2	0	0	2
21.	P18OEMI001	Clinical Microbiology	2	2	0	0	2
22.	P18OEMI002	Herbal Medicine	2	2	0	0	2
23.	P18OEPH001	Electrical Technician	2	2	0	0	2

**SEMESTER- I**

<b>P18MCCH101</b>	<b>Core 1: Quantum Chemistry, Group Theory And Electrochemistry</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours - 75					<b>4</b>	<b>2</b>	<b>0</b>	<b>4</b>		
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember about the basic Mathematics and Fundamentals of Quantum Chemistry										
CO2	Understand about the theoretical concepts of Quantum Mechanics of Simple Systems										
CO3	Understand its properties and uses of Quantum Chemistry										
CO4	Apply the detail about the Principles of Group Theory										
CO5	Apply the importance and Applications of Group Theory										
CO6	Analyze real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

Introduction to quantum mechanics - Black body radiation, photoelectric effect, de Broglie equation and its verification, Interpretation of Bohr's first postulate in terms of wave nature of electron, Heisenberg Uncertainty principle; Setting up the Schrödinger equation, operators, algebra of operators, linear operators, setting up operators of linear momentum, angular momentum, kinetic energy and total energy of systems.

**UNIT-IV: Principles of Group Theory** **15**

Introduction - groups, subgroups, classes, Group multiplication table; Molecular symmetry, symmetry elements and operations-products of symmetry operations; classes of symmetry operations and point group classification of molecules. Representations of groups: matrix representation of symmetry operations, reducible and irreducible representations; Statement of Great Orthogonality theorem; character tables and their construction

**UNIT-V: Applications of Group Theory** **15**

Symmetry and chemical bonding: Formulating SALC's with projection operators, formation of hybrid orbitals in molecules like  $\text{BF}_3$ ,  $[\text{PtCl}_4]^{2-}$  and  $\text{CH}_4$ , Molecular orbital theory for  $\text{C}_{2v}$  ( $\text{H}_2\text{O}$  or  $\text{NO}^{2-}$ ) and  $\text{T}_d$  compounds - selection rules for electronic transitions in carbonyl chromophore.

**UNIT-IV: Electrochemistry-I** **15**

Mean ion activity and activity coefficient of electrolytes in solution - ion association - ionic strength - Debye-Hückel theory and Debye-Hückel limiting law - its validity and limitations - strong and weak electrolytes - Debye theory of electrolytic conductance - Debye-Hückel-Onsager equation - verification and limitations - electrochemical cells and applications of standard redox potentials.

**UNIT-V: Electrochemistry-II** **15**

The electrical double layer - polarizable and non-polarizable interfaces - structure of electrical double layer - double layer models - Helmholtz, Guoy-Chapman and Stern models.

Kinetics of electrode processes - current-potential curve - Butler-Volmer relation and its approximations - symmetry factor and transfer coefficient - Tafel equation - charge transfer resistance - Nernst equation from Butler-Volmer equation - primary and secondary batteries - fuel cells - corrosion and its prevention methods.

**Text books**

1. K.V.Raman, Group Theory and its Applications to Chemistry, Tata McGraw-Hill, 1990.
2. A.K.Chandra, Introductory Quantum Chemistry, Tata McGraw-Hill, 2nd Edn.
3. D.R.Crow, Principles and applications of Electro Chemistry, Chapman & Hall.
4. V.Ramakrishnan and M.S.Gopinathan, Group Theory in Chemistry, Vishal, 1988.

**Reference Books**

1. Biophysics, ed., W.Hoppe, W.Lohmann, H.Markl, H.Uiegler, Springer-Verlag, 1983.
2. Quantum Chemistry, McQuarrie A. D., Viva Books, India, First Indian Edition (2003) ISBN-81-7649-423-2.
3. D.R.Crow, Principles and applications of Electro Chemistry, Chapman & Hall.
4. K.J.Laidler, Chemical Kinetics, Tata-McGraw Hill. J. Moore, Physical Chemistry, 5th Edn., Orient Longman.

<b>P18MCCH102</b>	<b>Core 2: Solid State, Bonding And Polymeric Inorganic Compounds</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>					
	Total Contact Hours - 75		<b>4</b>	<b>2</b>	<b>0</b>	<b>4</b>					
	Prerequisite course – B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Mrs. K. Kalpana / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the properties and uses of solid state, bonding and polymeric inorganic compounds										
CO2	Understand about the theoretical concepts of Diffraction Methods										
CO3	Understand properties and uses of Covalent Bonding										
CO4	Apply the detail about the Metallic Bonding										
CO5	Apply the importance of Polymeric Inorganic Compounds										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

Close packing of atoms and ions – HCP and BCC types of packing – voids, radius ratio derivation and its influence on structures. Representative structures of AB and AB<sub>2</sub> types of compounds: rock salt, calcium chloride, wurtzite, zinc blende, rutile, fluorite, antiferite, cadmium iodide and nickel arsenide. Structure of graphite, diamond and spinels - normal and inverse types -perovskite structures.

#### **UNIT – II: Diffraction Methods**

**15**

Crystallographic point groups – space groups – screw axis and glide plane – seven crystal systems and Bravais lattice –Miller indices- interplanar distances in orthogonal crystal systems – X-ray diffraction studies – powder and rotating crystal methods – systematic absences and lattice types – data analysis for cubic system – electron diffraction by gases – principles and measurements – determination of structures – comparison between electron, neutron and X-ray diffractions.

#### **UNIT–III: Covalent Bonding**

**15**

VB approach to bonding -Concept of hybridisation and structure of molecules. VSEPR theory - shapes of molecules. MO approach to covalent bonding – symmetry and overlap of atomic orbitals – symmetry of molecular orbitals – sigma, pi and delta bondings – energy levels in homo and hetero nuclear diatomic systems – bond length, bond order and bond energy – ionic character in a covalent bond. The concept of multicentre bonding. Structure and bonding in fluorine and oxygen compounds of xenon, di- and tri-nuclear clusters of rhenium halides, diborane and tetraborane.

#### **UNIT–IV: Metallic Bonding**

**15**

Drude Lorentz model merits and demerits – Sommerfeld model – Band theory – formation of Brillouin zones – conductors and insulators – semiconductors - Hall effect – photoconductivity - superconductors, Point-, line- and plane defects in solids – Stoichiometric and non-stoichiometric defects – Frenkel and Schottky defects. Effect of imperfections on physical properties like electrical conductivity, thermal, optical and magnetic phenomena.

#### **UNIT–V: Polymeric Inorganic Compounds**

**15**

Isopoly and heteropoly acids – Structure and bonding of 6- and 12 – isopoly and heteropoly anions - Structure of silicates - applications of Pauling's rule of electrovalence –one-, two- and three- dimensional silicates - Synthesis and structure of ring and cage compounds– borazine, phosphazine, carboranes and sulfur-nitrogen compounds.

#### **Text books**

1. R.S.Drago, “Physical Methods in Inorganic Chemistry”, Van Nostrand Reinhold, 2nd Edn. 1968.
2. B.N.Figgis and J.Lewis, “The Magneto Chemistry of Complex Compounds” in “Modern Coordination Chemistry”, Edn Lewis & Wilkins PP-400-454, Interscience
3. A.I.Vogel, “A text book of Quantitative Inorganic Analysis, ELBS, 3rd Edn. 1969.
4. J.E.Huhey, Inorganic Chemistry, Harper and Rao 3rd Edition Edn. 1983.

#### **Reference Books**

1. F.A.Cotton and G.Wilkinson, “A Text book of Advanced Inorganic Chemistry” 3rd Edn. Wiley, 1972.
2. P.J. Wheatley, “Determination of Molecular Structure”, Oxford, 2nd Edn., 1961.
3. B.N.Figgis and J.Lewis, “The Magneto Chemistry of Complex Compounds” in “Modern Coordination Chemistry”, Edn Lewis & Wilkins PP-400-454, Interscience, N.Y. 1967.

Course Coordinator

HOD

<b>P18MCCH10</b> 3	<b>Core 3: Organic Reaction Mechanism And Stereochemistry</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours - 75					<b>4</b>	<b>2</b>	<b>0</b>	<b>4</b>		
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. G. Padmapriya / Chemistry										
<b>COURSE OBJECTIVES:-</b> To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Gain the knowledge about the organic reaction mechanism and stereochemistry										
CO2	Understand about the theoretical concepts of Introduction to stereochemistry										
CO3	Understand its properties and uses of Aliphatic substitution reactions										
CO4	Apply the detail about the Aromatic substitution reactions										
CO5	Apply the importance of Elimination and addition reactions										
CO6	Analyze Create the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT-I: Determination of reaction mechanism****15**

Factors affecting the strength of acids and bases – Bronsted and Lewis concepts of acids and bases - Guidelines to propose a reasonable reaction mechanism – Energy profile, intermediate, transition state – kinetic and thermodynamic control – Hammond postulate – methods of determining reaction mechanism – kinetic methods – primary and secondary kinetic

isotopic effect – non kinetic methods – isotope labeling, crossover experiment, trapping of intermediates, stereochemical studies.

#### **UNIT–II: Introduction to stereochemistry**

**15**

Concepts of chirality – recognition of symmetry elements – necessary and sufficient condition for optical activity – chirality about a center – specification of configuration by Cahn Ingold and Prelog rule – compounds with more than one chiral centre – calculation of number of stereoisomers – *erthyo* and *threo* nomenclature – inter-conversion of sawhorse, Fisher and Newman projections – Concept of axial chirality – R and S nomenclature for axially chiral molecules. Geometrical isomerism – *E* and *Z* nomenclature – determination of configuration of geometrical isomers by physical and chemical methods.

#### **UNIT–III: Aliphatic substitution reactions**

**15**

Distinction between nucleophile and a base – $S_N1$  and  $S_N2$  mechanisms – kinetic and stereochemical features – ion pair mechanism – effects of substrate structure, nature of nucleophile, solvent polarity, leaving group ability on the course of the reactions –  $S_Ni$  reaction – Neighboring group participation – Allylic and vinylic substitution. Mechanism of aliphatic electrophilic substitution reactions –  $S_{E1}$ ,  $S_{E2}$  and  $S_{Ei}$  mechanisms.

#### **UNIT–IV: Aromatic substitution reactions**

**15**

The concept of aromaticity – Huckel's rule and identifying aromaticity in various carbocyclic and charged species – nonaromatic and antiaromatic systems – effects of aromaticity on bond length and resonance energies – ring current effects – chemistry of fullerenes, annulenes and heteroannulenes. Mechanism of aromatic electrophilic substitution reactions – *pi* and *sigma* complexes – nitration, halogenation, sulfonation, Friedel Crafts alkylation and acylation reactions, Reimer Tiemann reaction – orientation and reactivity - partial rate factors.-Aromatic nucleophilic substitution reactions –  $S_{NAr}$ ,  $S_{N1}$  and benzyne mechanisms – Chichibabin reaction - linear free energy relationship – Hammett equation – significance of *sigma* and *rho* – Taft equation.

#### **UNIT–V: Elimination and addition reactions**

**15**

$E1$ ,  $E2$  and  $E1CB$  mechanisms - structure and solvent effects - orientation of double bonds – regio and stereoselectivities – *cis*elimination reactions – competition between elimination and substitution. Regio and stereochemistry of addition of halogens and halogeno acids to carbon carbon multiple bonds – hydroboration – addition to carbonyl bond – Aldol, Perkin, Stobbe, Dieckmann condensations, Reformatsky, Grignard, Mannich reactions – Micheal addition – Formation and applications of enamines – Stork enamine reaction – mechanisms of ester hydrolysis

#### **Text books**

1. J.March, Advanced Organic Chemistry, 4th Edn. John Wiley, New York, 1992.
2. P.Sykes, A Guide book to Mechanisms in Organic Chemistry, 6th Edn., Longmans Scientific and Technical, Essex, 1986.
3. F.S.Gould, Mechanism and Structure in Organic Chemistry, Holt, New York, 1959.
4. T.H.Lowry and K.S.Richardson, Mechanism and theory in Organic Chemistry, Harper and Row, New York, 1976.

#### **Reference Books**

1. T.W.G.Solomons, Organic Chemistry, 6th Edn., John Wiley, New York, 1996.
2. G.W.Loudon, "Organic Chemistry", 3rd edn. Benjamin-Cummings, 1995.
3. F.A.Carey and R.J.Sundberg, Advanced Organic Chemistry, Part A and Part B, 3rd Edn., Plenum press, New York, 1990.

CourseCoordinator

HOD

<b>P18MCCH1L1</b>	<b>Core 4: Organic Chemistry Practical</b>	L	T	P	C						
	Total Contact Hours - 75	0	0	6	3						
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr G. Padmapriya / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO 1	Remember the knowledge about the need of chemistry practical and its toxicity										
CO 2	Understand about the uses of experiments in our day today life										
CO 3	Understand and know about its importance of chemical played important role										
CO 4	Apply the detail about practical importance to be aware of the concepts from the basis.										
CO 5	Apply Evaluate the importance of handling and precision of experimental skills										
CO 6	Analyze Create the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO 7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						L	H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	

					✓					
4	Approval		47 <sup>th</sup> Academic Council Meeting							

### ORGANIC CHEMISTRY PRACTICALS

- a) Organic analysis – Separation of two component mixture and identification of components by chemical and spectral methods – (about 4 – 5 mixtures)
- b) Organic double stage preparation – (about 5 – 6 )
- c) Estimation of ketone, carboxylic acid and glucose
- d) Extraction of natural products such as Caffeine, embelin, atranorin and lecanoric acid

### TEXT BOOKS:

1. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978
2. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
3. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
4. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
5. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
6. N.S. Ganaprasadam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.

### REFERENCE BOOKS:

1. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).
2. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Vogel's Text Book of Quantitative Chemical Analysis. 5th Ed., ELBS/Longman England, 1989.

**CourseCoordinator**

**HOD**

<b>P18MCCH1L2</b>	<b>Core 5: Inorganic Chemistry Practicals</b>		L	T	P	C					
	Total Contact Hours - 75		0	0	6	3					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the need of chemistry practical and its toxicity										
CO2	Understand about the uses of experiments in our day today life										
CO3	Understand know about its importance of chemical played important role										
CO4	Apply the detail about practical importance to be aware of the concepts from the basis.										
CO5	Apply the importance of handling and precision of experimental skills										
CO6	Analyze Create the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						L	H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	<b>Category</b>	<b>Humanities &amp; Social Studies (HS)</b>	<b>Basic Sciences (BS)</b>	<b>Engg Sciences (ES)</b>	<b>Professional Core (PC)</b>	<b>Core Elective (CE)</b>	<b>Non-Major Elective (NE)</b>	<b>Open Elective (OE)</b>	<b>Any other</b>	<b>Project/Term Paper/ Seminar/ Internship (PR)</b>	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

## INORGANIC CHEMISTRY PRACTICALS

Practical – A : Qualitative Analysis

Less common metal ions – Tl, Se, Te, Ce, W, Ti, Zr, Th, V, U, Li (two metal ions in cationic and anionic forms)

Practical – B : Quantitative Analysis

- a) EDTA titrations : Zn(II), Mg(II), Cu(II) and Ni(II)
- b) Redox titrations : Fe(II) vs. Ce(IV) , Fe(II) vs dichromate,  $\text{NO}_2^-$  vs Ce(IV)
- c) Spectrophotometric methods of analysis : Fe(II) , Cu(II) , Mn(II) and Cr(III)

**TEXT BOOKS:**

- 7. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978
- 8. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
- 9. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
- 10. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
- 11. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt.,1996.
- 12. N.S. Ganapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.

**REFERENCE BOOKS:**

- 6. Halpern, A. M. &McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).
- 7. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
- 8. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
- 9. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
- 10. Vogel's Text Book of Quantitative Chemical Analysis. 5th Edi., ELBS/Longman England, 1989.

**CourseCoordinator**

**HOD**

**SEMESTER-II**

<b>P18MCCH201</b>	<b>Core 6: Principles of molecular spectroscopy</b>		L	T	P	C					
	Total Contact Hours - 75		4	1	0	4					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. T. Ezhilarasu / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the Microwave Spectroscopy and Infrared Spectroscopy										
CO2	Understand about the Raman, Electronic and Fluorescence Spectroscopy										
CO3	Understand the properties and uses of Nuclear Magnetic Resonance Spectroscopy-I										
CO4	Apply the detail about the Nuclear Magnetic Resonance Spectroscopy-II										
CO5	Apply the Electron Spin/Paramagnetic Resonance Spectroscopy										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT-I: Introduction, Microwave Spectroscopy and Infrared Spectroscopy 15**

Electromagnetic radiation - interaction of electromagnetic radiation with molecules - types of molecular spectroscopy - factors affecting line width and intensity - signal to noise ratio and resolving power - absorption and emission spectroscopy - Microwave Spectroscopy - Rotation of molecules - rotational spectra of rigid rotator, intensities of rotational lines, effect of isotopic substitution - rotational spectrum of non-rigid rotator - linear & symmetric top molecules - Stark effect - Applications of microwave spectroscopy - determination of bond length, bond angle dipole moment and atomic mass from microwave spectra - Infrared Spectroscopy: vibrating diatomic molecule - harmonic and anharmonic oscillators - diatomic vibrating rotator - vibrations

of polyatomic molecules - molecular vibrations, types of molecular vibrations, rotational vibrational spectra of linear and symmetric top molecules.

**UNIT-II: Raman, Electronic and Fluorescence Spectroscopy** **15**

Raman spectroscopy- classical and quantum theory of Raman effect- rotational Raman spectra- linear, symmetric top molecules-vibrational Raman spectra- Raman activity of vibrations, rule of mutual exclusion, polarizability ellipsoids- rotational Fine structures- Resonance Raman and Laser Raman spectroscopy- Electronic Spectra of diatomic molecules- The Born-Oppenheimer approximation, vibrational coarse structure: progressions, intensity of vibrational-electronic spectra: Franck-Condon principle, dissociation energy and dissociation products, rotational fine structure of electronic-vibration transitions, Fortrat diagram - predissociation. Fluorescence and phosphorescence – Jablonski diagram – Fluorescence spectroscopy – FRET.

**UNIT-III: Nuclear Magnetic Resonance Spectroscopy-I** **15**

Nuclear spin states and NMR active nuclei, nuclear magnetic moments- mechanism of resonance absorption- population of nuclear spin states, proton NMR- interaction of spin magnetic moment of a proton with external magnetic moment, chemical shift and shielding. nuclear spins in a magnetic field - Zeeman effect -Larmor precession -resonance phenomenon - Bloch equations -spin - lattice and spin-spin relaxation times -nuclear shielding and chemical shift -spin-spin coupling – basic principles of FT NMR -inversion recovery and CPMG sequenced for  $T_1$  and  $T_2$  measurements.

**UNIT-IV: Nuclear Magnetic Resonance Spectroscopy-II** **15**

Analysis of complex NMR spectra -chemical equivalence, chemical environment, spin-spin splitting, coupling constant, geminal, vicinal, long-range, trans, aromatic, allylic coupling, factors influencing coupling constant, splitting of nmr signals- AB, AX and AMX types - Overhauser effect - NMR of paramagnetic compounds -relaxation by paramagnetic ions in solution - INDOR, CIDNP - 2 Dimensional NMR - Pulse sequences - NMR in solids -magic angle spinning -chemical shift anisotropy - NMR Imaging - MRI.

**UNIT-V: Electron Spin/Paramagnetic Resonance Spectroscopy** **15**

Electron spin - Electronic Zeeman effect – Presentation of the spectrum-EPR spectrum of hydrogen atom (first order treatment) - g factors - Hyperfine splitting: nuclear spin ( $I = 1/2, 1, 3/2, 5/2$ ) interaction with electron spin - hyperfine coupling constants - EPR spectra of organic radicals (AA and AB type) - EPR spectra of heteronuclear compounds - McConnell's relation – Introduction to multi-electron systems: zero field splitting – multi-electron systems-Kramer's degeneracy - Applications of EPR spectra for inorganic compounds - anisotropy in the hyperfine coupling constant - EPR instrumentation.

**TEXT BOOKS:**

1. C.N. Banwell and E.N. McCash – Fundamentals of Molecular spectroscopy, 5 th Edition, Tata McGraw Hill, New Delhi, 2006.
2. G.M. Barrow, Introduction to Molecular Spectroscopy, McGraw Hill, New York, 2007.
3. P.S. Kalsi, Spectroscopy of Organic Compounds, Wiley Eastern Ltd. Madras, 1995.
4. Joseph Lambert, Scott Gronert, Herbert Shurvell, David Lightner, Robert Graham Cooks, Organic Structural Spectroscopy: Pearson New International Edition, 2 nd Edition, 2013.

**REFERENCE BOOKS:**

1. W. Kemp Organic Spectroscopy, ELBS, 2nd Edn., 1987.
1. John R. Dyer, Applications of absorption spectroscopy of Organic Compounds, Prentice Hall, London, 1987.
2. Robert M Silverstein, Francis Webster, Kiemle, Bryce. Spectrometric identification of organic compounds, 8 th Ed., Wiley. 2014.
3. Y.R.Sharma, Elementary Organic Absorption Spectroscopy, Chand & Co, 1986.

4. Donald L.Pavia, Gary M.L.Lampman, George S. Kriz, James R. Vyvyan, Spectroscopy, Cengage Learning India Private Ltd., 2007

Course Coordinator

HOD

<b>P18MCCH202</b>	<b>Core 7: Coordination Chemistry And Bio-Inorganic Chemistry</b>					L	T	P	C		
	Total Contact Hours - 75					4	1	0	4		
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the Chemistry of Coordination Compounds										
CO2	Understand about the Inorganic Reaction Mechanisms										
CO3	Understand the properties and uses of Organometallics										
CO4	Apply the detail about the Pi-acceptor Complexes										
CO5	Apply the importance of co-ordination and bio-inorganic compounds										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT-I: Chemistry of Coordination Compounds

15

Werner's coordination theory-Isomerism in coordination compounds – types of ligands and chelate effect – stability constant determination. VB theory and CFT - Splitting of d-orbitals under different geometries – CFSE – evidence for CFSE – structure of spinels – factors affecting CFSE – spectrochemical series – Jahn-Teller distortion – M.O. theory of bonding – sigma and  $\pi$ -bonding in coordination compounds.

**UNIT-II: Inorganic Reaction Mechanisms****15**

Electron transfer reactions: Outer-sphere and inner sphere electron transfer reactions – The Marcus theory – non-complementary reactions – synthesis of coordination compounds by electron transfer reactions.

Substitution reactions : substitution reactions of square planar complexes of Pt(II) and other  $d^8$  metal complexes – significance of trans-effect – substitution reactions of octahedral complexes – acid and base hydrolysis reactions – anation reactions – synthesis of coordination compounds by substitution reactions.

Molecular rearrangements and reactions of coordinated ligands – the template effect and macrocyclic ligands.

**UNIT-III: Organometallics****15**

Metal alkyl and aryls – 18 electron rule – olefin and acetylene complexes – Zeise's salt – Dewar-Chatt approach to bonding in ethylene and acetylene complexes – cyclopentadiene, benzene and cyclobutadiene complexes of transition metals – their preparations, bonding and reactions. Homogeneous catalysis involving organometallics: oxidative addition and reductive elimination reactions – hydrogenation, isomerization and hydroformylation of olefins – carbonylation of methanol, oxidation of olefins (Wacker's process) - heterogeneous catalysis – Ziegler-Natta catalysis.

**UNIT-IV: Pi-acceptor Complexes****15**

Synthesis, structure and bonding of mono nuclear and poly-nuclear carbonyls – nitrosyl complexes – dinitrogen complexes – metal carbonylato complexes, carbonyl hydrides and complex metal cyanides.

**UNIT-V: Bioinorganic Chemistry****15**

Metalloporphyrins – chlorophyll, hemoglobin and myoglobin – structure and function of hemoglobincytochromes. Metalloenzymes, enzyme action inhibition and restoration – carboxypeptidase-A and carbonic anhydrase – Vitamin  $B_{12}$  and  $B_{12}$  coenzymes. Metalloproteins – non-heme iron proteins – rubredoxin and ferredoxin – copper proteins and their classification – nitrogenases, their structure and function. Metal ions in biology – sodium ion pump – metal poisons and chelating agents in medicine

**TEXT BOOKS:**

1. F.A.Cotton and G.Wilkinson, "A Text book of Advanced Inorganic Chemistry" 3rd Edn. Wiley, 1972.
2. R.C.Evans, "An Introduction to Crystal Chemistry"
3. J.C.BalorEdts. "Comprehensive Inorganic Chemistry, Vol. IV & V, Academic Press, 1979.
4. P.J. Wheatley, "Determination of Molecular Structure", Oxford, 2nd Edn., 1961

**REFERENCE BOOKS:**

1. T.C.Wadington, "Non-aqueous Solvents," Nelson, 1969.
2. K.F.Purcell and J.C.Kotz, "Inorganic Chemistry, Holt Saunders, 1977.
3. A.I.Vogel, "A text book of Quantitative Inorganic Analysis, ELBS, 3rd Edn. 1969.
4. J.E.Huhey, Inorganic Chemistry, Haarper and Rao 3rd Edition Edn. 1983

**Course Coordinator****HOD**

<b>P18MCCH203</b>	<b>Core 8: Conformational Analysis, Reagents And Organic Synthesis</b>					L	T	P	C		
	Total Contact Hours - 75					4	1	0	4		
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. G. Gurumoorthy / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the Conformational analysis										
CO2	Understand about the Dynamic stereochemistry										
CO3	Understand the properties and uses of Reagents in organic synthesis										
CO4	Apply the detail about the Molecular rearrangements										
CO5	Apply the importance of Organic Synthesis										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT-I: Conformational analysis

15

Restricted rotation in C-C bonds – conformation of n-butane – conformational isomers – conformational free energy – population of conformers – influence of dipole dipole repulsion, van der Waals forces – intramolecular hydrogen bonding on the stability of conformers. Cyclohexanes – stability and isomerism in mono and di substituted cyclohexanes – flexible forms – A<sup>1,2</sup> strain and A<sup>1,3</sup> strain – conformation of cyclohexanone and 2-halocyclohexanones –

alkyl ketone effects – anomeric effect. Conformation of decalin, perhydrophenanthrene and perhydroanthracene.

#### **UNIT–II: Dynamic stereochemistry**

**15**

Conformation and reactivity in acyclic systems – steric and stereoelectronic effects – *cis* elimination, E2 elimination, intramolecular rearrangements – neighbouring group participation. Cyclohexyl systems - esterification – oxidation - Substitution reaction - E2 elimination - intramolecular rearrangements – neighbouring group participation – formation and cleavage of epoxide. Reactivity in decalyl systems- reactions of enols and enolates.

#### **UNIT–III: Reagents in organic synthesis**

**15**

Use of the following reagents in organic synthesis: Complex metal hydrides, Gilman's reagent, Lithium diisopropylamide, dicyclohexylcarbodiimide, trimethylsilyl iodide, tri-*n*-butyltin hydride, Osmium tetroxide, DDQ, Merrifield resin, Wilkinson's catalyst and Baker's yeast. Woodward Prevost hydroxylation, Peterson synthesis, Collins reagent, Samarium iodide, NBS, Olah reagent, AIBN, CAN, Raney Ni, Sharpless asymmetric epoxidation – 1,3-dithiane.

#### **UNIT–IV: Molecular rearrangements**

**15**

Migratory aptitudes – nucleophilic, electrophilic and free radical rearrangements – intermolecular and intramolecular rearrangements – Wagner Meerwein, pinacol-pinacolone, benzil-benzilic acid, Schmidt, Hoffmann, Lossen, Curtius, Fries, Beckmann, Faavorski, Stevens, Neber rearrangements

#### **UNIT–V: Organic Synthesis**

**15**

Importance of synthesis – carbon-carbon bond making reactions – functional group modifications – retrosynthetic analysis – synthons and synthetic equivalents – nucleophilic, electrophilic, electroneutral and free radical synthons – retron, partial retron and super retron - Chiron – umpolung – protection and deprotection – product, chemo, regio and stereoselectivities. One and two group disconnections – Diels Alder reactions – Robinson annulation method – 1,2- 1,3- 1,4- 1,5- and 1,6- difunctional compounds.

#### **TEXT BOOKS:**

1. P.S.Kalsi, Spectroscopy of Organic Compounds, 3rd Edn., New Age International, New Delhi, 1998.
2. W.Kemp Organic Spectroscopy, ELBS, 2nd Edn., 1987.
3. Y.R.Sharma, Elementary Organic Absorption Spectroscopy, Chand & Co, 1986
4. J.D.Roberts and M.C.Casario, "Basic Principles of Organic (Polymer) Chemistry", 2nd Edn., Benjamin, New York, 1977.
5. R.T.Morrison and B.N.Boyd, "Organic Chemistry", 6th Edn., Prantice-Hall of India, New Delhi, 1975.

#### **REFERENCE BOOKS:**

1. C.H.Depuy and D.L.Chapman, Molecular Reactions and Photochemistry, Prentice Hall, 1975
2. T.L.Gilchrist and R.C.Storr, Organic Reactions and Orbital Symmetry, 2nd Edn., Cambridge, 1972.
3. R.E.Lehr and A.P.Marchand, Orbital Symmetry, A problem solving approach, Academic Press, New York, 1972.
4. A.L.Bellamy, An introduction to conservation of orbital symmetry, Longmann,

Course Coordinator

HOD

<b>U18MCCH204</b>	<b>CORE- 9 - GREEN CHEMISTRY</b>		L	T	P	C					
	Total Contact Hours - 75		4	1	0	4					
	Prerequisite – B.Sc Chemistry level										
	Course Coordinator Name & Department:- – D.G. Padmapriya / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the properties and uses of chemistry in our life										
CO2	Understand about the theoretical concepts of Agricultural purposes										
CO3	Understand the properties and uses of Energy sources										
CO4	Apply the detail about the gaseous state, postulates and importance of Renewable sources										
CO5	Apply the importance of Industrial case studies										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT I: Principles & Concept of Green Chemistry****15**

Introduction –Concept and Principles-development of Green Chemistry- Atom economy reactions –rearrangement reactions , addition reactions- atom uneconomic-sublimation elimination-Wittig reactions-toxicity measures- Need of Green Chemistry in our day to day life.

**UNIT II: Measuring and Controlling Environmental Performance****15**

Importance of measurement – lactic acid production-safer Gasoline – introduction to life cycle assessment-four stages of Life Cycle Assessment (LCA) –Carbon foot printing-green process Matrics-eco labels -Integrated Pollution and Prevention and Control(IPPC)-REACH (Registration, Evaluation, Authorization of Chemicals).

**UNIT III: Emerging Green Technology and Alternative Energy Sources 15**

Design for Energy efficiency-Photochemical reactions- Advantages-Challenge faced by photochemical process. Microwave technology on Chemistry- Microwave heating –Microwave assisted reactions- Sono chemistry and Green Chemistry –Electrochemical Synthesis-Examples of Electrochemical synthesis.

**UNIT IV: Renewable Resources 15**

Biomass –Renewable energy – Fossil fuels-Energy from Biomass-Solar Power- Other forms of renewable energy-Fuel Cells-Alternative economics-Syngas economy- hydrogen economy-Bio refinery chemicals from fatty acids-Polymer from Renewable Resources –Some other natural chemical resources.

**UNIT V: Industrial Case Studies 15**

Methyl Methacrylate (MMA)-Greening of Acetic acid manufacture-Vitamin C-Leather manufacture –Types of Leather –Difference between Hide and Skin-Tanning –Reverse tanning – Vegetable tanning –Chrome tanning-Fat liquoring –Dyeing –Application-Polyethylene- Ziegler Natta Catalysis-Metallocene Catalysis-Eco friendly Pesticides-Insecticides.

**TEXT BOOKS:**

1. Mike Lancaster, Green Chemistry and Introductory text, II Edition.
2. P.T. Anastas and J.C Warner, Green Chemistry theory and Practice, Oxford University press, Oxford (1988).
3. P. Tundo et. al., Green Chemistry, Wiley –Blackwell, London (2007).

**REFERENCE BOOKS:**

1. T.E Graedel, Streamlined Life cycle Assessment, Prentice Hall, New Jersey (1998).
2. V.K. Ahluwalia, Methods and Reagents of Green Chemistry: An Introduction by Green Chemistry.
3. Protti D.Dondi et.al., Green Chemistry.

**Course Coordinator**

**HOD**

<b>P18MCCH2L1</b>	<b>Core 10: Practical – III - Physical Chemistry Practical</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>					
	Total Contact Hours - 75		<b>0</b>	<b>0</b>	<b>6</b>	<b>3</b>					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. M. Kumar / Chemistry										
<b>COURSE OBJECTIVES:-</b> To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the need of chemistry practical and its toxicity										
CO2	Understand about the uses of experiments in our day today life										
CO3	Understand and know about its importance of chemical played important role										
CO4	Apply the detail about practical importance to be aware of the concepts from the basis.										
CO5	Apply the importance of handling and precision of experimental skills										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						L	H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### 1. General Experiments:

- 1.1 Kinetics of acid-catalysed hydrolysis of an ester
- 1.2 Determination of partition coefficient of I<sub>2</sub> between CCl<sub>4</sub> and H<sub>2</sub>O, formation constant of the KI<sub>3</sub> complex, and determination of unknown KI concentration
- 1.3 Study of adsorption isotherms and determination of unknown concentration

### 2. Electrochemistry Experiments:

### **Conductometry Experiments**

- 2.1 Measurement of conductivity and interpretation
- 2.2 Conductometric Titrations
- 2.3 Determination of dissociation constant of a weak acid
- 2.4 Determination of solubility product of a sparingly soluble salt

### **Potentiometry Experiments**

- 2.5 Potentiometric titrations
  - 2.6 Determination of pH of a buffer
  - 2.7 Determination of solubility product and pKa
3. Phase diagram - three component system
  4. Selected spectrophotometric and spectrofluorometric experiments.

### **TEXT BOOKS:**

1. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978
2. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
3. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
4. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
5. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
6. N.S. Ganapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.

### **REFERENCE BOOKS:**

1. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).
2. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Vogel's Text Book of Quantitative Chemical Analysis. 5th Ed., ELBS/Longman England, 1989.

**Course Coordinator**

**HOD**

**ELECTIVE PAPERS I**

<b>P18MECH011</b>	<b>ELECTIVE – 1 – INDUSTRIAL CHEMISTRY</b>		L	T	P	C					
	Total Contact Hours - 75		4	0	0	4					
	Prerequisite – B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Mrs. S. Vinitha / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the generation of energy from various types of fuels.										
CO2	Understand about the chemicals in improvement of agricultural crops										
CO3	Understand its employed for purification of water for industry and home										
CO4	Apply the detail about the Pollution occurring from various sources and resulting toxic effects										
CO5	Apply the concepts involved in the pollutant technology										
CO6	Analyze Create the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO 1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT-1: INDUSTRIAL FUELS**

**15**

**Energy:** Sources: non-renewable, classification of fuels: solid, liquid and gaseous. Calorific value of fuels and its determination - **Solid fuels:** Coal: types – properties and uses – lignite, sub-bituminous coal, bituminous coal and anthracite. Coking and non-coking coal - **Liquid fuels:** Refining of crude petroleum and uses of fractions. Hydrodesulphurisation. Cracking: thermal and catalytic (fixed bed and fluidised bed catalysis). Octane number. Production

and uses of tetraethyl lead, ETBE and MTBE - **Gaseous fuels:** Natural gas and gobar gas: production, composition and uses., Gobar electric cell.

## **UNIT-2: CHEMISTRY AND AGRICULTURE**

**15**

**Fertilizers:** NPK, representation, superphosphate, triple superphosphate, uses of mixed fertilizers - Micronutrients and their role, biofertilizers, plant growth hormones – **Pesticides:**

Classification of pesticides with examples - Insecticides; stomach poisons, contact insecticides, fumigants. Manufacture and uses of insecticides. DDT, BHC (gamma-hexachlorocyclohexane: Conformation of gamma isomer) pyrethrin - Mention of aldrin, dieldrin, endrin and pentachlorophenol (and its Na salts) and Biopesticides - Herbicides: Manufacture of 2,4-D and 2,4,5-T - Fungicides: Preparation of Bordeaux mixture. Mention of lime-sulphur, creosote oil and formula - **Sugar industry:** Double sulphitation process. Refining and grading of sugar. Saccharin: synthesis and use as a sugar substitute - aspartame. Ethanol: manufacture from molasses by fermentation.

## **UNIT-3: WATER TREATMENT**

**15**

**Introduction:** Sources of water. Hardness of water-temporary or carbonate hardness, permanent hardness or non-carbonate hardness. Units of hardness, disadvantages of hard water – In domestic, in industry and in steam generation in boilers. Effect of iron and manganese in water - Estimation of hardness – EDTA method – Estimation of total hardness – O. Hehner's method or alkali titration method - **Water softening methods:** Industrial purpose Lime – soda process, Zeolite process; Ion-exchange - Demineralisation – deionization process. Mixed – bed deionization - Domestic purpose - Removal of suspended impurities. Removal of microorganism – Chlorination – Break point chlorination. Reverse osmosis. Desalination - Waste water treatment

## **UNIT-4: POLLUTION AND CHEMICAL TOXICOLOGY**

**15**

**Pollution:** Air pollution - Acid rain. Green house effect (global warming), ozone layer depletion - photochemical oxidants. Control of air pollution. Water pollution – organic pollutants, Chemical oxygen demand (COD), Biological oxygen demand (BOD), total organic carbon. International standards for water and air quality and regulations - **Chemical toxicology:** Effect of toxic chemicals on enzymes. Lead, mercury and cyanide pollution and their biochemical effects. Carbon monoxide, sulfur dioxide, oxides of nitrogen, ozone – biochemical effects - **Quality control:** ISI specification. Patent: Purpose and procedures.

## **UNIT-5: SEMINAR TOPICS**

**15**

Glass, Cement, Dyes, Paints, Special paints, Lubricants and greases, Refractories, Abrasives, Plastics, Perfumes and flavoring industries, Fermentation industries, Explosives, Pulp and paper industries, Rubber industries, Pharmaceutical industries, Food and food products industries, Photographic product industries, Ceramic industries, Petrochemicals.

### **TEXT BOOKS:**

1. Norris Shreve, R. and Joseph a. Brink, Jr. Chemical Process Industries, 4th Ed.; Mc Graw Hill Kogakusha, Ltd: 1977.
2. Subbarao, n. S. Biofertilizers in Agriculture; Oxford and IBH Publishing Co.: New Delhi, 1982.
3. Jain, P. C. And Jain, M. Engineering Chemistry, 10th Ed.; Dhanpat Rai And Sons: Delhi, 1993

### **REFERENCE BOOKS**

1. Kamaraj, p.; Jeyalakshmi, R. And Narayanan, V. Chemistry in Engineering and Technology; Sudhandhira Publications: Chennai, 2001.

2. Kuriakose, j. C. And rajaram, j. Chemistry in Engineering and Technology. Vol 2.; Tata Mc Graw Hill: New Delhi, 1988.

Course Coordinator		HOD									
<b>P18MECH012</b>	<b>ELECTIVE – 1 – Textile Chemistry</b>	L	T	P	C						
	Total Contact Hours - 75	4	0	0	4						
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. G. Padmapriya / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the concepts of Flavanoids and carbohydrates										
CO2	Understand about the theoretical concepts Terpenoids and alkaloids										
CO3	Understand its properties and uses of concepts Steroids										
CO4	Apply the detail about the concepts Antibiotics, vitamins and prostaglandins										
CO5	Apply the concepts Aminoacids, proteins and nucleic acids										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT I:

1. Fibre theory –polymers and polymerization-Morphology of fibres – Molecular arrangements in fibres.
2. General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a)natural cellulosic fibres (cotton and jute) (b) natural protein fibre (wool and silk).

### UNIT II:

Chemical structure, production, properties and uses of the following synthetic fibres. (i) Man made cellulosic fibres (Rayon, modified cellulosic fibres) (ii) Man made protein fibres (Azions) (iii) Poly amide fibres (different types of nylons) (iv) Poly ester fibres (v) Acrylic fibres and (vi) Olefin fibres.

**UNIT III:**

Impurities in raw cotton and grey cloth, wool and silk- general principles of the removal – Scouring – bleaching – Desizing – Kierboiling- Chemicking –Chemical and machinery use- Degumming and Bleaching of silk Scouring and Bleaching of wool.

**UNIT IV:**

Dyeing – Classification of dyes and their properties- applications – direct, basic, sulphur and azoic dyes on cotton. Application of Vat and solubilised vat dyes on cotton and viscose. Mordant mineral colours and black.Application of vegetable and other colour to cotton.

**UNIT V:**

Dyeing of wool and silk –Fastnerss properties of dyed materials – dyeing of nylon, terylene and other synthetics - Finishes given to fabrics- Mechanical finishes on cotton, wool and silk, method used process of mercerizing –Anti-crease and Anti-shrink finishes – Water proofing.

**TEXT BOOKS:**

1. Chemical Technology of fibrous Materials – F.sadov, M.Horchagin and A.Matetshy, Mir Publishers.
2. The Identification of Textile Fibres – Bruno Nuntak.

**REFERENCE BOOKS:**

3. Introduction to Textile Science -3rd edition, MaryoryL.Joseph. B.Sc. Chemistry (Colleges) 2007-08 revised Page 34 of 57

**Course Coordinator**

**HOD**

<b>P18MECH013</b>	<b>ELECTIVE – 1 – Dairy Chemistry</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours - 75						<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>		
	Prerequisite B.Sc., Chemistry level											
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry											
<b>COURSE OBJECTIVES:-</b> To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.												
<b>COURSE OUTCOMES (COs)</b>												
CO1	Remember the knowledge about the concepts of Flavanoids and carbohydrates											
CO2	Understand about the concepts Terpenoids and alkaloids											
CO3	Understand its properties and uses of Steroids											
CO4	Apply the detail about the Antibiotics, vitamins and prostaglandins											
CO5	Apply the importance of Aminoacids, proteins and nucleic acids											
CO6	Analyze the real time applications of Chemistry in day today life.											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low												
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	
2	CO1	H	L						H			
	CO2	H	L									
	CO3	H	L									
	CO4	H	L									
	CO5	H	L									
	CO6	H	L									
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)		
					✓							
4	Approval	47 <sup>th</sup> Academic Council Meeting										

### UNIT I:

15

Milk: Definition-General composition of milk-physical properties of milk- colour, odour, acidity-natural and developed, specific gravity-Recknagel effect viscosity and conductivity, factors affecting the gross competition of milk, physico-Chemical change taking place in milk due to processing parameters-boiling pasteurization- sterilization and homogenization.

Adulterants, preservatives and neutralizers-example and their detection.Estimation of fat, specific gravity, acidity and total solids in milk.

**UNIT II:**

**15**

Milk lipids-terminology and definitions classification – saponifiable (triglycerides) and unsaponifiable matters (sterols and cholesterol) phospholipids-structure and properties (Lecithin and Cephalin) Milk fat constants-refractive index-saponification number, Iodine number, R.M.number, R.M number and polenske number - Milk proteins-Chemistry of proteins in general structure-N-terminal and Cterminal, hydrogen bond, disulphide bond and salt linkages, outlines of primary, secondary and tertiary structure of proteins. Physical properties of milk proteins-Electrical properties and hydration, solubility.Reaction of milk properties with formaldehyde and ninhydrin. Non-protein nitrogen constituents of milk, effect of heat on milk protein, milk enzyme and functions - Milk carbohydrate-Lactose-Its structure, solubility, hydrolysis, Oxidation and reduction, Estimation of lactose in milk - Milk vitamins-water and soluble vitamins, effect of heat and light on vitamins - Ash and mineral matters in milk.

**UNIT III :**

**15**

**Creams:** Definition-composition-chemistry of creaming process-gravitational and centrifugal methods of separation of cream-Factors influencing cream separation (Mention the factors only)-Cream neutralization. Estimation of fat in cream.**Butter:** Definition-% composition-manufacture-Estimation of fat, acidity, salt and moisture content-Desi butter.**Ghee:** Major constituents-common adulterants added to ghee and their detection-rancidity-definition-types (hydrolytic, oxidative and ketonic) prevention-antioxidants and synergists (natural and synthetic)-Measurements.

**UNIT IV :Fermented milk products:**

**15**

Fermentation of milk-definition, conditions, cultured milk-definition of culture-examples, conditions, types-cultured cream-cultured butter milk-Bulgarius milk-acidophilus milk-yogurt. Bacteriophage-definition and its function.**Indigenous products:** Definition percentage composition-preparation-physicochemical changes take place during khoa-making-khoa sweet-Gulabjamun, chana sweet-Rossogolla-ingredients and preparation.**Ice cream:** Definition-percentage composition-types-ingredientsneededmanufacture of ice-cream stabilizers-emulsifiers and their role.

**UNIT V : Milk powder:**

**15**

Definition-need for making powder-drying process-spray drying, drum drying, jet drying and foam drying-principles involved in each. Manufacture of whole milk powder by spray drying process-keeping quality of milk powder.**Dairy Detergents:** Definition-characteristics-classification-washing procedure (modern method) sterilization-chloramin-T and hypochlorite solution.

**TEXT BOOKS:**

1. Outlines of Dairy Technology-Sukumar De
2. Principles of Dairy Chemistry-Robert Jenness&S.Patarn.
3. Indian Dairy products-K.S. Rangappa and K.T. Achaya.

**REFERENCE BOOKS**

4. Modern Dairy Products-L.M. Lampert.
5. Principles of Dairy processing-Warner.

**Course Coordinator**

**HOD**

**SEMESTER- III**

<b>P18MCCH301</b>	<b>Core 11: Chemical Thermodynamics, Equilibria And Quantum Mechanics</b>		L	T	P	C					
	Total Contact Hours - 75		4	1	0	4					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. K. Kannan / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember about the basic concept of Equilibrium Thermodynamics and Non-equilibrium Thermodynamics										
CO2	Understand about the Statistical Thermodynamics										
CO3	Understand its properties and uses of Chemical and Phase Equilibria										
CO4	Apply the detail about the Quantum Mechanics of Simple Systems										
CO5	Apply the importance of Applications of Quantum Chemistry										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT-I: Equilibrium Thermodynamics and Non-equilibrium Thermodynamics 15**

General review of enthalpy, entropy and free energy concepts - second law of thermodynamics - concept of entropy - Gibbs function- Gibbs- Helmholtz equation- Maxwell relations - genesis of third law and its limitations-thermodynamics of systems of variable compositions-partial molar quantities and their determination - chemical potential - Gibbs-Duhem equation - Gibbs-Duhem-

Margules equation - fugacity and its determination - choice of state - Non-equilibrium thermodynamics - conservation of mass and energy-entropy production - entropy production in chemical reactions-entropy production and entropy flow in open systems - Onsager's theory - validity and its verification - non-equilibrium states -irreversible thermodynamics of biological systems.

#### **UNIT-II: Statistical Thermodynamics**

**15**

Combinatory rule - probability theorem - permutations and combinations - concept of ensembles energy states and energy levels - macro-states and micro-states - Maxwell-Boltzmann statistics - thermodynamic probability, Sterling's approximation, Lagrange's undetermined multiplier, distribution functions - Partition function and thermodynamic functions- molar partition function- entropy and third law - separation of partition function- translational, rotational, vibrational and electronic partition functions, combined partition function- equilibrium constant and partition function. Quantum statistics - Bose-Einstein and Fermi-Dirac statistics - photon gas -degeneracy and Bose Einstein condensation, application to liquid He - negative Kelvin temperature.

#### **UNIT-III: Chemical and Phase Equilibria**

**15**

Reaction free energy/ reaction potential - reaction isotherm and direction of spontaneity - Standard reaction free energy - its calculation from thermochemical, electrochemical and equilibrium data - Temperature coefficient of reaction free energy and equilibrium constant. Gibbs phase rule - its thermodynamic derivation - application of phase rule to three component systems - Formation of one pair, two pairs and three pairs of partially miscible liquids - Systems composed of two solids and a liquid - Common ion effect – Salting out.

#### **UNIT-IV: Quantum Mechanics of Simple Systems**

**15**

Writing the Hamiltonian for H and He atoms- eigen functions and eigen values, proving that linear momentum and angular momentum operators are linear, Hermitian operator and its properties, commutator theorem and its converse, Expansion theorem; Postulates of quantum mechanics. The Schrödinger wave equation- particles in 1D and 3D boxes, harmonic oscillator, rigid rotator, Hydrogen atom, Hydrogen orbital - Time dependent Schrödinger wave equation- Approximation methods - Perturbation Theory (first order and non-degenerate), The Variation method, linear variation principle, Helium - Hartree-Fock self-consistent field method.

#### **UNIT-V: Applications of Quantum Chemistry**

**15**

Chemical bonding- VB & MO theory as applied to  $H_2^+$ , Conjugated hydrocarbons and Aromatic hydrocarbons, Huckel MO theory - Molecular Spectroscopy and quantum mechanics- Born Oppenheimer approximation, Schrodinger equation for rotational, vibrational and electronic components and their selection rules.

#### **TEXT BOOKS:**

1. P.W. Atkins, Physical Chemistry, 5th Edn., Oxford, International Student Edition, 1994.
2. Fermi, Enrico (1956). Thermodynamics (New ed.). Dover Publications.
3. Glasstone S. and Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co Ltd.

#### **REFERENCE BOOKS:**

1. Van Ness, H. C. (1983). Understanding Thermodynamics. Dover Publication.
2. Callen, Herbert (1985). Thermodynamics and an Introduction to Themostatistics (2nd ed.). New York: John Wiley & Sons.
3. Rajaram J. and Kuriacose, J.C. (1986) Thermodynamics for students of Chemistry, New Delhi: Lal Nagin Chand.

4. Puri B.R., Sharma L.R. and Pathania M.S. (2013), Principles of Physical Chemistry, (35 th edition), New Delhi: Shoban Lal Nagin Chand and Co. Ltd.

**Course Coordinator**

**HOD**

<b>P18MCCH302</b>		<b>Core 12: ANALYTICAL CHEMISTRY</b>				L	T	P	C		
		Total Contact Hours - 75		4	1	0	4				
Prerequisite B.Sc., Chemistry level											
Course Coordinator Name & Department:- – Dr. G. Padmapriya / Chemistry											
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the Errors in Chemical Analysis										
CO2	Understand about the Spectral and Thermal techniques										
CO3	Understand its properties and uses of Chromatographic techniques and Mass spectrometry										
CO4	Apply the detail about the Electro analytical techniques										
CO5	Apply the importance of Advanced Chemical Analysis										
CO6	Analyze the real time applications of Polymeric Inorganic Compounds										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	Academic Council Meeting									

**UNIT-I: Errors in Chemical Analysis**

**15**

Systematic and random errors- Distribution of experimental results. Statistical treatment- standard deviation, variance, confidence limits, application of statistics to data treatment and evaluation, student-t and f tests, detection of gross errors, rejection of a result-Q test, estimation of detection limits. Least square method, correlation coefficient and its determination.

**UNIT-II: Spectral and Thermal techniques**

**15**

Instrumentation of UV-Vis, AAS, AES and spectrofluorimetry. Types of optical instruments, components of optical instruments-sources, monochromators, detectors- samplepreparations-applications in quantitative analyses. IR spectrometry: instrumentation designs-various types of sources, monochromators, sample cell considerations, different methods of sample preparations, FTIR instruments Principles, instrumentation and applications of Thermogravimetry (TG), Differential Thermal Analysis (DTA) and Differential Scanning Calorimetry (DSC).

**UNIT – III: Chromatographic techniques and Mass spectrometry 15**

Principles of chromatography: TLC, column. Principles and Instrumentation of HPLC, GC, GC-MS Mass spectrometry: basic principles – molecular ion peak – parent peak – fragments –meta stable ion – isotope peaks – determination of molecular weight and molecular formula – fragmentation pattern of simple organic molecules – McLafferty rearrangement – retro Diels Alder reaction.

**UNIT–IV: Electroanalytical techniques 15**

Instrumentation - different types of electrodes - two electrode and three electrode cell setup, importance of supporting electrolyte, mass transport processes - General classification of electro analytical techniques. Potentiometry - ion selective electrodes and measurement of open circuit potential. Coulometry- Controlled potential coulometry, constant current coulometry, Determination of number of transferred electrons and methods for determination of the thickness of electrodeposits. Voltammetry techniques – Polarography - Cyclic voltammetry – Pulse techniques (Normal pulse, Differential pulse and square wave)-stripping voltammetry: Anodic, cathodic and adsorptive. Chronopotentiometry and chronoamperometry.

**UNIT–V: Advanced Chemical Analysis 15**

Principle, instrumentation and applications of PES (UPS and XPS), Aüger electron spectroscopy, Electron microscopy (SEM and TEM), EDAX and SPM (STM and AFM).

**TEXT BOOK:**

1. Introduction to Instrumental Analysis by R. D. Broun, Mc Graw Hill (1987)
2. Instrumental methods of chemical analysis by H. willard, L.Meritt, J.A. Dean and F.A. settle. Sixth edition CBS (1986)
3. Fundamentals of Analytical Chemistry, 6th edition, D.A. Skoog, D.M. West and F.J. Holler, Saunders college publishing. 8
4. Principles of Instrumental Analysis, Skkog, Holler, Nieman, (Sixth Ed.)

**REFERENCE BOOKS:**

1. Vogel's Textbook of Quantitative analysis 6th Ed.
2. Preparative chromatography Chrome Ed. book series, Raymond P. W. Scott (free e book available on internet)
3. Extraction technique in analytical science, John R. Dean, Wiley (2009)
4. Practical HPLC method Development, Snyder, Kirkiand, Glajch, Wiley India Pvt. Ltd.

**Course Coordinator**

**HOD**

<b>P18MCCH303</b>	<b>Core 13: Applications of Spectroscopy And Magnetism</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours - 75					4	1	0	4		
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. T. Ezhilarasu / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the UV-vis spectra of metal complexes and organic compounds										
CO2	Understand about the theoretical concepts of IR and Raman spectroscopy										
CO3	Understand the properties and uses of NMR spectroscopy										
CO4	Apply the detail about the Mossbauer and NQR spectroscopy										
CO5	Apply the importance of Magnetism										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	Academic Council Meeting									

### UNIT-I: UV-vis spectra of metal complexes and organic compounds 15

Term symbols for atoms and ions – splitting of orbitals and terms in crystal fields – characteristics of d-d transitions – energy levels – Orgel and Tanabe-Sugano diagram – effect of Jahn-Teller distortion and spin-orbit coupling on absorption spectra – crystal field spectra of transition metal complexes – calculation of  $10Dq$  and  $B'$  for Co(II) ( $O_h$ ) and Ni(II) ( $O_h$ ) complexes– spectral properties of lanthanide complexes. Charge transfer spectra of halide, cyanide and bipyridine complexes (octahedral, square planar and tetrahedral complexes).

The Woodward-Fieser rules – calculation of  $\lambda_{\max}$  for dienes, enones and polyenes – Use of UV spectroscopy in distinguishing geometrical isomers

### **UNIT-II: IR and Raman spectroscopy**

**15**

Molecular vibrations, fundamentals, overtones, combination and difference bands – coupling of vibrations – Fermi resonance – Application of IR in Organic chemistry- characteristic group frequencies – Finger print region Combined application of IR and Raman spectra for structural elucidation of  $\text{N}_2\text{O}$ ,  $\text{ClF}_3$ ,  $\text{ClO}_4^-$  and  $\text{NO}_3^-$ ; Group theoretical approach to find the IR and Raman active vibrations of simple compounds– Effect of coordination upon ligand vibrations of  $\text{H}_2\text{O}$ ,  $\text{CNS}^-$ ,  $\text{NO}_3^-$ ,  $\text{CN}^-$  &  $\text{SO}_4^{2-}$ .

### **UNIT-III: NMR spectroscopy**

**15**

Application NMR spectroscopy in the structural analysis of organic compounds – Uses of parameters like chemical shifts (both proton and carbon) and coupling constant – Uses of DEPT, J-resolved, H,H-COSY, C,H-COSY, HMBC and NOESY spectra; lanthanide shift reagents in NMR, Solving structural problems using NMR

Application of NMR in the structural elucidation of inorganic compounds –  $^{31}\text{P}$  NMR spectra of  $\text{P}_4\text{S}_3$ ,  $\text{H}_3\text{PO}_3$ ,  $\text{H}_3\text{PO}_2$  and  $\text{HPF}_2$ ;  $^{19}\text{F}$  NMR spectra of  $\text{ClF}_3$ ,  $\text{BrF}_5$  and equimolar mixture of  $\text{TiF}_6^{2-}$  and  $\text{TiF}_4$  in ethanol– Fluxional behavior of molecules –  $^{10}\text{B}$  and  $^{11}\text{B}$  resonance studies.

### **UNIT-IV: Mossbauer and NQR spectroscopy**

**15**

Theory of Mossbauer spectroscopy – Doppler effect – isomer shift – quadrupole splitting – magnetic hyperfine splitting – application of MB spectroscopy to inorganic compounds

NQR: Energies of quadrupole resonance – effect of a magnetic field on the spectra – relationship between electric field gradient and molecular structure – the interpretation of  $e^2\text{Qq}$  data – effects of the crystal lattice on the magnitude of  $e^2\text{Qq}$  – structural information from NQR spectra.

### **UNIT – V: Magnetism**

**15**

Types of magnetic behavior – expression for Bohr magneton, spin and orbital magnetic moments - Derivation of the expression  $\mu_{\text{eff}} = 2.84 (\chi_{\text{M}} \cdot T)^{1/2}$  – determination of magnetic susceptibility by Gouy method – Calculation of magnetic moment from experimental data – magnetic properties of free ions – Effect of ligand field on orbital contribution – magnetic behavior of complexes with A, E and T ground terms – Temperature independent paramagnetism – spin-orbit coupling constant from spectral and magnetic moment data – magnetic properties of 3d, 4d and 4f ions – anti-ferromagnetic and ferrimagnetic interactions.

### **TEXT BOOK:**

1. Introduction to Instrumental Analysis by R. D. Broun, Mc Graw Hill (1987)
2. Instrumental methods of chemical analysis by H. Willard, L. Merritt, J.A. Dean and F.A. Settle. Sixth edition CBS (1986)
3. Fundamentals of Analytical Chemistry, 6th edition, D.A. Skoog, D.M. West and F.J. Holler, Saunders college publishing. 8
4. Principles of Instrumental Analysis, Skoog, Holler, Nieman, (Sixth Ed.)

### **REFERENCE BOOKS:**

1. Vogel's Textbook of Quantitative analysis 6th Ed.
2. Modern analytical techniques in the pharmaceutical and bio analysis By Dr. Istvan Bak (Book Available Online).
3. Preparative chromatography Chrome Ed. book series, Raymond P. W. Scott (free e book available on internet)
4. Extraction technique in analytical science, John R. Dean, Wiley (2009)

Course Coordinator		HOD										
<b>P18MCCH304</b>	<b>Core 14: Physical methods in Chemistry</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours - 75						4	1	0	4		
	Prerequisite B.Sc., Chemistry level											
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry											
<b>COURSE OBJECTIVES:-</b>												
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.												
<b>COURSE OUTCOMES (COs)</b>												
CO1	Remember the knowledge about the Spectroscopy											
CO2	Understand about the theoretical concepts of mass Spectroscopy											
CO3	Understand the properties and uses of Photo Spectroscopy											
CO4	Apply the detail about the Thermo chemistry											
CO5	Apply the importance of Chromatography Spectroscopy											
CO6	Analyze the real time applications of Chemistry in day today life.											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low												
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	
2	CO1	H	L						H			
	CO2	H	L									
	CO3	H	L									
	CO4	H	L									
	CO5	H	L									
	CO6	H	L									
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)		
					✓							
4	Approval	Academic Council Meeting										

### UNIT I: SPECTROSCOPY

15

Interaction of matter with radiation - Einstein's theory of transition probability - Rotational spectroscopy of rigid rotator - non rigid rotator - diatomic and polyatomic molecules. Electronic spectra – progressions and Sequences, selection rules, Franck – Condon principle, Solvent effects, Types of electronic transition.

### UNIT II: MASS SPECTROSCOPY

15

Introduction, ion production- EI, CI, FD and FAB, factors affecting fragmentation, ion analysis abundance. Mass spectral fragmentation of organic compounds, common functional groups, molecular ion peak, metastable peak, Mc Lafferty rearrangement. Nitrogen rule. High resolution mass spectrometry. Examples of mass spectral fragmentation of organic compounds with respect to their structure determination.

### **UNIT III: Photochemistry**

**15**

Absorption of light and nature of electronic spectra - electronic transition - Frank-Condon principle - Selection rules - Photodissociation, Predissociation, Photochemical reactions: Photoreduction, photooxidation, photodimerization, photochemical substitution, photoisomerization - Photochemistry of environment: Green-house effect - Joblonski diagram - Photophysical process in electronically excited molecules by different types of pathways - Fluorescence - Phosphorescence - Internal conversion - Intersystem crossing - Quantum yield - Photosensitization - Chemiluminences

### **UNIT IV: Electro analytical Methods and Thermogravimetry**

**15**

ORD & CD: Principle- Circular birefringence - Circular dichroism - Cotton effect - Types of ORD curves - Applications of Cotton effect curves/plain dispersion curves - Octant rule - Applications for determination of conformation and configuration - Chromatography: Definition - Classifications - Principle - Practice of adsorption, partition, paper, Thin-layer, HPLC and Gas chromatographic techniques

### **UNIT V: ORD/CD/Chromatography**

**15**

Voltammetry: Principles - Voltammograms - Equation of voltammogram - Modified Voltametric Methods - DPV - Cyclic Voltammetry - Amperometry - Coulometry: Different methods - Coulometric titrations - Conductometric titrations - Anodic/cathodic stripping voltammetry - Thermogravimetry: TGA/DTA/DSC Instrumentation - Applications.

### **TEXT BOOK:**

1. Introduction to Instrumental Analysis by R. D. Broun, Mc Graw Hill (1987)
2. Instrumental methods of chemical analysis by H. Willard, L. Merritt, J.A. Dean and F.A. Settle. Sixth edition CBS (1986)
3. Fundamentals of Analytical Chemistry, 6th edition, D.A. Skoog, D.M. West and F.J. Holler, Saunders college publishing. 8
4. Principles of Instrumental Analysis, Skoog, Holler, Nieman, (Sixth Ed.)

### **REFERENCE BOOKS:**

1. Vogel's Textbook of Quantitative analysis 6th Ed.
2. Modern analytical techniques in the pharmaceutical and bio analysis By Dr. Istvan Bak (Book Available Online).
3. Preparative chromatography Chrome Ed. book series, Raymond P. W. Scott (free e book available on internet)
4. Extraction technique in analytical science, John R. Dean, Wiley (2009)

Course Coordinator

HOD

<b>P18MCCH3L1</b>	<b>CORE - 15 - MAJOR PRACTICAL - VI</b>						L	T	P	C		
	Total Contact Hours - 75						0	0	6	3		
	Prerequisite – B.Sc., Chemistry level											
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry											
<b>COURSE OBJECTIVES:-</b> To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.												
<b>COURSE OUTCOMES (COs)</b>												
CO1	Remember the knowledge about the need of chemistry practical and its toxicity											
CO2	Understand about the uses of experiments in our day today life											
CO3	Understand and know about its importance of chemical played important role											
CO4	Apply the detail about practical importance to be aware of the concepts from the basis.											
CO5	Apply the importance of handling and precision of experimental skills											
CO6	Analyze the real time applications of Chemistry in day today life.											
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low												
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	
2	CO1	H	L						L	H		
	CO2	H	L									
	CO3	H	L									
	CO4	H	L									
	CO5	H	L									
	CO6	H	L									
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)		
					✓							
4	Approval	Academic Council Meeting										

**GRAVIMETRIC ANALYSIS:**

1. Estimation of Lead as lead chromate.
2. Estimation of Barium as barium chromate.
3. Estimation of Nickel as Nickel -DMG complex.
4. Estimation of Copper as copper (I) thiocyanate

5. Estimation of Magnesium as magnesiumoxinate
6. Estimation of Barium as barium sulphate.
7. Estimation of Iron as Iron (III) oxide.

**TEXT BOOKS:**

1. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978
2. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
3. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
4. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
5. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt.,1996.
6. N.S. Ganapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.

**REFERENCE BOOKS:**

1. Halpern, A. M. &McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).
2. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Vogel's Text Book of Quantitative Chemical Analysis. 5th Edi., ELBS/Longman England, 1989.

**Course Coordinator**

**HOD**

**ELECTIVE PAPERS II**

<b>P18MECH021</b>	<b>ELECTIVE – 2 – Biological Chemistry</b>		L	T	P	C					
	Total Contact Hours - 75		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the concepts of aminoacis and proteins										
CO2	Understand the theoretical concepts about the mechanism of enzymes and co-enzymes										
CO3	Understand the properties and uses of Nucleic acids										
CO4	Apply the detail about the gaseous state, postulates and importance of Lipids										
CO5	Apply the importance of Carbohydrates										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**Unit-I: Amino acids and proteins**

**15**

Classification and structure of amino acids, configuration of amino acids, acid-base properties and isoelectric point, separation of amino acids, peptide bonds, disulfide linkages, proteins classification based on solubility, shape, composition and function, structure of proteins, determination of the primary structure of a protein, secondary, tertiary and quaternary structures, protein denaturation.

**Unit-II: Enzymes, co-enzymes and their mechanism of action**

**15**

Enzymes, Classification, kinetics, inhibition, mechanisms of enzyme action, cofactors as derived from vitamins, co-enzymes, prosthetic, prosthetic group and apoenzymes, structure and biological functions of coenzyme-A, thiamine pyrophosphate, pyridoxal phosphate, NAD<sup>+</sup>, NADP<sup>+</sup>, FAD, lipoic acid, overview of reactions catalysed by the above cofactors.

**Unit-III: Nucleic acids**

**15**

Nature of genetic material, structure of purine and pyrimidine, nucleotides and nucleosides, types of nucleic acids, structure of DNA, properties of nucleic acids, -T<sub>m</sub>, denaturation and renaturation, hypo and hyperchromicity, basic ideas on replication, transcription and translation, determination of the base sequence of DNA.

**Unit-IV: Lipids**

**15**

Fatty acids classification, nomenclature, structure and properties of fatty acids - structure and function of prostaglandins, tri-acyl glycerol, structure and functions of phospholipids, spingomyelin, plasmologens, structure and function of glycolipids, cholesterol.

**Unit-V: Carbohydrates**

**15**

Classification of carbohydrates, stereo isomerism and optical isomerism of sugars, mutarotation, occurrence, structure and biological importance of mono, di and polysaccharides, an introduction to mucopolysaccharides, reactions of carbohydrates due to the presence of hydroxyl, aldehyde and ketone groups.

**TEXT BOOKS:**

1. D. L. Nelson, M. M. Cox, Lehninger Principles of Biochemistry, 5thEd., W. H. Freeman; New York, USA, 2005.
2. R. K. Murray, D. K. Grammer, Harper's Biochemistry, 29th Ed., McGraw Hill, Lange Medical Books, United Kingdom, 2009.

**REFERENCES BOOKS:**

1. J.L. Jain, S. Jain, N. Jain, Fundamentals of Biochemistry, S. Chand & Company. India, 2013.
2. P. Y. Bruice, Organic Chemistry, 5th Ed., Pearson, 2014.

**Course Coordinator**

**HOD**

<b>P18MECH022</b>	<b>ELECTIVE – 2 – Medicinal Chemistry</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>					
	Total Contact Hours - 75		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the properties and uses of Drug Design										
CO2	Understand about the theoretical concepts of Pharmacodynamics Chemistry										
CO3	Understand its properties and uses of Antibiotics and Antiinfective Drugs										
CO4	Apply the detail about the Psychoactive Drugs										
CO5	Apply the importance of Therapeutic Agents, SAR and Their mode of Actions										
CO6	Analyze the applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Po s</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO 3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	<b>Category</b>	<b>Humanities &amp; Social Studies (HS)</b>	<b>Basic Sciences (BS)</b>	<b>Engg Sciences (ES)</b>	<b>Professional Core (PC)</b>	<b>Core Elective (CE)</b>	<b>Non-Major Elective (NE)</b>	<b>Open Elective (OE)</b>	<b>Any other</b>	<b>Project/Term Paper/ Seminar/ Internship (PR)</b>	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT-I - Drug Design:

15

Development of new drugs, procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, structure-activity relationship (SAR), factors affecting bioactivity, resonance, inductive effect, isosterism/bioisosterism, spatial considerations. Theories of drug activity: occupancy theory, rate theory, induced fit theory. Quantitative structure activity relationship. History and development of QSAR. Concepts of drug receptors. Elementary treatment of drug receptor interactions. PhysicoChemical parameters:

lipophilicity, partition coefficient, electronic ionization constants, steric, Free-Wilson analysis, Hansch analysis relationships between Free-Wilson and Hansch analysis.

**UNIT-II - Pharmacokinetics and Pharmacodynamics: 15**

Pharmacokinetics: Introduction to drug absorption, disposition, elimination using pharmacokinetics. Important pharmacokinetic parameters in defining drug disposition and in therapeutics. Mention of uses of pharmacokinetics in drug development process. Pharmacodynamics: Introduction, elementary treatment of enzyme stimulation, enzyme inhibition, sulphonamides, membrane active drugs, drug metabolism, xenobiotics, biotransformation. Significance of drug metabolism in medicinal chemistry.

**UNIT-III - Antibiotics and Antiinfective Drugs: 15**

Antibiotics: Structure, SAR and biological action of antibiotics. Examples: penicillin G, penicillin V, ampicillin, amoxycillin, chloramphenicol, cephalosporin, tetracycline and streptomycin. Sulfonamides: Structure, SAR and mode of action of sulfonamides, sulfonamide inhibition and probable mechanisms of bacterial resistance to sulfonamides. Examples: sulfadiazine, sulfafurazole, acetyl sulfafurazole, Sulfaganidine, Phthalylsulfo acetamide, Mafenide. Sulphonamide related compounds Dapsone. Local antiinfective drugs: Introduction and general mode of action. Examples: sulphonamides, furazolidone, nalidixic acid, ciprofloxacin, norfloxacin, chloroquin and primaquin

**UNIT-IV - Psychoactive Drugs: 15**

Introduction, neurotransmitters, CNS depressants and stimulants. SAR and Mode of actions. Central Nervous System Depressant: General anaesthetics. Sedatives & Hypnotics: Barbiturates and Benzodiazepines. Anticonvulsants: Barbiturates, Oxazolidinediones, Succinimides, Phenacemide and Benzodiazepines. Psychotropic Drugs: The neuroleptics (Phenothiazines and butyrophenones), antidepressants (Monoamine oxidase inhibitors and Tricyclic antidepressants) and anti-anxiety agents (Benzodiazepines). Central Nervous System Stimulants: Strychnine, Purines, Phenylethylamine, analeptics, Indole ethylamine derivatives,

**UNIT-V - Therapeutic Agents, SAR and Their mode of Actions: 15**

Antineoplastic Agents: Cancer chemotherapy, role of alkylating agents and antimetabolites in treatment of cancer. Mention of carcinolytic antibiotics and mitotic inhibitors. Biological action of mechlorethamine, cyclophosphamide, melphalan, uracil, and 6-mercaptopurine. Cardiovascular Drugs: Antihypertensive and hypotensive drugs, antiarrhythmic agents, vasopressor drug Direct acting arteriolar dilators. Biological action of methyl dopa, propranolol hydrochloride, amyl nitrate, sorbitrate, verapamil, Atenolol. Antihistaminic agents: Ethylene diamine derivatives, amino alkyl ether analogues, cyclic basic chain analogues. Antifertility agents: General antifertility agents. Diuretics: Mercurial diuretic, Non mercurial diuretics (Thiazides, carbonic-anhydrase inhibitors, xanthine derivatives, pyrimidine diuretics and osmotic diuretics).

**TEXT BOOKS:**

1. An Introduction to Medicinal Chemistry, Graham L. Patrick.
2. Medicinal Chemistry: Principles and Practice Edited by F.D. King.

**REFERENCES BOOKS:**

1. Introduction to Medicinal Chemistry, Alex Gringuage.

Course Coordinator

HOD

<b>P18MECH023</b>	<b>ELECTIVE–2–FOOD CHEMISTRY</b>		L	T	P	C					
	Total Contact Hours - 75		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>					
	Prerequisite: B.Sc., Chemistry										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the Introduction of Food Chemistry										
CO2	Understand about the theoretical concepts of Constituents of Foods										
CO3	Understand its properties and uses of Foods and its Additives										
CO4	Apply the detail about the Nutrition and Balanced Diet										
CO5	Apply the importance of Food Adulteration and Hygiene										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT I: INTRODUCTION**

**15**

**Food:** source, functions of food – food groups – food guide – basic five food groups, usage of the food guide – food in relation to health – objectives of cooking - **Water:** Purification processes – Ion exchangers, reverse osmosis, activated charcoal treatment. Use of chlorination, ozone, and UV light disinfection. Specification of drinking water. Water borne diseases – microbiological examination. Sources and detection - **Milk:** Composition and effectiveness as a

diet. Fat content in milk, whole and skimmed - Effect of cooking and heat processing of milk – pasteurization. Preservation of milk - Deep freeze preservation, dairy products – cheese, butter, ghee and kova. Spray drying technique – milk powder, infant food preparation. Lactose intolerance Milk substitutes – vegetable milk. Toned milk.

## **UNIT 2: CONSTITUENTS OF FOODS**

**15**

**Proteins:** amino acids – peptides – proteins, modification of food products through heat processing .Effect of cooking – steaming or cooking under pressure of legumes - Enzymes: Nomenclature, classification – Apo, holo and coenzymes. Enzymes used in food processing - **Carbohydrates:** Classification, structure and reactions of monosaccharides, glucose, fructose, structure of sucrose, maltose, lactose and starch. Artificial sweetening agents.

## **UNIT 3: FOODS AND FOOD ADDITIVES:**

**15**

**Food additives:** Artificial sweeteners – saccharin, cyclamate, aspartame – food flavours – esters, aldehydes and heterocyclic compounds. Antioxidants. Food colours – changes in cooking..Restricted use. Spurious colours. Emulsifying agents, preservatives – leavening agents. Baking powder – Yeast. Taste enhancers – MSG-vinegar - **Modern food:** Mushroom cultivation and types, spirulina composition. Snack foods - Production of bread, bun and biscuits. Raw materials, methods and machinery required - Candy manufacturing. Caramellisation. Fast foods. Instant foods. Dehydrated foods - Oleoresin of spices. Condiments.

## **UNIT 4: NUTRITION AND BALANCED DIET**

**15**

**Nutrition** – calorific value of food stuff – RQ of food (Respiratory quotient of food) – basal metabolic rate – factors influencing BMR, specific dynamic action (SDA) of food - **Thermogenic effect** – energy requirements of individuals – diet and its components – the protein requirements – biological value of proteins, supplementary value of proteins. Diseases associated with protein malnutrition - Nutritional value of carbohydrates. – Fibers in the diet, dietary sugars – nutritional aspects of lipids.

## **UNIT 5: FOOD ADULTERATION AND HYGIENE**

**15**

**Adulterants:** Common adulterants in different foods – milk and milk products, vegetable oils, and fats, spices and condiments, cereals, pulses, sweetening agents and beverages. Contamination with toxic chemicals – pesticides and insecticides. Principles involved in the analysis of detection and prevention of food adulteration - **Microbial growth:** growth curve of bacteria. Effect of environmental factors on growth of microorganisms. pH, water activity, oxygen availability temperature – beneficial effect of micro organisms Food borne illness – bacteria, virus, moulds and parasites. (Any two illness each) - **Food preservation and processing** : Food deterioration, methods of preservation and processing - **Quality control:** Specifications and standards: PFA, FPO, FDA, drug license, WHO standards, ISI specifications, packing and label requirements, essential commodities act, consumer protection act. AGMARK.

### **TEXT BOOKS:**

1. Swaminathan M. Advanced Text Book on Food and Nutrition , Volume I and II Printing and Publishing Co., Ltd., Bangalore. 1993.
2. Swaminathan m. Text book on Food Chemistry, Printing and Publishing Co., Ltd., Bangalore. 1993.

### **REFERENCE BOOKS**

3. Norman N. Potter ,Food Science, CBS Publishers And Distributors, New Delhi. 1994.
- 4.

Course Coordinator

HOD

**AUDIT COURSE**

<b>P18ACEN001</b>	<b>AUDIT COURSE : ENGLISH FOR RESEARCH PAPER WRITING</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 30						<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Ms.Subathra/English										
<b>COURSE OBJECTIVES:-</b> Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Recognize to prepare and Plan the word order, breaking of long sentences, structural formation of paragraph and being concise without any ambiguities.										
CO2	Describe how to write abstract and introduction to any topic or project.										
CO3	Relate the skills require for the discussions and conclusions.										
CO4	Express the quality of paper and time management in writing skills.										
CO5	Illustrate the useful phrase and how to ensure the paper is as good.										
CO6	Prepare the oral presentation in class using effective delivery strategies.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PS O2	PSO3
2	CO1		H	L					-	-	-
	CO2		H	L							
	CO3		H	L							
	CO4		H	L							
	CO5		H	L							
	CO6		H	L							
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

UNIT - 1: PLANNING AND PREPARATION : 6  
**Planning and Preparation - word order - breaking up long sentences, structuring, paragraphs and sentences, being concise and removing redundancy, avoiding ambiguity and vagueness.**

UNIT-2 : ABSTRACT 6  
**Clarifying who did what - highlighting your findings - hedging and criticizing - paraphrasing and plagiarism - sections of a paper - abstracts - introduction.**

UNIT -3 : DISCUSSION AND CONCLUSION 6  
**Review of the literature - methods - results - discussion - conclusions, the final check - key skills are needed when writing a title - key skills are needed when writing an abstract - key skills are needed when writing an introduction - skills needed when a review of the literature.**

UNIT -4 : WRITING SKILLS 6  
**Skills are needed when writing the methods - skills needed when writing the results - skills are needed when writing the discussion - skills are needed when writing the conclusions.**

UNIT -5: QUALITY AND TIME MAINTAINANCE 6  
**Useful phrases - how to ensure paper is as good as it could possibly be the first -time submission.**

TEXT BOOKS :

1. Goldbort R (2006) Writing for Science, Yale University Press (Available on Google Books).
2. Day R(2006), How to Write and Publish a Scientific Paper, Cambridge University Press.

REFERENCE BOOKS :

1. HighmanN, Handbook of Writing for the Mathematical Sciences, SIAM, Highman's Book, 1<sup>st</sup>, Edition, 1998.
2. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2<sup>nd</sup> Edition, 2011.

Course Coordinator

HOD

<b>P18ACCE002</b>	<b>AUDIT COURSE : DISASTER MANAGEMENT</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 30						<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Ms.Jhony/ Dept. of Business Administration										
<b>COURSE OBJECTIVES:-</b> Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the key concepts in disaster risk reduction and humanitarian response.										
CO2	Understand the disaster risk reduction and humanitarian response policy from multiple perspectives.										
CO3	Illustrate the standards of humanitarian response.										
CO4	Criticize the practical relevance in specific types of disasters and conflict situations.										
CO5	Evaluate the strengths and weakness of disaster management approaches.										
CO6	Predict the planning and programming in different countries, particularly their home country or the countries they work .										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1						H		-	-	-
	CO2						H				
	CO3						H				
	CO4						H				
	CO5						H				
	CO6						H				
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
4	Approval	Academic Council Meeting									

**UNIT - : INTRODUCTION: 6**

Disaster : Definition - Factors and Significance - Difference between Hazard and Disaster - Natural and Manmade Disasters - Difference - Nature - Types and Magnitude.

**UNIT - 2 : REPERCUSSIONS OF DISASTERS AND HAZARDS: 6**

Economic Damage - Loss Of Human And Animal Life - Destruction Of Ecosystem - Natural Disasters: Earthquakes - Volcanisms - Cyclones - Tsunamis - Floods - Droughts And Famines - Landslides And Avalanches - Man-made disaster.

**UNIT -3 : DISASTER PRONE AREAS IN INDIA: 6**

Study Of Seismic Zones - Areas Prone To Floods And Droughts - Landslides And Avalanches - Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami - Post-Disaster Diseases And Epidemics.

**UNIT -4 : DISASTER PREPAREDNESS AND MANAGEMENT 6**

Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard - Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies - Media Reports: Governmental And Community Preparedness.

**UNIT -5 : RISK ASSESSMENT 6**

Disaster Risk: Concept And Elements - Disaster Risk Reduction, Global And National Disaster Risk Situation - Techniques Of Risk Assessment - Global Co- Operation In Risk Assessment And Warning, People's Participation In Risk Assessment - Strategies for Survival.

**TEXT BOOKS:**

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "New Royal book Company.

**REFERENCE BOOKS:**

1. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.  
2. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., New Delhi.

Course Coordinator

HOD

<b>P18ACEN003</b>	<b>AUDIT COURSE : SANSKRIT FOR TECHNICAL KNOWLEDGE</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 30							<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Ms.Subathra / Dept. of English										
<b>COURSE OBJECTIVES:-</b> Learners will get a working knowledge in illustrious Sanskrit, the scientific language in the world.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the learning of Sanskrit to improve brain functioning										
CO2	Review the Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power										
CO3	Practice the engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature										
CO4	Identify the uses of basic Sanskrit language										
CO5	Estimate Ancient Sanskrit literature about science & technology can be understood										
CO6	Develop the projects either individual or group on presentations.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1		H	L					-	-	-
	CO2		H	L							
	CO3		H	L							
	CO4		H	L							
	CO5		H	L							
	CO6		H	L							
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

**UNIT -1 : INTRODUCTION:****6**

Alphabets, Consonants, Nouns Declensions; Nominative, Accusative( singular, dual and plural)

**UNIT - 2 : BASIC OF SANSKRIT LIERATURE:****6**

Instrumental case, Dative, Ablative, and Indeclinables, verbal conjugation: first person, second person, third person: Present Tense.

**UNIT - 3 : FUNDAMENTALS OF SANSKRIT ARCHITECTURE:****6**

Genitive, locative and Vocative Absolute, Masculine Gender, Feminine Gender and Neuter Gender.

**UNIT -4 : VERBAL CONJUGATION:****6**

Verbal Conjugation: Past Tense and Future Tense Declensions ending in Rāmaḥ, Kaviḥ, Bhānuḥ, Mātr , Mālā

**UNIT - 5 : TRANSLATION:****6**

Translation of simple sentences, Stories & selected Subhashitas

**TEXT BOOKS:**

1. “Abhyaspustakam” – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi.
2. Sanskrit for Beginners by Dr. M. NarasimhacharyandDr.S. Ramaratnam, N&R Publications,  
Chennai & New Delhi.

**REFERENCE BOOKS :**

1. “Teach Yourself Sanskrit” Prathama Deeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication.
2. “India’s Glorious Scientific Tradition” Suresh Soni, Ocean books (P) Ltd., New Delhi.

**Course Coordinator****HOD**

		<b>AUDIT COURSE : VALUE EDUCATION</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>P18ACBA004</b>	Total Contact Hours – 30							<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Mr.Srinivasan/ Dept. of Business Administration										
<b>COURSE OBJECTIVES:-</b> Our objectives are to promote a new understanding and framework help learners to achieve positive and purposeful lives for themselves and their communities through engaging with values to guide and inform their behaviour.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember and describe feelings of self-worth that arise through striving for personal success in physical activity and sport										
CO2	Demonstrate the tolerance of other people's abilities during physical activity and sport										
CO3	Generalize the Values, attitudes that they need to develop in their class programmes										
CO4	Choose the essential steps to become good leaders.										
CO5	Select their role and contribution to the nation building.										
CO6	Prepare to understand value of education and self- development										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1				H			L	-	-	-
	CO2				H			L			
	CO3				H			L			
	CO4				H			L			
	CO5				H			L			
	CO6				H			L			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

**UNIT-I:****6**

Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self esteem.

**UNIT-II:****6**

Family values - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

**UNIT-III:****6**

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

**UNIT-IV:****6**

Social values - Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

**UNIT-V:****6**

Effect of international affairs on values of life/ Issue of Globalization - Modern warfare - Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

**TEXT BOOKS:**

1. T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995).
2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.

**REFERENCE BOOKS:**

1. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
2. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)
3. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.
4. M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.

**Course Coordinator****HOD**

<b>P18ACW005</b>	<b>AUDIT COURSE : CONSTITUTION OF INDIA</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 30							<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Mr.Prakash/Dept. of Law										
<b>COURSE OBJECTIVES:-</b>											
To Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Underline to address the growth of Indian opinion regarding modern Indian intellectuals										
CO2	Express the constitutional role and entitlement to civil and economic rights										
CO3	Utilize the emergence of nationhood in the early years of Indian nationalism.										
CO4	Distinguish the role of socialism in India										
CO5	Judge the commencement of the Bolshevik Revolution										
CO6	Predict its impact on the initial drafting of the Indian Constitution										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1			H				L	-	-	-
	CO2			H				L			
	CO3			H				L			
	CO4			H				L			
	CO5			H				L			
	CO6			H				L			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

**UNIT -1 : HISTORY OF MAKING OF THE INDIAN CONSTITUTION: 6**

History - Drafting Committee, ( Composition & Working)

**UNIT -2 : PHILOSOPHY OF THE INDIAN CONSTITUTION: 6**

Preamble - Salient Features - Directive Principles of State Policy - Fundamental Duties.

**UNIT -3 : CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES: 6**

Fundamental Rights - Right to Equality - Right to Freedom - Right against Exploitation - Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies.

**UNIT -4 : ORGANS OF GOVERNANCE: 6**

Parliament - Composition - Qualifications and Disqualifications - Powers and Functions - Executive President - Governor - Council of Ministers - Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions.

**UNIT -5 : LOCAL ADMINISTRATION & ELECTION COMMISSION : 6**

District's Administration head: Role and Importance - Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation - Pachayati raj: Introduction, PRI: Zila Pachayat - Elected officials and their roles - Introduction of Election Commission - Election Commission: Role and Functioning - Chief Election Commissioner and Election Commissioners - State Election Commission: Role and Functioning - Institute and Bodies for the welfare of SC/ST/OBC and women.

**TEXT BOOKS:**

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

**REFERENCE BOOKS:**

1. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
2. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

**Course Coordinator**

**HOD**

<b>P18ACBA006</b>	<b>AUDIT COURSE : PEDAGOGY STUDIES</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 30							<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Dr.Arunkumar / Dept. of Business Administration										
<b>COURSE OBJECTIVES:-</b> To inform programme design and policy making undertaken by the Dfid, other agencies and researchers.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	List common training so everyone teaches from the same curriculum										
CO2	Describe to learners what is expected of them										
CO3	Illustrate the teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.										
CO4	Inspect the review existing evidence on the review topic to inform programme design.										
CO5	Assess how the outcomes of a single course align with larger outcomes for an entire program										
CO6	Plan appropriate teaching strategies, materials and assessments										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1		H	L					-	-	-
	CO2		H	L							
	CO3		H	L							
	CO4		H	L							
	CO5		H	L							
	CO6		H	L							
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

**UNIT - 1 : INTRODUCTION AND METHODOLOGY: 6**

Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning - Curriculum - Teacher education - Conceptual framework, Research questions -Overview of methodology and Searching.

**UNIT - 2 : THEMATIC OVERVIEW: 6**

Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.

**UNIT - 3 : EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES :-6**

Methodology for the in depth stage: quality assessment of included studies - How can teacher education (curriculum and practicum) and the schoolcurriculum and guidance materials best support effective pedagogy? Theory of change - Strength and nature of the body of evidence for effective pedagogicalpractices.

**UNIT - 4 : PROFESSIONAL DEVELOPMENT: 6**

Alignment with classroom practices and follow upsupport - Peer support - Support from the head teacher and the community - Curriculum and assessment - Barriers to learning: limited resources and large class sizes

**UNIT - 5 : Research gaps and future directions:- 6**

Research design - Contexts - Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.

**TEXT BOOKS:**

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2):245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal o Curriculum Studies, 36 (3): 361-379.
3. Akyeamong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research
4. project (MUSTER) country report 1. London: DFID.

**REFERENCE BOOKS:-**

1. Akyeamong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning ofbasic maths and reading in Africa: Does teacher preparation count? International JournalEducational Development, 33 (3): 272–282.
2. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
3. Chavan M (2003) Read India: A mass scale, rapid, ‘learning to read’ campaign.

**Course Coordinator**

**HOD**

<b>P18ACBA007</b>	<b>AUDIT COURSE : PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 30						<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Mr.Srinivasan/Dept.of Business Administration										
<b>COURSE OBJECTIVES:-</b> To become a person with stable mind, pleasing personality and determination											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Identify the way to achieve the highest goal happily										
CO2	Review to awaken wisdom for learners										
CO3	Schedule to study of Shrimad-Bhagwad-Geeta will help the student										
CO4	Developing his personality and achieve the highest goal in life										
CO5	Evaluate the person who has studied Geeta will lead the nation and mankind to peace and prosperity										
CO6	Propose to study of Neetishatakam will help in developing versatile personality of students										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1		H					H	-	-	-
	CO2		H					L			
	CO3		H					H			
	CO4		H					L			
	CO5		L					H			
	CO6		H					H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
									✓		
4	Approval	Academic Council Meeting									

**UNIT - 1 : HOLISTIC DEVELOPMENT OF PERSONALITY- I 6**

Neetisatakam-Holistic development of personality : Verses- 19,20,21,22 (wisdom) -  
Verses- 29,31,32 (pride & heroism) - Verses- 26,28,63,65 (virtue) -  
Verses- 52,53,59 (dont's) -Verses- 71,73,75,78 (do's).

**UNIT - 2 : BHAGWADGEETA: 6**

Approach to day to day work and duties. ShrimadBhagwadGeeta: Chapter 2-Verses 41, 47,48.  
Chapter 3- Verses 13, 21, 27, 35.

**UNIT - 3: BHAGWAD GEETA:- 6**

ShrimadBhagwadGeeta: Chapter 6-Verses 5, 13, 17, 23, 35, Chapter 18-Verses 45, 46,  
48.

**UNIT - 4: BASIC KNOWLEDGE: 6**

Statements of basic knowledge. ShrimadBhagwadGeeta: Chapter2-Verses 56, 62, 68.  
Chapter 12 - Verses 13,14, 15, 16,17, 18.

**UNIT - 5: ROLE MODEL : - 6**

Personality of Role model. Shrimad BhagwadGeeta: Chapter2-Verses 17,  
Chapter 3-Verses 36,37,42, - Chapter 4-Verses 18, 38,39 - Chapter18 – Verses 37,38,63.

**TEXT BOOK:**

1. P.Gopinath, “Bhartrihari’s Three Satakam (Niti-sringar-vairagya)”, Rashtriya Sanskrit Sansthanam, New Delhi.

**REFERENCE BOOK:**

1. “Srimad Bhagavad Gita” by Swami SwarupanandaAdvaita Ashram (Publication Department), Kolkata.
2. [http://openlearningworld.com/section\\_personality\\_development.html](http://openlearningworld.com/section_personality_development.html)

**Course Coordinator**

**HOD**

**SEMESTER IV**

<b>P18MCCH401</b>	<b>Core 16: Chemical Kinetics, Surface Chemistry</b>		<b>L</b>	<b>T</b>	<b>P</b>						<b>C</b>
	Total Contact Hours - 75		<b>4</b>	<b>2</b>	<b>0</b>						<b>4</b>
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the concepts of Chemical Kinetics										
CO2	Understand about the nature of Catalysis and Surface Chemistry										
CO3	Understand the properties and uses of Macromolecules and Kinetics of Polymerization										
CO4	Apply the detail about the Properties of Polymers										
CO5	Apply the importance of Fabrication and Patterning Nanostructures										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT-I: Chemical Kinetics**

**15**

Basic kinetic concepts - Theories of reaction rates-collision theory - transition State theory - salt effect - temperature effects, Arrhenius equation, chemical interpretation of activation parameters, microscopic reversibility - Lindemann, Hinshel wood, RRK, RRKM and Slater treatments - fast reaction kinetics - survey of methods for very fast reactions - stopped flow methods - chemical relaxation methods - flash photolysis.

**UNIT–II: Catalysis and Surface Chemistry****15**

Homogenous catalysis - activation barrier - Hammett acid-base catalysis - rate of acid and base catalysis - acidity function. Enzyme catalysis: Brief introduction on enzymes - advantages - Michaelis-Menton kinetics - Lineweaver Burk plot - enzymatic inhibitor. Heterogenous catalysis: Adsorption, physisorption and chemisorptions, Langmuir and BET adsorption, Gibbs adsorption isotherm, insoluble surface films, electrokinetic phenomena, zeta potential. Surface active agents - classification, micellization, hydrophobic interaction, CMC and factors affecting CMC, counter-ion binding to micelles - thermodynamics of micellization - reverse micelles.

**UNIT–III: Macromolecules and Kinetics of Polymerization****15**

Overview of polymers - structure and classification of polymers - kinetics and mechanism of free radical and ionic polymerizations - degree of polymerization - condensation and coordination polymerizations - Zeigler-Natta polymerization - copolymerization - molecular weight of polymers - number and weight average molecular weights - determination of molecular weight - light scattering and viscosity methods - gel permeation chromatography.

**UNIT–IV: Properties of Polymers****15**

Polyesters, silicones, rubbers and fibers - properties of polymers - rheology and solubility - physical states and transition - crystallinity - glass transition temperature - factors influencing  $T_g$ , crystallinity in polymers - amorphous polymers - plasticization - vulcanization, reinforcement and elastomers - conducting polymers - electrical and optical properties - mechanism of electrical conduction in polymers - conducting polymers/filler composite - applications and limitations.

**UNIT–V: Fabrication and Patterning Nanostructures****15**

Preparation of nanostructures: Nucleation and particle growth-sol process, sol-gel process, chemical co-precipitation, hydrothermal/solvothermal synthesis, pyrolysis, vapor deposition - Techniques of nanofabrication: Types of lithography – application of lithography - Self-assembly for nanofabrication: Nontemplated self-assembly, templated self-assembly, self-assembled monolayers (SAMs) - preparation of SAMs, mechanisms of assembly, SAMs as surface layers - Surface modification of nanoparticles, characterization techniques-SEM, TEM, HRTEM, AFM, SAXS, LDI-MS, STM.

**TEXT BOOKS:**

1. Chemical Kinetics by Keith Laidler, Harper and Row, 1995.
2. Chemical Kinetics: The study of reaction rates in solution by Kenneth A. Connors, VCH, 1990
3. Billmeyer, F. W. Textbook of Polymer Science, John Wiley & Sons, Inc.
4. Nanobiotechnology by Subbiah balagi, MJP Publishers, India (2010).

**REFERENCES BOOKS:**

1. Electrochemistry by Carl H. Hamann, Andrew Hamnett and Wolf Vielstich, Wiley VCH, 1998.
2. Gowariker, V. R.; Viswanathan, N. V. & Sreedhar, J. Polymer Science, New Age International (P) Ltd. Pub.
3. Introduction to nanotechnology by C.P. Poole, Jr & F. J. Owens, John Wiley and Sons (2009).

**Course Coordinator****HOD**

<b>P18MCCH402</b>	<b>Core 17: Nuclear Chemistry And Photochemistry</b>		L	T	P	C					
	Total Contact Hours - 75		4	1	0	4					
	Prerequisite B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Mrs. K. Kalpana / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the concepts of Nuclear Chemistry										
CO2	Understand about the theoretical concepts of Principles of Photochemistry										
CO3	Understand its concepts of Inorganic Photochemistry										
CO4	Apply the detail about the concepts of Organic Photochemistry										
CO5	Apply the importance of concepts of Pericyclic reactions										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT-I: Nuclear Chemistry

15

Properties of nucleus – different types of nuclear forces – liquid drop model, shell model of nucleus – nuclear reactions induced by charged particles – Q value – nuclear reaction cross section, significance and determination – theory of nuclear fission – reactor and its components – production of feed materials for nuclear reactors – disposal of radioactive wastes – nuclear fusion, stellar energy. Application of radioisotopes in agriculture, industry and medicine – neutron activation analysis.

**UNIT-II: Principles of Photochemistry****15**

Absorption of light by molecules – Reaction paths of electronically excited molecules - Fluorescence and phosphorescence – Jablonski diagram – Physical properties of the electronically excited molecules: Excited state dipole moments, Excited state pKa and redox potentials – Life time of excited state molecules- Stern-Volmer equation and its application – Photosensitization - Chemiluminescence – Quantum yield and actinometry.

**UNIT-III: Inorganic Photochemistry****15**

Elementary ideas on the photosystems I and II - Photochemistry of Cr(III), Co(III), Ru(II), Pt(II) and Pt(IV) complexes – photoaquation – photoanation – photoisomerisation – photo redox reactions – charge transfer photochemistry – photosensitisation – solar energy conversion – photogalvanic cell – water splitting.

**UNIT-IV: Organic Photochemistry****15**

Thermal vs photochemical reactions –energy transfer reactions - sensitized reactions – Photochemical reactions of ketones and enones – Norrish type I and type II reactions – Paterno-Buchi reaction - isomerisation of olefins – di-*pi*-methane rearrangement – photochemical reduction and photochemical oxidations –oxidative couplings – photochemistry of arenes.

**UNIT-V: Pericyclic reactions****15**

Definition – electrocyclic, cycloaddition and sigmatropic reactions – Orbital correlation diagram, state correlation diagram, frontier orbital theory and aromatic transition state approach – endoselectivity and regiochemistry in Diels-Alder reactions- Cope and Claisen rearrangements.

**TEXT BOOKS:**

1. J.E.Huhey, Inorganic Chemistry, Harper and Rao 3rd Edition Edn. 1983..
2. W.Kemp Organic Spectroscopy, ELBS, 2nd Edn., 1987.
3. P.S.Kalsi, Spectroscopy of Organic Compounds, 3rd Edn., New Age Int, New Delhi, 1998.
4. S.M.Muherjee and S.P.Singh, Pericyclic Reactions, Macmillan, 1976.

**REFERENCE BOOKS:**

1. Physical and Theoretical Chemistry, C.D.George, P.M.Thomas and C.D.Joseph (1966).
2. Text Book of Physical Chemistry, P.L.Soni, O.P.Dharmara, U.N. Dash, Sultan Chand & Sons, New Delhi.
3. Principles of Physical Chemistry, B.R.Puri, L.R.Sharma, M.S.Pathania, Shoban Lal Nagin Chand & Co. New Delhi.

**Course Coordinator****HOD**

<b>P18MCCH4L1</b>	<b>CORE - 18 - ANALYTICAL PRACTICAL - V</b>					L	T	P	C		
	Total Contact Hours - 75					0	0	6	3		
	Prerequisite – B.Sc., Chemistry level										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the need of chemistry practical and its toxicity										
CO2	Understand about the uses of experiments in our day today life										
CO3	Understand and know about its importance of chemical played important role										
CO4	Apply the detail about practical importance to be aware of the concepts from the basis.										
CO5	Apply the importance of handling and precision of experimental skills										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	L						L	H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	Academic Council Meeting									

### **ANALYTICAL PRACTICAL:**

- (1) Calibration of glass wares and balance.
- (2) Determination of %age purity of given sample of Isoniacid.
- (3) Determination of %age of Asprin in the given tablet.
- (4) Determination of available chlorine in bleaching powder.

- (5) Determination of vitamin C in orange juice/amla.
- (6) Determination of acetic acid in vinegar.
- (7) Determination of sodium carbonate and sodium bicarbonate in washing soda.
- (8) Determination of ascorbic acid in vitamin C tablets.
- (9) Determination of %age purity of given sample of Analgin tablet.
- (10) Determination of calcium and magnesium in water sample.
- (11) Determination of sulphate in water sample.
- (12) Determination of chloride in water sample.

#### **TEXT BOOKS:**

7. Vogel, A.I. A Textbook of Quantitative Inorganic Analysis, ELBS. 1978
8. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
9. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
10. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
11. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
12. N.S. Ganaprasadam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.

#### **REFERENCE BOOKS:**

6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).
7. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
8. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
9. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
10. Vogel's Text Book of Quantitative Chemical Analysis. 5th Edi., ELBS/Longman England, 1989.

**Course Coordinator**

**HOD**

**ELECTIVE PAPERS III**

<b>P18MCCH031</b>	<b>ELECTIVE – 3 – POLYMER CHEMISTRY</b>		L	T	P	C					
	Total Contact Hours - 60		4	0	0	4					
	Prerequisite: II B.Sc., Chemistry										
	Course Coordinator Name & Department:- – Dr. P. Paulraj / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the introduction of polymer										
CO2	Understand about the method of polymerization										
CO3	Understand properties and uses of polymer degradation										
CO4	Apply the detail about the Industrial polymers										
CO5	Apply the importance of polymer processing										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT 1 : INTRODUCTION TO POLYMER**

**12**

Monomers, Oligomers, Polymers and their characteristics - Classification of polymers : Natural synthetic, linear, cross linked and network; plastics, elastomers, fibres, Homopolymers and Co-polymers - Bonding in polymers : Primary and secondary bond forces in polymers ; cohesive energy and decomposition of polymers - Determination of Molecular mass of polymers: Number Average molecular mass (Mn) and Weight average molecular mass (Mw) of polymers and determination by (i) viscosity (ii) Light scattering method (iii) Gel Permeation Chromatography (iv) osmometry and ultracentrifuging.

**Self study:**

Molecular weight determination of high polymers by different methods.

**UNIT 2 : KINETICS AND MECHANISM FOR POLYMERIZATION 12**

Chain growth polymerization : Cationic, anionic, free radical polymerization, Stereo regular polymers : Ziegler Natta polymers - Polycondensation-non catalysed, acid catalysed polymerization, molecular weight – distribution - Step growth polymers

**Self study:** Degrees of polymerization

**UNIT 3 : TECHNIQUES OF POLYMERIZATION 12**

Bulk, Solution, Emulsion, Suspension, Melt polycondensation, solution polycondensation interfacial and gas phase polymerization - Types of Polymer Degradation, Thermal degradation, mechanical degradation, photodegradation, Photo stabilizers.

**Self study:** Solid and gas phase polymerization

**UNIT 4 : INDUSTRIAL POLYMERS: 12**

Raw material, preparation, fibre forming polymers, elastomeric material - Thermoplastics : Polyethylene, Polypropylene, polystyrene, Polyacrylonitrile, Poly Vinyl Chloride, Poly tetrafluoro ethylene, nylon and polyester - Thermosetting Plastics : Phenol formaldehyde and epoxide resin - Elastomers : Natural rubber and synthetic rubber - Buna - N, Buna-S and neoprene - Conducting Polymers : Elementary ideas ; examples : poly sulphur nitriles, poly phenylene, polypyrrole and poly acetylene.

**Self study:** Poly methylmethacrylate, polyimides, polyamides, polyurethanes, polyureas, polyethylene and polypropylene glycols

**UNIT 5 : INTRODUCTION TO POLYMER PROCESSING : 12**

Compounding: Polymer Additives: Fillers, Plasticizers antioxidants and thermal stabilizers fire retardants and colourants - Processing Techniques: Calendaring, die casting, compression moulding, injection moulding, blow moulding, extrusion moulding and reinforcing.

**Self study:** Film casting, Thermofofming, Foaming.

**TEXT BOOKS :**

1. V.R. Gowariker, Polymer Science, Wiley Eastern, 1995.
2. G.S. Misra, Introductory Polymer Chemistry, New Age International (Pvt) Limited, 1996.

**REFERENCE BOOKS:**

1. F. N. Billmeyer, Textbook of Polymer Science, Wiley Interscience, 1971.
2. Kumar and S. K. Gupta, Fundamentals and Polymer Science and Engineering, Tata McGraw-Hill, 1978.

**Course Coordinator**

**HOD**

<b>P18MCCH032</b>	<b>ELECTIVE-3-SPECTROSCOPIC TECHNIQUES</b>					L	T	P	C		
	Total Contact Hours - 60					<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>		
	Prerequisite – B.Sc., Chemistry Level										
	Course Coordinator Name & Department:- – Mrs. S. Vinitha / Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the introduction of chemical kinetics										
CO2	Understand about the theoretical concepts of catalyst										
CO3	Understand its introduction of molecular spectroscopy										
CO4	Apply the detail about the uses and importance of the spectral techniques										
CO5	Apply the importance of concepts involved in the photochemistry										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	47 <sup>th</sup> Academic Council Meeting									

### UNIT I: CHEMICAL KINETICS

12

Concept of rate of reactions – factors influencing rate of reaction – Rate law, rate constant, order and molecularity of reactions – differential and integral forms of rate equations for zero, first and second order reactions – third and fractional order reactions (no derivation) – half life period – pseudo first order reactions - Methods for the determination of order of reactions – integration method, differentiation method, graphical method, half-life method, and Oswald's isolation

method - Experimental methods involved in the following kinetics of reactions: titrimetry, monometry, polarimetry, dilatometry and spectrophotometric techniques with examples

## **UNIT II - CATALYSIS**

12

Acid–base catalysis – types and mechanisms – primary salt effect in ionic reactions - Enzyme catalysis – Characteristics of enzymes – factors affecting enzyme catalysis – derivation of Michaelis-Menton equation - Surface Chemistry – mechanism of catalytic action – unstable intermediate compound formation theory – adsorption or contact theory. Catalytic promoters and poisons - Adsorption isotherms – derivation of Freundlich and Langmuir adsorption isotherms – use of B.E.T. isotherm in surface area determination (derivation not required).

## **UNIT III - MOLECULAR SPECTROSCOPY I**

12

Various types of spectra and the energy changes - Microwave spectroscopy – theory of rotational spectra of diatomic molecules – Stark effect – symmetric top molecules and asymmetric top molecules – isotopic effect – applications. calculation of bond length – its limitations - Infrared spectroscopy – theory of vibration-rotation spectra – types of vibration – force constant - Raman spectroscopy – Raman effect – theory – pure rotational Raman spectra – vibrational Raman spectra – comparison of IR and Raman spectra – structural determinations of simple molecules.

## **UNIT IV - MOLECULAR SPECTROSCOPY II**

12

UV and Visible spectroscopy – Vibrational Coarse structure – Frank Condon Principle – The Fortrat diagram – Pre-dissociation - NMR spectroscopy – basic principles – chemical shift and spin-spin coupling – coupling constant – chemical shift reagents. ESR spectroscopy – basic principles – hyperfine splitting - Mass spectrometry – basic principles of mass spectrum – molecular peak, base peak, metastable peak – fragmentation – nitrogen rule – determination of molecular formulae with examples – identification of alcohols, aldehydes, aromatic hydrocarbons.

## **UNIT V – PHOTOCHEMISTRY**

12

Classification of photochemical reactions – Jablonski diagram – Characteristics of photochemical reactions – comparison with thermochemical reactions – Laws of photochemistry – quantum yield – examples of reactions of simple and high quantum yield – primary and secondary processes photochemical chain reactions hydrogen–chlorine reaction – Photosensitization – chemiluminescence – photosynthesis – photodimerisation of anthracene. Fluorescence and phosphorescence – quenching of fluorescence and Stern–Volmer equation - Interaction of high–energy radiation with matter – radiolysis of water – hydrated electron.

### **TEXT BOOKS:**

1. Physical and Theoretical Chemistry, C.D.George, P.M.Thomas and C.D.Joseph (1966).
2. Text Book of Physical Chemistry, P.L.Soni, O.P.Dharmara, U.N. Dash, Sultan Chand & Sons, New Delhi.

### **REFERENCE BOOKS:**

3. Principles of Physical Chemistry, B.R.Puri, L.R.Sharma, M.S.Pathania, Shoban Lal Nagin Chand & Co. New Delhi.

**Course Coordinator**

**HOD**

<b>P18MCCH033</b>	<b>ELECTIVE – 3-</b>		L	T	P	C					
	<b>PHARMACEUTICAL CHEMISTRY</b>										
	Total Contact Hours - 60		4	0	0	4					
	Prerequisite B.Sc., Chemistry level										
Course Coordinator Name & Department:- Mrs. S. Vinitha / Chemistry											
<b>COURSE OBJECTIVES:-</b>											
To make the students learn about the chemistry from the basic and understood all theoretical background with all concepts understands thoroughly.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the knowledge about the basics of pharmaceutical chemistry										
CO2	Understand about the antibiotics and their activity.										
CO3	Understand its analgesic and antipyretic activities.										
CO4	Apply the detail about the activities of anaesthetics and local anaesthetics.										
CO5	Apply the importance of clinical chemistry.										
CO6	Analyze the real time applications of Chemistry in day today life.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/ Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	<b>Category</b>	<b>Humanities &amp; Social Studies (HS)</b>	<b>Basic Sciences (BS)</b>	<b>Engg Sciences (ES)</b>	<b>Professional Core (PC)</b>	<b>Core Elective (CE)</b>	<b>Non-Major Elective (NE)</b>	<b>Open Elective (OE)</b>	<b>Any other</b>	<b>Project/Term Paper/ Seminar/ Internship (PR)</b>	
					✓						
4	Approval		47 <sup>th</sup> Academic Council Meeting								

### UNIT I: Basics of Pharmaceutical Chemistry

12

Definitions – the terms – drugs, pharmacology, pharmacy, chemotherapy, therapeutics – pharmacologically active principles in plants – first aid – important rules of first aids, cuts, fractures, bleeding for blood, maintaining breathing burns and first aid box – tuberculosis (T.B.), jaundice, piles, typhoid, malaria, cholera – causes – symptoms, diagnosis – prevention and

treatment – medicinally important compounds of iron – ferrous gluconate, ferrous sulphate and ferric ammonium citrate.

**UNIT II:Antibiotics**

12

Definition – introduction – classification and biological actions – penicillin, chloramphenicol, streptomycin and tetracycline – structure, properties and therapeutic uses – chemical structure and pharmacological activity – effect of unsaturation, chain length, isomerism, halogens, amino groups, hydroxyl groups and acid groups.

**UNIT III:**

12

Analgesic and Antipyretics Narcotic analgesic – analgesic action of morphine – derivatives of morphine – heroin and apomorphine – synthetic analgesics – pethidine, methadone – nonnarcotic analgesic – aspirin, paracetamol and phenacetin – analgin – preparation, properties and uses – ibuprofen and ketoprofen – structure and uses.

**UNIT IV:**

12

Anaesthetics and Local Anaesthetics Characteristics of anaesthetics – classification of anaesthetics – general anaesthetics – volatile anaesthetics – ether, chloroform and halothane – advantages and disadvantages – non-volatile anaesthetics (intravenous anaesthetics) – methohexitone and propanidid – structure and uses – cocaine and amethocaine – structure and uses – benzocaine and procaine – structure, synthesis and uses.

**UNIT V:**

12

Clinical Chemistry Determination of sugar (glucose) in serum – o-toluidine method – diagnostic test for sugar in urine – Benedict's test – detection of diabetes – detection of cholesterol in urine – detection of anaemia – estimation of haemoglobin (Hb concentration) – red cell count.

**TEXT BOOKS:**

1. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry; 5th Ed., S. Chand and Company Ltd., New Delhi, 2014.
2. S. Lakshmi; Pharmaceutical Chemistry; 1st Ed., S. Chand and Company Ltd., New Delhi, 1995.

**REFERENCES BOOKS:**

1. BhagavathiSundari; Applied Chemistry; 1st Ed., MJP Publishers, Chennai, 2006.

**Course Coordinator**

**HOD**

## Open Elective

<b>P18OEBA001</b>	<b>ADVERTISING AND SALES MANAGEMENT</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 60						4	0	0	4	
	Prerequisite course –UG Level										
	Course Coordinator Name & Department:- T Manjiniprakash/BBA										
<b>COURSE OBJECTIVES: -</b>											
Identify the terms and concepts that are commonly used in promotion and advertising.											
Demonstrate preparation to comprehend the basic advertising.											
Give the relationship which underlines these terms and concepts To familiarize the students with the basic fundamentals of accounting.											
To impart knowledge on final accounts of sole trading concern.											
To enable the students on the concept of income & expenditure and receipts and payments.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Students gain basic knowledge of Advertising its functions, roles and development of advertising.										
CO2	Know about Advertising design and its strategies.										
CO3	Expose on Advertising, media and about its types.										
CO4	To forecast sales and its techniques used in management.										
CO5	Students were enriched about salesmanship, sales planning, budgeting.										
CO6	Develop an advertising plan and present and defend it persuasively.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	<b>PO3</b>	PO4	<i>PO5</i>	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	L	M						M		
	CO2	H	L							L	
	CO3	L	H								
	CO4	H	L								
	CO5	L	M								
	CO6	M	L								
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)
									✓		

4	Approval	Academic Council Meeting
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**UNIT - I**

**12**

Introduction to Advertising- Definition -Roles of Advertising- Functions of Advertising-Steps in Development of Advertisement

**UNIT – II**

**12**

Advertising Design- Appeals- Structure of an Advertisement - Message Strategies - Cognitive strategy- Executional Strategies-Creating Advertising- Advertising Effectiveness.

**UNIT–III**

**12**

Advertising Media - Merit and demerits- Kinds of Advertising - Advertising Media- print media - Broadcasting media- Non-media advertising- online advertising.

**UNIT – IV**

**12**

Sales Management - Defining - Objectives -Strategies- Sales Executives – Functions -Qualities - Sales Presentation Techniques - Emerging Trends in Sales Management.

**UNIT – V**

**12**

Selling Concept - Objectives- scope and techniques of Salesmanship- Sales Planning- Importance – process- Sales Budget- Objectives-uses of sales Budget.

**Text book**

1. Advertising & promotion: George E.Belch, THM
2. Advertising Management, Dr.Varma&Aggarwal, kingBooks

**References:**

1. Sales promotion and advertising management by M .N.Mishra. Himalaya Publication.
2. Advertising and sales management by SanjeevChauhan (Astha publication)
3. Anderson, Hair, Bush: Professional Sales Management, McGraw Hill, Singapore.

T Manjiniprakash

*CourseCoordinator*

*HOD*

<b>P18OEBA002</b>	<b>BPO MANAGEMENT</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 60							4	0	0	4
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- .P.Srinivasan/ Business Administration										
<b>COURSE OBJECTIVES: -</b>											
To familiarize the students with the basic fundamentals of BPO industry											
To impart knowledge on BPO industry											
To enable the students on the concept of various decisions in Business Process Outsourcing											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Develop a strategic understanding of the concepts of BPO's and its benefits										
CO2	Explaining various models used in functioning of BPO's and Trends.										
CO3	Describe the opportunities and challenges in Human Resources BPO										
CO4	Analyzes about call centers its functions, processes and classifications										
CO5	Developing efficiency in understanding the customers and capabilities in handling calls.										
CO6	To understand the future trends in BPO industry										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
	COs/Pos	PO1	PO2	<i>PO3</i>	PO4	<i>PO5</i>	PO6	PO7	<i>PS O1</i>	PS O2	PS O3
	CO1	H	M						M	L	
	CO2	H	L								
	CO3	H	M								
	CO4	M	H								
	CO5	M	M								
	CO6	L	M								
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)	Enng sciences(ES)	Professional Core (PC)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/ Seminar/ Internship(PR)		
								✓			
4	Approval	Academic Council Meeting									

### UNIT – I

Business Process Outsourcing – Meaning – definition - Basics - Benefits - BPO Models - - BPO Companies in India.

12

### UNIT-II

Healthcare BPO – Structure of the American Healthcare Sector – Activity Profile –Future Trends and Threats – Case Study – Cbay Systems.

12

**UNIT - III****12**

Human Resource BPO – Reasons for outsourcing HR – Activities involved in HR BPO – HR Outsourcing Trends – Career in HR BPO – Emerging BPO Domains – Media and Entertainment BPO – Publishing BPO.

**UNIT – IV****12**

Call Centres – Functions – Processes – classifications – Telemarketing – Tele selling – Preparing for a Job – Approach – Training – Selection Process.

**UNIT – V****12**

Improving Efficiency – Handling Calls – Team Player – Pleasing the Customers – Converse efficiently – Reducing stress.

**TEXT BOOKS:**

1. BPO Industry in India by S K Awasthi by Jain Book
2. Business Process Outsourcing: Its Prospects and Challenges by Barua.

**REFERENCE BOOKS**

1. Sudhindra Mokhasi (2009), BPO – Sutra : True stories from India's BPO and call centres, - Rupa & Co.
2. Kulkarni, Sarika. (2005), Business process outsourcing – Delhi, Jaico Publishing House.
3. Shikapur, Deepak (2004), BPO Digest. Ameya Inspiring Books.

Mr. P. Srinivasan

**Course Coordinator**

**HOD**

<b>P18OEBA003</b>	<b>CALL CENTER MANAGEMENT-Voice and Non Voice</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours –60						4	0	0	4	
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:-A.Jhony / BBA										
<b>COURSE OBJECTIVES:-</b>											
Develop and motivate a call centre team.											
Get the most out of call monitoring technology and prepare effective management reports.											
React to and plan for operational bottlenecks.											
Give meaningful feedback to call-centre agents and set achievable goals and targets.											
Students will learn about the roles and methods of different kinds of call centers. They will apply this by designing their own call center and trying to anticipate customer needs.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Gaining a basic knowledge about call centers its functioning and classifications.										
CO2	To know about handling the Issues and problems related to calls in a efficient manner.										
CO3	Gives knowledge of technical communications, speech process and educate conversation of oral skills.										
CO4	Students acquire knowledge towards pre-interview about Interview questions and answering techniques										
CO5	Analyses fully about the medias of communications.										
CO6	Demonstrate awareness of the pragmatics of call center planning and operation										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
	CO1	M	H						M	H	
	CO2	M	H								
	CO3	L	H								
	CO4	L	H								
	CO5	M	H								
	CO6	L	H								
	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

**UNIT – I****12**

Call centers – Meaning – Functions – Processes - Classifications – Tele selling – Types of call centers.

**UNIT – II****12**

Improving Efficiency – Handling calls – Team Players – Components and working of call center – Issues and problems.

**UNIT – III****12**

Nature of Technical communication: Stages of communication – Nature of Technical Communication - The speech process – Conversation and Oral skills.

**UNIT – IV****12**

Job Interview: Pre – Interview preparation techniques – Interview questions – Answering Strategies – Frequently asked Interview questions.

**UNIT – V****12**

Communication media – Telephone – Fax – Internet – Email – Video conferencing.

**TEXT BOOKS**

1. Brad Cleveland - Call Center Management on Fast Forward: Succeeding in the New Era of Customer Relationships (3rd Edition) Third Edition,
2. Mr. Thomas Anthony Laird - Advice from a Call Center Geek: Rethinking Call Center Operations,

**REFERENCE BOOKS**

1. W. Stallings “Data and Computer Communication” Pearson Education, 5 Edition, 2001.
2. M. AshrajRizvi,” Effective Technical Communication”, Tata McGraw – Hill Education, 2005.
3. R.S.N.Pillai&Bagavathi – Modern commercial correspondence.

***A.Jhony****Course Coordinator**HOD*

<b>P18OEBA004</b>	<b>CUSTOMER RELATIONSHIP MANAGEMENT</b>							<b>LT</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 60							4	0	0	4
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Dr.D Arun Kumar /BBA										
<b>COURSE OBJECTIVES: -</b>											
To Popularize the students with the basic fundamentals of CRM.											
To improve knowledge & skills on Customer relationship of Marketing strategy.											
To develop the students on the concept of Customer service.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	To popularize with the basics of CRM.										
CO2	Can increase awareness about Customer relationship.										
CO3	Able to be aware of the concept of Customer service.										
CO4	Can respond to the concept of Customer needs.										
CO5	Develop confidence in the practical aspects of Customer Satisfaction										
CO6	Identify the main Customer Expectations.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	M	L						M		
	CO2	L	L								
	CO3	M	L								
	CO4	L	L								
	CO5	M	H								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)	Engg Sciences (ES)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

### UNIT – I

12

CRM – Introduction – Definition – Need for CRM – Customer satisfaction – Customer loyalty – Product Marketing – Direct Marketing-

**UNIT – II****12**

Customer learning relationship – Key stages of CRM - Force driving CRM – Benefits of CRM – Growth of CRM Market in India – Key principles of CRM.

**UNIT – III****12**

CRM – Program – Ground work for effective use of CRM – Components of CRM – Types of CRM.

**UNIT - IV****12**

CRM Process - Frame work – Governance process- Performance evaluation process.

**UNIT-V****12**

Use of Technology in CRM – Call center process – CRM Technology tools – Implementation – Requirements analysis – selection of CRM Package – reasons and failure of CRM.

**TEXT BOOK**

1. Kristin Anderson & Carol Kerr – Customer Relationship Management – McGrawHill 2002
2. Sheth – Customer Relationship Management – McGraw Hill Edition 1<sup>st</sup> Edition 2000

**REFERENCE BOOK**

1. Dr. P .Sheela Rani – Customer Relationship Management – Margham Publication.
2. K. Balasubramaniam – Customer Relationship Management – GIGO Publication, 2005.
3. Dr. Ravi Kalakota E – business – Road map for success, Pearson education Asia, 2000.

Dr.D.ArunKumar  
*Course Coordinator*

*HOD*

<b>P18OEBA005</b>	<b>ENTREPRENEURSHIP DEVELOPMENT</b>						<b>LT</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours – 60						4	0	0	4	
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- Dr.DArun Kumar /BBA										
<b>COURSE OBJECTIVES: -</b>											
To make publicity on the students with the basic fundamentals of Entrepreneur Development											
To improve knowledge & skills on Entrepreneurship.											
To develop the students on the concept of Entrepreneurial skills.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	To popularize with the basics of Entrepreneur development.										
CO2	Can increase awareness about Entrepreneurship.										
CO3	Able to be aware of the concept of Entrepreneurial skills.										
CO4	Can respond to the concept of Entrepreneurial knowledge.										
CO5	Develop confidence in the practical aspects of Business Opportunity.										
CO6	Identify the main Innovations in Entrepreneurial Development.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	L	L						M	L	
	CO2	L	M								
	CO3	L	L								
	CO4	L	L								
	CO5	L	L								
	CO6	L	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									



<b>P18OEBA006</b>	<b>HUMAN RESOURCE MANAGEMENT</b>							<b>LT</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 60							<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- P.Srinivasan / BBA										
<b>COURSE OBJECTIVES: -</b>											
Today's competitive business environment owes its success to effective management of its human resource.											
The quality of the organization's employees, their attitude, behavior and satisfaction with their jobs, and their behavior towards ethics and values and a sense of fair treatment all impact the firm's productivity, level of customer service, reputation, and survival.											
The students of human resources management must aware of basic aspects of human resource management to understand the functioning of human resource management in an organizational setting.											
Students gained knowledge in the present-day human resources development practice by incorporate themselves in the changing environment of HRM.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Identify how firms gain a sustainable competitive advantages through people										
CO2	To be aware of the responsibility managers of have concerning human resource management										
CO3	Identify the importance of change management.										
CO4	To implement basics compensation and performance appraisal										
CO5	Importance of labour welfare and grievance handling for employment										
CO6	Understand the importance of Employee participation and Relations.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1		
2	CO1	H	H						M		
	CO2	M	M							PS O2	PS O3
	CO3	L	H								
	CO4	M	L								
	CO5	M	M								
	CO6	H	H								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

**UNIT – I** **12**  
Human Resource Function- Human Resource Philosophy – Changing environments of HRM – Strategic human resource management – Role of HR Managers.

**UNIT – II** **12**  
Recruitment & Placement: Sources, Developing and using application forms - IT and online recruitment - Selection process, basic testing concepts - types of test - work samples & simulation - selection techniques – interview - Designing & conducting the effective interview - computer aided interview.

**UNIT – III** **12**  
Training & Development: Employee Orientation- Training process- Need analysis- Training techniques- special purpose training- Performance appraisal: Methods - Problem and solutions - MBO approach - Performance appraisal in practice.

**UNIT – IV** **12**  
Basic Compensation & Pay plans - factors determining pay rate - Current trends in compensation - Computerized job evaluation - financial incentives - benefits - Insurance benefits - retirement benefits – welfare measure

**UNIT – V** **12**  
Trade unions - Discipline administration - grievances handling - Labour Welfare: Importance & Implications of labour legislations - Employee health.

#### **TEXT BOOKS**

1. Dr.R.Venkatapathy&AssissiMenacheri, Industrial Relations &Labour Welfare, Adithya Publications, CBE, 2001. 5. Robert L.Gibson and Marianne H.Mitchell, Introduction to Counseling and Guidance, VI edition, PHI, 2005
2. L.M. Prasad – Human Resource Management – S. Chand & Sons – 2007.

#### **REFERENCEBOOKS**

1. Gary Dessler, "
2. zo& Stephen P.Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
3. VSP Rao, Human Resource Management: Text and cases, First edition, Excel Books, New Delhi - 2000.
4. P.SrinivasanHuman Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson. **David A. DeCen**

*P.Srinivasan*  
*Course Coordinator*

*HOD*

<b>P18OEBA007</b>	<b>LOGISTICS &amp; SUPPLY CHAIN MANAGEMENT</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 60						4	0	0	4	
	Prerequisite course: UG Level										
	Course Coordinator Name & Department:- T.Manjiniprakash / BBA										
<b>COURSE OBJECTIVES:-</b>											
To make the students to understand the usefulness of logistics and supply chain.											
This document lists the course’s major subject areas and the knowledge, comprehension, application, analysis, synthesis and evaluation skills that they are designed to impart.											
Identify the sources of cost in a supply chain.											
Define inventory and types of inventory in a supply chain.											
Define transportation cost and identify the factors that contribute to this cost.											
Calculate inventory cost and transportation cost for a logistics problem.											
Define fixed and variable cost.											
Understand the economies of scale in transportation and inventory cost											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Identify and Analyze Business Models, Business Strategies and corresponding Competitive Advantage.										
CO2	Formulate and implement Warehouse Best Practices and Strategies.										
CO3	Plan Warehouse and Logistics operations for optimum utilization of resources										
CO4	Apply logistics and purchasing concepts to improve supply chain operations										
CO5	Apply quality management tools for process improvement										
CO6	Create an ideas about logistics and supply chain management										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	H	H						H		
	CO2	H	M								
	CO3	M	M								
	CO4	L	M								
	CO5	H	M								
	CO6	M	H								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

Logistics management and Supply Chain management - Definition, Evolution, Importance. The concepts of logistics. Logistics relationships - Functional applications - Logistics Organization - Logistics in different industries.

**UNIT –II** **12**

Logistics Activities: – objectives, solution. Customer Service, Warehousing and Material Storage, Material Handling, information handling and procurement Transportation and Packaging - Reverse Logistics - Global Logistics

**UNIT-III** **12**

Fundamentals of Supply Chain - Development of SCM - Strategic Supply Chain Management and Key components - Drivers of Supply Chain Performance – key decision areas – External Drivers of Change.

**UNIT-IV** **12**

Supply Chain Drivers and Design Drivers of supply chain performance: Framework for structuring Facilities warehouse – Inventory – Transportation – Information - Sourcing, and Pricing – Revenue management.

**UNIT-V** **12**

Demand and Inventory Aggregate Planning in a Supply Chain: role - strategies Implementation Responding to predictable variability in supply chain – Types of supply chains - creating responsive supply chains lean

**TEXT BOOKS**

1. Supply Chain Management: Ronald H. Ballou, Samir K. Srivastava, Pearson Education Ltd, Jan 2007.
2. Supply Chain Management: Anil Sinha, McGraw Hill Education, August 2011.

**REFERENCE BOOKS**

1. Logistics And Supply Chain Management: Martin Christopher, Pearson Education Ltd, 2016.
2. Supply Chain Management: Sunil Chopra, Peter Meindl, Dharma Virus Kalra, Pearson Education Ltd, 2016.
3. Supply Chain And Logistics Management: V. Anandaraj, S. Kumaran, Ishanka Saikira, Airwalk Publication, Jan 2018.

T.Manjiniprakash.  
**Course Coordinator**

**HOD**

<b>P18OEBA008</b>	<b>OFFICE MANAGEMENT</b>							<b>LT</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours – 60							4	0	0	4
	Prerequisite course – UG Level										
	Course Coordinator Name & Department:- D.K.Sowmiyalakshmi /BBA										
<b>COURSE OBJECTIVES: -</b>											
To familiarize the students with the basic fundamentals of accounting.											
To impart knowledge on final accounts of sole trading concern.											
To enable the students on the concept of income & expenditure and receipts and payments.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	To make them understand office management and duties of an office manager										
CO2	To give an idea about proper filing and indexing of office documents										
CO3	To understand the principles of record management and different types of records in business organization.										
CO4	To enable them to aware about safety hazardous and steps to improve office safety.										
CO5	To introduce different measures of office work										
CO6	Create an ideas about office management										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PS O3
2	CO1	H	H						H		
	CO2	M	M								
	CO3	M	H								
	CO4	L	H								
	CO5	H	H								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

Introduction: Meaning, functions and importance of office management; office management and organization. Principles of office management and organization. Principal departments of modern office.

#### **UNIT-II**

**12**

Office Manager: qualities of office manager. The authorities and responsibilities of an office manager. Office accommodation: Selection of site. Office layout. Environment and working conditions.

#### **UNIT-III**

**12**

Office equipment's - Reproduction equipment - Typewriter - Duplicators - Photo Copier - Communication Equipment - Intercom - Telephone - Use of Computers in Office Management Office System - Procedure - Routine - And methods - Paper work in office Filing functions.

#### **UNIT-IV**

**12**

Office Communication: Various means of communication- Their use, Correspondence through Internet - Office Correspondence -Central vs. Departmental Correspondence - Handling Mail - Postal Services - Oral written - Internal and external communication - Records Management Types - Forms Controls - Principles - Foremost -Continuous stationery

#### **UNIT-V**

**12**

Office Supervisor - Meaning and characteristics of Supervisor - Status - Place and Role of Supervisor - Effective Supervisor - Qualification - skill of Supervisor.

#### **TEXT BOOKS**

1. Modern Office Management: N. D Sharma, And Publishers, Jan 2006.
2. Office Management: Prashansa K. Ghosh, S. Chand & Sons, Jan 2010

#### **REFERENCE BOOKS**

1. Office Management: R.S.N Pillai&Bhagavathi, S. Chandler & Come, Dec 2010.
2. Office Management: R. Nangia, G. K Gupta, Crescent Publishing House.
3. Office Management: Dr. R. K Chopra, PriyankaGauri, Himalaya Publishing House, Jan 2017.
4. Of Non-Trading Organization-Receipts And Payment Account- Income And Expenditure Account

*D.K.Sowmiyalakshmi*  
CourseCoordinator

*HOD*

<b>P180EVC001</b>	<b>PHOTOGRAPHY AND VIDEOGRAPHY</b>							L	T	P	C
	Total Contact Hours – 60							4	0	0	4
	Prerequisite – UG Level										
	Course Coordinator Name & Department:- P. Nagarajan, Dept of Visual Communication										
<b>COURSE OBJECTIVES</b>											
<ul style="list-style-type: none"> <li>To understand the fundamentals of Photography and Videography</li> <li>To examine the technical factors of indoor and outdoor photography and Videography</li> <li>To enable the students to equip themselves to become a photography and Videography professionals.</li> </ul>											
<b>COURSE OUTCOMES (COs)</b>											
<b>CO1</b>	Can analyze the fundamentals of Photography and Videography										
<b>CO2</b>	Understanding of the camera operations										
<b>CO3</b>	Evaluating the lighting										
<b>CO4</b>	Can be aware of the wrong exposures										
<b>CO5</b>	Can promote various types of photography and Videography										
<b>CO6</b>	Understanding the concept of photo-journalism										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
2	CO1	H	M								
	CO2	H	M								
	CO3	H	M								
	CO4	H	M								
	CO5	H	M								
	CO6	H	M								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	*		
4	<b>Approval</b>	Academic Council Meeting									

Human Eye and Camera. Basics of Camera (aperture, shutter speed, focal length, f-stop, depth of field etc.,) Camera operations, Introduction to Television Production, Types of telecasting, Television Crew, an overview of direction.

**UNIT-II: 12**

Types of Still and video cameras. Types of Lenses. Visual Perception, Art direction, floor management- indoor & outdoor, production management, budget preparation. Locations: Indoor, set, on-sights sets, - Outdoor on-sight sets, blue matte. Etc.,

**UNIT-III: 2**

Understanding lighting-indoor and outdoor, Exposing and Focusing, Types of lighting, Natural and Artificial Lights, Controlling lights, Exposure Meters. Camera techniques & operation, Framing, shots & movements (wide, medium, close ups, shadow, zoom, pan, tilt, aerial etc.),

**UNIT-IV: 12**

Photography for advertising-Consumer and industrial. Usage of various types of camera lenses (Normal, Tele, Zoom etc.), usages of various filters (day ,night, colour correcting filter, diffusion filter), objectives TV lighting, various types of Lights (baby, Junior, Senior, etc.,)

**UNIT- V: 12**

Basics of photo-journalism, Photo-features, Photo - essays, Writing captions, Visual story telling. Planning a shoot-studio, location, set props and casting.Colour temperature, lighting for different situations (interviews, indoor, out-door), types of lighting( Back, Front, full, semi, etc.,)

**TEXT BOOKS:**

1. The Art of Photography: A Personal Approach to Artistic Expression, Barnbaum, Bruce, Rocky Nook
2. Photography Demystified: Your Guide to Gaining Creative Control, David McKay, Photography Inc.
3. Television Productions: A History of All Series and Pilots, by JonAbbott, Publisher: McFarland & Company (May 13, 2009)
4. Production Management for TV and Film: The Professional's Guide, Methuen Drama (August 1, 2010)

**REFERENCE BOOKS:**

1. The Photographer's Eye, Szarkowski, John, The Museum of Modern Art, New York (Publisher)
2. Creative Composition: Digital Photography Tips and Techniques, Davis, Harold, Wiley
3. From Concept to Screen: An Overview of Film and Television Production, Robert Benedetti, Pearson; 1 edition (June 11, 2001)
4. The Television Handbook, Routledge, Holland, P (1999)

**CourseCoordinator**

**HOD**

<b>U18SEEN001</b>	<b>SOFT SKILLS</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 30							2	0	0	2
	Prerequisite – Higher Secondary Level										
Course coordinator name & Dept: Mrs. B.CAROLINE– English											
<b>COURSE OBJECTIVES:-</b> To effectively complement the already existing Hard Skills so that the combination becomes a winning blend that could project the candidate’s true worth in proper perspective.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the personal as well as professionals goals of the students										
CO2	Understand the manners during professional meetings										
CO3	Apply the right reasons of stress										
CO4	Analyze the importance of communication skills										
CO5	Evaluate the excellence in both personal and professional life										
CO6	Create the Growth & development of soft skills										
Category	OE										
Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PSO2	PS O3
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
								✓			
4	Approval	47 <sup>th</sup> Academic Council Meeting									

**UNIT I      Soft Skills**

Introduction to soft skills



<b>P18OEEN002</b>	<b>MASS MEDIA AND COMMUNICATION</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours – 30							2	0	0	2
	Prerequisite – UG Level										
	Course coordinator& Dept :–Dr.P.AROCKIA NATHAN - English										
<b>COURSE OBJECTIVES :</b> To impart students with the efficient knowledge of important events in through literature											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the art of writing, report and editing										
CO2	Understand the skills of writing										
CO3	Apply the Role & importance in social change										
CO4	Analyze the social structure of Indian society										
CO5	Evaluate the growth & development of communication and media										
CO6	Create the interpreting the meaning from the text										
Mapping of Course Outcomes with Program outcomes (POs) (1/2/3 indicates strength of correlation) 3-High, 2-Medium, 1-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1		
2	CO1	H	L						H	PSO2	PSO2
	CO2	H									
	CO3	H	L								
	CO4	H	L								
	CO5	H									
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

### UNIT I -Communication and Media

6

Communication & Media: Definition, meaning and concept.  
Different types of communication: verbal and written  
Scope and Process of Mass Media & Communication

### UNIT II -History of Mass media

6

History of the development of electric media in India: Radio & TV

Role of media in society, Impact of media on audience,  
Media effects, limitations and different form of media.

**UNIT- III- Role & Responsibilities** **6**

Role and responsibilities of journalist, ethics, careers,  
Media management, Media laws in India, and freedom of press  
Qualities and Responsibilities of a reporter

**UNIT IV -Theories & Principles** **6**

Theories and Principles of Editing  
Communication and theories of social change,  
Role of media in social change, Development communication

**UNIT V-Technology & Development** **6**

Changing trends of mass communication under the process of globalization  
Technology in the development of media.

**Text Books**

1. Vivian, John, Mass Media & communication Boston, Massachusetts : Pearson Allyn and Bacon, c.2008.
2. Stovall, James Glen, Writing for the mass media, New Jersey : Pearson Education, Inc., c.2012

**Reference Books:**

1. Parthasarathy, Rangaswami, journalism in India, sterling Publisher pvt. Ltd. New Delhi.
2. D.S. Mehta. Mass communication and Journalism in India New Delhi, Allied Publishers, 2011

**Course Coordinator**

**HOD**

<b>P18OESC001</b>	<b>COMPUTER APPLICATIONS</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-Dr.S.ThiruNirai Senthil / BCA										
<b>COURSE OBJECTIVES:-</b> Learners will be familiar with basic of computer application. Learners will understand the applications of computer & able to know about the operating systems.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Gain knowledge in fundamental computer applications										
CO2	Understand the concept of input device functions										
CO3	Identify the suitable input devices for application										
CO4	Analyze the input and output devices and its processes										
CO5	Evaluate data and storage devices for application										
CO6	Create an real time application using a system software and application software										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L							H	
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	CoreElective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I****6**

Brief History of Development of Computers ,Computer System Concept, Computer System Characteristics ,Capabilities and Limitations, Types of Computers-Personal Computer (PCs) - IBM PCs, Types of PCs- Desktop, Laptop, Notebook, Palmtop, etc. Basic Components of a Computer System - Control Unit, ALU, Input/ Output Unit-Memory, Storage Fundamentals - Primary Vs Secondary memory.

**UNIT II****6**

Input Devices : Keyboard, Mouse, Joystick, Scanners, Digital Camera, MICR,OCR, OMR, ,Light pen, Touch Screen.

**UNIT III****6**

Output Devices: Monitors - Characteristics and types of monitor, Size, Resolution, Refresh Rate, Dot Pitch, Video Standard - VGA, SVGA, XGA etc. Printers - Daisy wheel, Dot Matrix, Inkjet, Laser. Plotter, Sound Card and Speakers.

**UNIT IV****6**

Various Storage Devices - Magnetic Disks, Hard Disk Drives, Floppy, Disks, Optical Disks.

**UNIT V****6**

Computer Software, Need, Types of Software - System software, Application software System Software - Operating System, Compiler , Assemblers, Interpreter.

**TEXT BOOKS:**

1. S.K. Basandra, “Computers Today”, Galgotia Publications,2010.
2. Alexis Leon & Mathews Leon, “Fundamentals of Information Technology”, Vikas Publishing House, New Delhi,2009.

**REFERENCE BOOKS:**

1. Rajeev Mathur, “Dos Quick Reference”, Galgotia Publications.

**Course Coordinator****HOD**

<b>P18OESC002</b>	<b>MULTIMEDIA</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours– 30							2	0	0	2
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-Dr.S.ThiruNirai Senthil / BCA										
<b>COURSE OBJECTIVES:-</b> To Understand the basic multimedia concepts and designing concepts.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Gain knowledge in basic concepts of multimedia										
CO2	Analyze the multimedia application problems.										
CO3	Understand the Video capturing, Sound capturing, editing concepts.										
CO4	Identify the basic multimedia design principles.										
CO5	Evaluate the multimedia system and Design Process.										
CO6	Create a real time application using a multimedia concept.										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								
	CO2	H	-								H
	CO3	H	-								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I** **6**  
Multimedia Fundamentals: Concept of multimedia, Fundamental criteria for the design of a multimedia presentation, Multimedia Application Goals & Objectives, opportunities in multimedia production.

**UNIT II** **6**  
Role of multimedia-development of team members, avoiding problems in planning a multimedia application.

**UNIT III** **6**  
Multimedia Building Blocks: Text, Graphics, Video capturing, Sound capturing, editing.

**UNIT IV** **6**  
Basic design principle: proximity, visual hierarchy, Symmetry, Asymmetry, Repetition, unity, Contrast, dynamics, Emphasis, Multimedia Authoring tools.

**UNIT V** **6**  
Design, Development and evaluation of multimedia a system, Development of user interface design, Design Process.

**Text Books**

1. John Villamil, Casanova, Louis Molina, “An introduction to multimedia”,1998.
2. Mohammad Dastbaz, “Designing Interactive Multimedia Systems”,2002.

**Reference Books**

1. Bohdan O. Szuprowicz, “Multimedia Networking”,1995.
2. Stephen McGloughlin, “Multimedia on theweb”,1997.

**Course Coordinator**

**HOD**

<b>P18OESC003</b>	<b>ADVANCED EXCEL</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-S.Anupriya / BCA										
<b>COURSE OBJECTIVES:-</b> To identify the various functions in Excel Sheet											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Understand the advanced Excel formulas.										
CO2	Evaluate IF conditions, AND, OR functions.										
CO3	Analyze the advanced filter options.										
CO4	Execute the multiple windows, splitting windows management.										
CO5	Understand the pivot table methods.										
CO6	Create a real time application by creating, modifying Excel sheet.										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								H
	CO2	H	L								
	CO3	H	L	M	M						
	CO4	H	L	M	M						
	CO5	H	L	M	M						
	CO6	H	L	M	M						
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internshin(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I****6**

Uses of Advance Excel Formulas -VLOOKUP, HLOOKUP, SUMIF, SUMIFS, SUMPRODUCT, DSUM, COUNTIF, COUNTIFS, IF, IFERROR, ISERROR, ISNA, ISNUMBER, ISNONTEXT, OR, AND, SEARCH, INDEX, MATCH etc

**UNIT II****6**

Various Methods and Uses of IF Conditions , Usage of "IF" Conditions? , Creation of Multiple IF Conditions in One Cell , Use the IF Conditions with the Other Advance Functions, How to use nested IF statements in Excel with AND, OR Functions Sorting, Data Forms, Adding Data Using the Data Form, Finding Records Using Criteria

**UNIT III****6**

Filtering Data, AutoFilter, Totals and Subtotals, Row, Various Methods of Filter and Advance Filter options , Creating and Updating Subtotals , Various Method of Sorting Data ,Creating, Formatting and Modifying Chart.

**UNIT IV****6**

Customizing the Quick Access Tool Bar , Managing Windows ,Multiple Windows , Splitting Windows.

**UNIT V****6**

Various Methods and Options of Pivot Table, Using the Pivot Table Wizard, Changing the Pivot Table Layout, Subtotal and Grand total Options, Formatting, and Grouping items

**Text Books**

1. Jordan Goldmeler, “Advanced Excel Essentials” ,A Press, 2015 edition.

**Reference Books**

1. John Walkenbach, “Microsoft Excel 2013 Bible”, Wiley Publications,2013.

**Course Coordinator****HOD**

<b>P18OESC004</b>	<b>WEB DESIGNING</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours– 30							2	0	0	2
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-V.Ramya/BCA										
<b>COURSE OBJECTIVES:-</b> To Understand the basic web designing concepts.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Gain knowledge in web basics and server side scripting.										
CO2	Execute the HTML coding.										
CO3	Apply hyper links between webpages										
CO4	Evaluate the Embedded Style Sheets & Linking External Style Sheets.										
CO5	Create the backgrounds and user style sheets.										
CO6	Create a real time application using web designing concept.										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								H
	CO2	H									
	CO3	H									
	CO4	H									
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internshin(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I** **6**  
Introduction - The Internet in Industry and Research - Evolution of the Internet and World Wide Web - Web Basics – Client Side Scripting versus Server Side Scripting.

**UNIT II** **6**  
Introduction – First HTML example – Headings – Linking - Images, alt Attribute, Void Elements.

**UNIT III** **6**  
Using Images as Hyperlinks-Special Characters and Horizontal Rules – Lists – Tables.

**UNIT IV** **6**  
Introduction - Inline Styles - Embedded Style Sheets - Linking External Style Sheets

**UNIT V** **6**  
Backgrounds - Element Dimensions - Box Model and Text Flow - Drop-Down Menus - User Style Sheets.

**Text Books**

1. Paul Deitel, Harvey Deitel, Abbey Deitel, “Internet & World Wide Web: How To Program”, 5th Edition, Pearson Publication, 2012.

**Reference Books**

1. Jennifer Niederst Robbins, “Learning Web Design”, Fourth Edition, O’Reilly Media, 2012.
2. Thomas Michaud, “Foundations of Web Design, Introduction to HTML & CSS”, Pearson Publication, 2014.
3. Bayross, “Web Enable Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI”, BPB Publications, 2010.
4. T. A Powell, “Complete Reference HTML (Third Edition)”, TMH, 2002.

Course Coordinator

HOD

<b>P18OESC005</b>	<b>PHOTOSHOP</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-V.Brindha/BCA										
<b>COURSE OBJECTIVES:-</b> Learners can Apply methods to specific 3D Images and to identify various designs appropriate for Animation.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Gain knowledge to Create and save Images in fundamental computer applications										
CO2	Understand the title bar, menu bar, option bar, image title bar in photo shop program.										
CO3	Execute Zooming & Panning an Image while Working with Images.										
CO4	Analyze Color manipulations & Working with Toolbox										
CO5	Gain knowledge in Working with layers.										
CO6	Create a real time application using 3D image and Animation.										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								H
	CO2	H	-								
	CO3	H	-								
	CO4	H	-								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

### UNIT I

6

Introduction to Adobe photoshop, Getting started with photoshop, creating and saving a document in photoshop, page layout and back ground.

### UNIT II

6

Photoshop program window-titlebar, menu bar, option bar, image window, image title bar, status bar, ruler, palettes ,tool box, screen modes, saving files, reverting files, closing files.

### **UNIT III**

**6**

Images: working with images, image size and resolution, image editing, color modes and adjustments, Zooming & Panning an Image, Rulers, Guides & Grids-Cropping & Straightening an Image, image backgrounds, making selections.

### **UNIT IV**

**6**

Working with tool box: working with pen tool, save and load selection-working with erasers- working with text and brushes-Color manipulations: color modes- Levels – Curves - Seeing Color accurately - Patch tool

### **UNIT V**

**6**

Layers: Working with layers- layer styles- opacity-adjustment layers.

#### **Text Books**

1. Reema Thareja ,”Fundamentals of Computers”,Oxford University Press,2014.

#### **Reference Books**

1. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, Color
2. Adobe Creative Team ,”Adobe Photoshop Class Room in a Book”,2014.

**Course Coordinator**

**HOD**

<b>P18OESC006</b>	<b>FLASH</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours– 30							2	0	0	2
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-N.Mathimagal/ BCA										
<b>COURSE OBJECTIVES:-</b> Learners can identify methods appropriate for Basic Animation. Apply methods to design with flash.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Understand inWorking with flash, drawing with flash using Animation tools and Mixer.										
CO2	Execute working with multiple objects, importing color palettes										
CO3	Analyze Basic animation and working in the timeline,										
CO4	Create Frames, key frames, deleting, copying and reversing frames										
CO5	Evaluate the Shape tweening and shape hinting in motion										
CO6	Apply methods to design with flash										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								
	CO2	H	-								H
	CO3	H	-								
	CO4	H									
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internshin(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I** **6**

Working with flash, drawing with flash, drawing with the pencil, modifying lines, drawing with the pen, the oval and rectangle tools, free transform tool, envelope modifier, the brush tool, using the mixer.

**UNIT II** **6**

Adding custom colors to color palette, importing color palettes, working with multiple objects, grouping objects.

**UNIT III** **6**

Basic animation and working in the timeline, the timeline, movie properties.

**UNIT IV** **6**

Frames vs. key frames, deleting, copying, and reversing frames, frame-by-frame vector animation, Animation on an image.

**UNIT V** **6**

Shape twining , shape hinting , Shape tweening text , edit multiple frames , animating gradients, basic motion tweening.

**Text Books**

- 1.Nick Vandome ,“FLASH 5 in easy steps”, ,Dreamtech press,2001.

**Reference Books**

1. E A Vander Veer &Chris Graver, “Flash CS3”,Orelly Publications,2009.

**Course Coordinator**

**HOD**

<b>P18OESC007</b>	<b>COMPUTER HARDWARE AND NETWORKING</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-V.Ramya/BCA										
<b>COURSE OBJECTIVES:-</b> Learners familiar with the basic concepts of Microprosser,Controller, Server and to demonstrate the traditional imperative design of CPUs,cards,PCsand BIOS.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Design the structure of Micro Processor and PCs and CPUs										
CO2	Understand the structure of PC architecture and the study of various PCs										
CO3	Understand the Basics of Processor										
CO4	Study the CPU,Chips,Processor and Controllers										
CO5	Working with Internal Components cards and Higher Level Processor										
CO6	Used to develop the Backups,SwitchesRouters,BIOS,Floppy Disk and zip Driver										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	3	3	1	1	1	1	3	H		
	CO2	3	3	1	2	2	2	3			
	CO3	3	2	3	1	3	3	3			
	CO4	3	2	2	1	1	2	3			
	CO5	2	2	2	1	1	1	3			
	CO6	3	3	3	2	3	3	3			
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internshin(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

Microprocessor System - Introduction of System overview, Introduction to Processors, Memory Interfacing, Interfacing I/O Devices, Interfacing Data Converters, Display Interface, Serial I/O and Data Communication, Higher level Processors.

**UNIT II**

**6**

Introduction to PC Architecture Study of PC-AT/ATX System, Pentium, Core, Core 2 Cord, Core 2 Duo, I3, I5, I7.

**UNIT III**

**6**

Processor Basics of Processor and CPU Block Diagram of Computer and Computer Generation Motherboards, Chipset and Controllers, BIOS and the Boot Process, Computer Memory.

**UNIT IV**

**6**

Internal Components IDE and SATA Devices: Hard Disk Drive and CD/DVDs Drives, SCSI Devices, Floppy Disk, Zip Drive, Backup Drive, Expansion Cards- LAN Card, IDE Card , VGA and SVGA Cards, Sound Card, Interface Cards, I/O cards, Video Cards, USB Card, Fire-Wire Cards, Internal Ports, Cables and Connector Types.

**UNIT V**

**6**

Introduction of Network Cable like UTP, STP, Fiber Optics, Hub, Unmanageable Switch, Manageable Switch, Router, Modem, Wi-Fi, Access Point, PCI Wireless Card, USB Wireless Device, Print Server, USB Network Sharer, Backup Device, Server Hardware etc.

**Text Books**

1. Ramesh Gaonkar, “Microprocessor Architecture Programming and Application with the 8085”, Penram International Publication, October 2013.

**Reference Books:-**

1. M.L. Gupta, “Electronics and Radio Engineering”, Dhanpat rai & Sons, New Delhi.
2. B. Govindarajalu, “PC AND CLONES Hardware, Troubleshooting and Maintenance”, Tata Mc-graw-Hill Publication.
3. Stephen J. Bigelow, “PC Troubleshooting and Repair”, Dream tech Press, New Delhi.

**CourseCoordinator**

**HOD**

		<b>COMPUTER PROGRAMMING</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
<b>P18OESC008</b>	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level						4				
	CourseCoordinator Name& Department:-S.Anupriya/ BCA										
<b>COURSE OBJECTIVES:-</b>											
Learners understand the basic concepts of C programming. Practice the use of conditional and looping statements. Implement arrays, functions and pointers. Gain skills to handle strings and files.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Understand the concept of data types, loops, functions, array, pointers, string, structures and files.										
CO2	Design flow-chart, algorithm and program logic.										
CO3	Analyze problems, errors and exceptions.										
CO4	Apply programming concepts to compile and debug c programs to find solutions.										
CO5	Gain knowledge to use Function, Pointers, Structures, Unions & preprocessor directives										
CO6	Construct programs that demonstrate effective use of C.										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L						H		
	CO2	H	L								
	CO3	H	L	M				H			
	CO4	H	L	M				H			
	CO5	H	L	M				H			
	CO6	H	L	M				H			
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	CoreElective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I** **6**  
Generation and Classification of Computers, Basic organization of a Computer, Number System, Binary, Decimal, Conversion, Problems.

**UNIT II** **6**  
Algorithm, Pseudo code, Flow Chart, Problem formulation, Problem solving , Introduction to “C” programming, Fundamentals, Structure of C Program , compilation and linking processes, Constants, Variables, Data Types.

**UNIT III** **6**  
Expressions using operators in C, Managing input and output operations, Decision making and Branching, Looping Statements.

**UNIT IV** **6**  
Arrays, Initialization, Declaration, One Dimensional and Two Dimensional Arrays, String, String Operations, String Arrays.

**UNIT V** **6**  
Function, Definition of Function, Declaration of Function, Recursion, pointers, pointer and arrays, Structure data type, Structure definition, Structure declaration, Structure within a structure, Union, Storage classes, Pre-processor directives.

**Text Books:-**

1. Anita Goel and Ajay Mittal, “Computer Fundamentals and programming in C”, Dorling Kindersley (India) Pvt Ltd., Pearson Education in South Asia 2011.
2. Pradip Dey, Manas Ghosh, “fundamentals of computing and programming in c”, First edition, Oxford University Press, 2009.
3. Yashavant P. Kanethar, “Let Us C”, BPB Publications, 2011.

**Reference Books:-**

1. Byron S Gottfried, “ Programming with C”, Schaum’s Outlines, 2nd Edition, Tata McGraw-Hill 2006.
2. Dromey R.G., “How to Solve it by Computer”, Pearson Education, Fourth Reprint, 2007.
3. Kernighan., B.W and Ritchie, D.M, “ The C Programming Language”, Second Edition, Pearson Education, 2006.

**CourseCoordinator**

**HOD**

<b>P18OESC009</b>	<b>OFFICE AUTOMATION TOOLS</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	Total Contact Hours– 30						2	0	0	2	
	Prerequisite course – UG Level										
	CourseCoordinator Name& Department:-V.Brindha/BCA										
<b>COURSE OBJECTIVES:-</b> Learners understand the basic concepts of word, Excel, Power Point.											
<b>COURSE OUTCOMES(COs)</b>											
CO1	Understand the text manipulations for word documents.										
CO2	Analyze the templates and mail merge concepts.										
CO3	Apply the cell editing, formulae, built in functions used in the Excel Sheet.										
CO4	Develop the power point slide designs and backgrounds.										
CO5	Develop the graphics and animations using wizards.										
CO6	Create a document and apply various formatting techniques										
Mapping of CourseOutcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PS O	PS O
2	CO1	H	L								H
	CO2	H	L								
	CO3	H	L	M				H			
	CO4	H	L	M				H			
	CO5	H	L	M				H			
	CO6	H	L	M				H			
3	Category	Humanities &Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core(PC)	Corelective (CE)	Non-Major Elective(NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								√			
4	Approval	AcademicCouncilMeeting									

**UNIT I****6**

Text Manipulations- font size, style, color. Alignment- left, right and justify, paragraph alignment, Usage of Numbering, Bullets, Footer and Headers, Usage of Spell check, and Find & Replace, Text Formatting, Picture insertion and alignment.

**UNIT II****6**

Insertion – Table, chart, clip art, shapes, borders. Creation of documents, saving of documents, using templates, Creation templates, Mail Merge Concepts, Copying Text & Pictures from Excel.

**UNIT III****6**

Creating of Excel sheet, Cell Editing, Usage of Formulae and Built-in Functions, File Manipulations, Data Sorting, Worksheet Preparation, Drawing Graphs, Usage of Auto Formatting.

**UNIT IV****6**

Start power point, Create blank presentation, Selecting slide layout , Insert new slide, Editing presentation , Designing and formatting presentation , Change font, font color, size, style of text, Bullet and numbering, Slide design, layout, change background , preparing slide show presentation.

**UNIT V****6**

Inserting Clip arts and Pictures, Frame movements, Insertion of new slides. Preparation of Organization Charts, Presentation using Wizards, Usage of design templates, working with tables, graphics and animation, working with graphs and organization charts.

**Text Books**

1. Joyce Cox, Joan Lambert and Curtis Fryc, “Step by Step Microsoft Office Professional 2010”, Microsoft press edition.

**Reference Books**

1. Ralph T.Reilly, “The Handbook of Office Automation”, Universe Publications,2012.

**Course Coordinator****HOD**

<b>U18OEMI001</b>	<b>CLINICAL MICROBIOLOGY</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>										
	Total Contact Hours – 30						2	0	0	2										
	Prerequisite course – Under graduate degree in any discipline																			
	Course Coordinator Name & Department:- Dr. J. Senthil & Microbiology																			
<b>COURSE OBJECTIVES:-</b>																				
Learners will be familiar with microbiological related diagnostic techniques. Learners will understand the microbial morphology, structure, characters, classification, diseases and diagnostic tests.																				
<b>COURSE OUTCOMES (COs)</b>																				
CO1	Recall the general classification of microbes.																			
CO2	Recognize the different specimen collection methods and staining methods.																			
CO3	Apply different diagnostic tests to identify the diseases.																			
CO4	Apply the role of human pathogens in causing diseases.																			
CO5	Analyze the importance of antimicrobial compounds.																			
CO6	Analyze and develop new antimicrobial drugs and antibiotics against wide range of pathogens.																			
Mapping of Course Outcomes with Program Outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L Low																				
1	COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PS O1	PS O2	PSO3									
2	CO1	H	M						H											
	CO2	H	M																	
	CO3	H	M																	
	CO4	H	M																	
	CO5	H	M																	
	CO6	H	M																	
3	Category	Humanities & Social Studies (HS)		Basic Sciences (BS)		Engg Sciences (ES)		Professional Core (PC)		Core Elective (CE)		Non-Major Elective (NE)		Open Elective (OE)		Any other		Project/Term Paper/Seminar/ Internship(PR)		
4	Approval	Academic Council Meeting																		

## UNIT I

6

General introduction about clinical microbiology, Sterilization and Disinfection., Culture Media preparation, Staining Methods, Collection and Transportation of

Specimen - General Principles, Containers, Rejection, Samples - Urine, Faeces, Sputum, Pus, Body fluids, Swab, Blood, Disposal of Laboratory/Hospital Waste.

## **UNIT II**

**6**

General characters and classification of bacteria, Characteristics - Growth and maintenance of Bacteria, Pathogenicity and diagnosis of bacterial pathogens, antimicrobial compounds against clinical pathogens.

## **UNIT III**

**6**

Morphology and structure of fungi - Classification of fungi - Nutrition and cultivation of fungus - Cutaneous & Sub cutaneous and Systemic Mycosis - Lab diagnosis of fungal Infections - Opportunistic fungal infections.

## **UNIT IV**

**6**

General characters of viruses. - Classification of viruses. - Lab diagnosis of viral infections. - Cultivation of viruses. - Bacteriophages - Retro viruses - HIV, Hepatitis virus, Pox virus. - Picorna virus - Polio. - Orthomyxo virus - Influenza. - Arbo virus - Chikungunya, Dengue. - Herpes and Adeno virus.

## **UNIT V**

**6**

Definition - parasitism, host, vectors etc. Classification of Parasites, Phylum Protozoa-general Pathogenic and non pathogenic protozoa, Phylum Nematelminthes/Round worms (Nematoda), Phylum Platyhelminthes - class - Cestoda, class - Trematoda, Lab diagnosis of parasitic infections.

### **TEXT BOOKS:**

1. Monica Chees Brough. Medical laboratory manual for tropical countries, Elsevier Health Sciences, Butter worths, 1987.
2. Bailey and Scott. Diagnostic Microbiology, Eighth edition, The Mosby Company, 1990.

### **REFERENCE BOOKS:**

1. Keith Struthers K. Clinical Microbiology, 2<sup>nd</sup> Edition, CRC Press, 2017.
2. Jennie Wilson. Clinical Microbiology -An Introduction for Healthcare Professional, 8<sup>th</sup> Edition, Bailleire Tindall, 2000.

**Course Coordinator**

**HOD**

<b>U18OEMI002</b>	<b>HERBAL MEDICINE</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours – 30						2	0	0	2		
	Prerequisite course – Under graduate degree in any discipline											
	Course Coordinator Name & Department:- Dr. J. Senthil & Microbiology											
<b>COURSE OBJECTIVES:-</b> Learners will be familiar with medicinal herbs. Learners will understand the importance of herbal drugs and herbal therapies.												
<b>COURSE OUTCOMES (COs)</b>												
CO1	Recall the herbal medicines used in daily life.											
CO2	Recognize the different methods of herbal extraction and its types.											
CO3	Apply various herbal medicines in curing the diseases.											
CO4	Analyze the role of herbs in drug discovery.											
CO5	Evaluate the importance and toxicity studies of herbal extracts.											
CO6	Create and develop new drugs from wide range of medicinal plants available worldwide.											
Mapping of Course Outcomes with Program Outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L Low												
1	COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	
2	CO1	H	M						H			
	CO2	H	M									
	CO3	H	M									
	CO4	H	M									
	CO5	H	M									
	CO6	H	M									
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Project/Term Paper/Seminar/ Internship(PR)			
								✓				
4	Approval	Academic Council Meeting										

**UNIT I****6**

Definition of Herbal drug, Importance of Herbal therapies, Herbs used as nutraceuticals and healing agents. Making and using herbal medicines for common ailments like cold, skin infections and Diarrhea; Analytical Profiles of selected herbs.

**UNIT II****6**

General methods of extraction, types and principles of extractions - merits and demerits, selection of suitable extraction methods, purification and recovery of solvents

**UNIT III****6**

Different methods for isolation and estimation of phyto-constituents from medicinal herbs like *Mucuna pruriens*, *Garcinia combogia*, Green tea, *Hypericum species* etc.

**UNIT IV****6**

Qualitative and Quantitative estimation of standardized extracts by HPTLC, Biological standardization -Pharmacological screening of herbal extracts and Microbiological evaluation of herbal extracts, Toxicity studies of herbal extracts.

**UNIT V****6**

Herbal drugs acting on brain and nervous system – Rheumatoid arthritis – Psychoactive drugs – Depressants, Stimulants, hallucinogens – sources, effects, basic mechanism of action.

**TEXT BOOKS:**

1. Indian Herbal Pharmacopoeia, Vol.1 & 2, RRL, 1 DMA, 1998, 2000.
2. Kokate CK, Purohit and Gokhlae. Text book of Pharmacognosy, 4<sup>th</sup> edition, NiraliPrakashan, 1996.

**REFERENCE BOOKS:**

1. Toxicology and Clinical Pharmacology of Herbal Products, Melanie Johns Cupp.
2. Choudhary RD. Herbal drug industry, 1<sup>st</sup> edition, Eastern publisher, New Delhi, 1996.

**Course Coordinator****HOD**

<b>P18OEPH001</b>	<b>ELECTRICAL TECHNICIAN</b>							<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Contact Hours - 60							3	1	0	4
	Prerequisite – B.Sc Physics										
	Course Coordinator Name & Department:- Dr.S.Anandhi / Physics										
<b>OBJECTIVES:</b> Students will have an appreciation on the electrical systems and electrical equipment typically used in the Oil and Gas production plant.											
<b>COURSE OUTCOMES (COs)</b>											
<b>CO1</b>	Analyze and solve routine technical problems related to electrical systems by applying mathematics and science principles.										
<b>CO2</b>	Explain how to used electrical tools, operate and maintain specific equipment in the Oil and Gas production plant										
<b>CO3</b>	Explain how to perform corrective and preventive maintenance in electrical tasks.										
<b>CO4</b>	Understand the work on electrical systems safely and efficiently.										
<b>CO5</b>	Understand the electrical system and electrical equipment used in the Oil and Gas production plant.										
<b>CO6</b>	To execute the principle and how to working process of the transformer and classification of transformer										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PS O2	PS O3
2	CO1	H	H					H			
	CO2	H	H					H			
	CO3	M	M					H			
	CO4	M	H					H			
	CO5	H	H					H			
	CO6	H	H					H			
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship(PR)	
								✓			
4	Approval	Academic Council Meeting									

<b>UNIT-I</b>	<b>12</b>
Basic Principle Of Petroleum - Overview of Oil and Gas Processing -Wellhead Platform and Equipment	
<b>UNIT –II</b>	<b>12</b>
Introduction to Instrumentation -P & ID Drawing -Introduction to Distributed Control System (DCS)	
<b>UNIT –III</b>	<b>12</b>
Safety in Electrical Maintenance - Batteries and Chargers -Reading Electrical Diagrams - Cables and Conductors - Terminations and Splices - Motor Branch Circuit Protections	
<b>UNIT –IV</b>	<b>12</b>
Three Phase AC Induction Motors - AC Generator Maintenance -Fire & Gas Detection and Safety Systems and SIS -DC Generator -Construction& Principle- Types-Series,- Shunt & Compound Generator- EMF equation, Characteristics - (OCC & LCC). Armature reactions,- commutation Efficiency, Regulation & Applications. DC Motor- Construction& Principle. Types- Series, Shunt & Compound Motors. Characteristics curve-Applications. Necessity of starter- Construction and Working of- starters (3 point& 4 point). Speed control of DC Shunt-motor (armature & Field control. Traction System. - Trouble shooting –Care and maintenance.	
<b>UNIT-V</b>	<b>12</b>
Transformer –Principle -Construction- Classification of Transformers - EMF equation, rating - Loading, Losses & Efficiency Regulation. Parallel Operation- Cooling methods, Transformer-oil testing. Care and maintenance, - Protective devices. Tap Changer – ON load and OFF- load. Auto transformer, Instrument- Transformer- CT & PT. Welding Transformer.	

**TEXT BOOKS**

1. Fundamental Electrical circuits by Charles K. Alexander and Matthew NO Sadiku (2003)
2. Fundamental of Digital circuits 3<sup>rd</sup> edition by Kumar A Anandh

**Course Coordinator**

**HOD**

<b>P18PRCH4P1</b>	<b>PROJECT (DISSERTATION AND VIVA-VOCE)</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>		
	Total Contact Hours – 45					0	0	20	10		
	Prerequisite course – Chemistry										
	Course Coordinator Name & Department: Dr. G. Padmapriya/Chemistry										
<b>COURSE OBJECTIVES:-</b>											
To facilitate the students to understand the current scenario in science and technology and to present the research report on their findings as per the acceptable format.											
<b>COURSE OUTCOMES (COs)</b>											
CO1	Remember the concept and objectives, nature, types and methods of project.										
CO2	Understand the process and steps involved in preparation of project work, research gap										
CO3	Understand the research design, and methodology, sampling techniques & sampling design										
CO4	Apply the statistical tools in the project for data analysis										
CO5	Create the major findings, suggestions and conclusion										
CO6	Analyze the model for project report.										
Mapping of Course Outcomes with Program outcomes (POs) (H/M/L indicates strength of correlation) H-High, M-Medium, L-Low											
1	<b>COs/Pos</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
2	CO1	H	L						L	M	H
	CO2	H	L								
	CO3	H	L								
	CO4	H	L								
	CO5	H	L								
	CO6	H	L								
3	Category	Humanities & Social Studies (HS)	Basic Sciences (BS)	Engg Sciences (ES)	Professional Core (PC)	Core Elective (CE)	Non-Major Elective (NE)	Open Elective (OE)	Any other	Project/Term Paper/ Seminar/ Internship (PR)	
					✓						
4	Approval	Academic Council Meeting									

The project topics are to be finalized to the students at the end of the second semester with a time schedule to carryout various stages of work. During the semester vocation, the data Collection may be commenced. The theme selected by each student for the Dissertation should be related to various methodologies and techniques pertaining to Science and technology. Each candidate should submit three copies of dissertation as per the guidelines to the department concerned.

<b>Marks</b>	
<b>Dissertation</b>	<b>150</b>
<b>Viva- Voce Examination</b>	<b>50</b>

**Course Coordinator**

**HOD**