



KADI SARVA VISHWAVIDYALAYA
B.Sc Semester 5 Syllabus (W.E.F. June 2019)

	KADI SARVA VISHWAVIDYALAYA					
	B.SC CHEMISTRY SEMESTER - 5 SCHEME					
Subject Code	Course	Instructions Hrs / week	Examination			Credit
			Internal	University Exam	Total	
CCH-501	Inorganic Chemistry - II	3	30	70	100	3
CCH-502	Organic Chemistry - II	3	30	70	100	3
CCH-503	Physical Chemistry - II	3	30	70	100	3
CCH-504	Analytical Chemistry - II	3	30	70	100	3
FCG-501	(University Elective) Basic English – V	2	15	35	50	2
EGC-501	(Generic Elective - Institute elective) Good Laboratory Practice	2	50	00	50	2
SE CH 501-A	(Discipline Specific Specialization) Synthesis of Dyes & Application	2	50	00	50	2
SE CH 501-B	(Discipline Specific Specialization) Polymer Synthesis					
SE CH 501-C	(Discipline Specific Specialization) Medicinal Chemistry-III					
PCH-501	Chemistry Practical - V	12	0	200	200	6
Total		30	235	515	750	24



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CCH-501- Inorganic Chemistry - II

RATIONALE: This course is designed to enable students to acquire basic understanding of inorganic chemistry.

Its origin and structure helps the potential application of the unexplored and unidentified chemicals in the industry.

LEARNING OUTCOMES:

- Understand the concepts of inorganic chemistry
- Develop an understanding of the chemical systems around us
- Gain knowledge about the structure, function and applications of various chemicals

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of Mid Term examinations for 30 marks and End Term Examination conducted by University examination for 70 marks.

Subject Code	Subject Title	Credits	Theory			Total Marks
			Hrs.	Max Marks		
				Mid Term	End Term	
CCH-501	Inorganic Chemistry - II	3	45	30	70	100

COURSE CONTENT:

UNIT- I : Molecular symmetry

Number of lectures: 15

Weightage:34%

- Introduction, symmetry operations and symmetry elements: C_n , σ , S_n , i and E .
- Point groups for the molecules (excluding S_{2n} and I_h).
- Multiplication tables of C_{2v} , C_{2h} and C_{3v} point groups.

UNIT- II : Organo Metallic Compounds

Number of lectures: 15

Weightage:33%

- Definition
- Types of O.M.C.
Classification
- Nomenclature of O.M.C
- Structure and bonding in dihapto and metal olefins complexes. e.g. Ziese's salt complexes, ferrocene structure
- O.M.C. of Li and Al complexes, Be (Beralium)



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UNIT – III : Reaction Mechanism of Coordination Compounds

Number of lectures: 15

Weightage: 33%

- Substitution reaction of square planar complexes
- Reaction of Platinum II complexes, the trans effect, theories of trans effect, use of trans effect in synthesis and analysis
- Substitution reaction in octahedral complexes, Possible mechanism reactions, Ligand displacement reaction in octahedral complexes, acid hydrolysis, Base hydrolysis
- Electron transfer reaction, mechanism of redox reaction, mechanism of substitution in square planar complexes

REFERENCES

1. Valency and Molecular structure by Cartmell and Fowles.
2. Text book of Inorganic Chemistry by Durrant and Durrant.
3. Inorganic Chemistry by G. D. Tuli
4. Advance Inorganic Chemistry Vol-II Satya Prakash (S.Chand)
4. Concise Inorganic chemistry by J.D.Lee.
5. Inorganic Chemistry: Principles of Structure and Reactivity by James E. Huheey, Ellen A. Keiter, Richard L. Keiter, Okhil K. Medhi
6. Advanced inorganic chemistry by Cotton and Wilkinson
7. Chemical applications of Group theory by F. A. Cotton
8. Gurdeep Ra – InOrganic Chemistry

INSTRUCTION STRATEGIES

1. Interactions with the students to understand the level of students
2. Explaining & Discussing the major terminologies related to Chemistry
3. Teaching the topics included in the syllabus with the help of teaching aids like OHP, LCD (Power point presentation), Notes, Question Banks, References and Reprints / Copy of Articles, Models, Diagrams
4. Assistance in solving of questions from our question bank.

TEACHING AND EXAMINATION

UNIT	Examination Scheme % Weightage	Teaching Scheme No. of Lecture
Unit I	34	15
Unit II	33	15
Unit III	33	15
Total	100	45



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CCH-502- Organic Chemistry- II

RATIONALE: This course is designed to enable students to acquire basic understanding of organic chemistry

LEARNING OUTCOMES:

- Understand the concept of various organic reactions.
- Develop an understanding of the organic systems around us.
- Gain knowledge about the structure, function and applications of various organic compounds.

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of Mid Term examinations for 30 marks and End Term Examination conducted by University examination for 70 marks.

Subject Code	Subject Title	Credits	Theory			Total Marks
			Hrs.	Max Marks		
				Mid Term	End Term	
CCH-502	Organic Chemistry – II	3	45	30	70	100

COURSE CONTENT:

UNIT- I : Stereochemistry

Number of lectures: 15

Weightage:34%

- Conformational analysis of mono and di substituted cyclohexanes
- Molecular asymmetry as illustrated by allenes and diphenyls
- Isomerism of oximes.
- Determination of geometrical isomerism of Aldoxime.
- Determination of geometrical isomerism of Ketoxime(Beckmann's transformation)

UNIT- II Molecular rearrangements and Name Reactions

Weightage:33%

- Principle, Mechanism and Synthetic applications of the reactions:
- Hofmann Rearrangment.
- Fries rearrangement
- Wolf Rearrangement.
- Arndt Eistert reaction.
- Dieckmann Condensation.
- Mannich Reaction
- Clemmensen Reduction.



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UNIT- III : : Nucleophilic Substitutions

Number of lectures: 15

Weightage: 33%

A. Nucleophilic substitution at saturated carbon atom

- Stereochemistry of SN^1 and SN^2 reaction
- Relative reactivity in substitution
- Solvent effect variation at carbon site
- Relative leaving group activity
- Neighboring group participation
- Competitive reactions. Elimination $E1, E2$ and $E1cb$ mechanisms

B. Nucleophilic Aromatic Substitutions

- Nucleophilic aromatic substitution [Bimolecular displacement ($SN2$) mechanism]
- Elimination – Addition mechanism via benzyne
- Stability and properties of benzyne
- Evidences of Benzyne intermediate

REFERENCES

Organic Chemistry

1. Organic chemistry by Morrison & Boyd Vth Edition
2. Advance organic chemistry by R.K.Bansal.
3. Organic chemistry by I.L.Finar Vol I & II Vth Edition
4. Organic chemistry by pine, Hendrikson, Cram and Hammond IVth edition...
5. Synthetic organic chemistry by Gurdeep R Chatwal.
6. Advanced organic chemistry by Jerry March.
7. Organic reactions and their mechanisms IInd edition by P.S. Kalsi.
8. Stereo chemistry: conformation and mechanism VIth edition by P.S.Kalsi.
9. Organic chemistry of natural product Vol: I & II by Gurdeep R. Chatwal.
10. Advanced organic chemistry by Arun Bahal and B.S. Bahal.
11. Organic chemistry Vol, I, II, III by S.M.Mukherjee, S.P.Singh, R.P.Kapoor.
12. Stereo Chemistry by Nasipuri.

INSTRUCTION STRATEGIES

1. Interactions with the students to understand the level of students
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TEACHING AND EXAMINATION

UNIT	Examination Scheme %Weightage	Teaching Scheme No. of Lecture
Unit I	34	15
Unit II	33	15
Unit III	33	15
Total	100	45



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CCH 503- Physical Chemistry- II

RATIONALE: This course is designed to enable students to acquire basic understanding of the basic principles of physical chemistry.

LEARNING OUTCOMES:

- Understand the concept of physical sciences.
- Develop an understanding of the various physical chemistry laws and its applications.
- Gain knowledge about the physical chemistry existing in and around the society.

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of Mid Term examinations for 30 marks and End Term Examination conducted by University examination for 70 marks.

Subject Code	Subject Title	Credits	Theory			Total Marks
			Hrs.	Max Marks		
				Mid Term	End Term	
CCH- 503	Physical Chemistry – II	3	45	30	70	100

COURSE CONTENT

UNIT- I : Electro Motive Force

Number of lectures: 15

Weightage:34%

- Chemical Cell: Without Transference & with Transference Verification of Concentration cell and it's EMF equation.
- Electrolyte concentration cell
- Concentration cell without transference, Concentration cell with transference Electrode concentration cell
- Amalgam concentration cell, Gas Concentration Cell Liquid –Liquid junction potential
- Application of EMF measurements
- Determination of Degree of hydrolysis of salt
- Solubility of sparingly soluble salt
- Stability constant of complex,
- Dissociation constant of weak acid, Numericals

UNIT- II : Thermodynamics

Number of lectures: 15

Weightage:33%

- Zeroth law of thermodynamics
- Absolute temperature scale
- Nernst heat theorem
- Third law of thermodynamics
- Determination of absolute entropy
- Experimental verification of third law
- Entropy change in chemical reactions.
- Concept of Fugacity and determination of Graphical Method
- Numerical



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UNIT- III : Macromolecules

Number of lectures: 15

Weightage:33%

- Classification of Polymers
- Tacticity of polymers. (Optical Isomers)
- Polymerization reaction with example
- Addition Polymerization. (Polyethylene, Polystyrene, PVC)
- Condensation Polymerization (Nylon-66, Dacron)
- Mechanisms of Polymerization
- Free radical chain Polymerization
- Anionic Polymerization
- Cationic Polymerization
- Kinetics of Free radical chain Polymerization Degree of Polymerization
- Molar masses of Polymer
- Number Average Molar Mass
- Weight Average Molar Mass
- Determination of Molar Masses of Macro Molecules
- Viscosity Method Light Scattering Method
- Numerical

REFERENCES:

1. Advance Physical Chemistry by Gurdeepraj.
2. Physical Chemistry (Question and Answer) by R. N. Madan, G.D. Tuli, S.Chand.
3. Principal of Physical Chemistry by Puri, Sharma, Pathania.
4. Chemical Thermodynamics by R.P. Rastogi and R.R.Mishra.
5. Physical chemistry by atkins.
6. Essentials of Physical Chemistry by B. S. Bahal, Arun Bahal, G.D.Tuli,
7. Physical Chemistry by P.W. Atkins, 5th edn, Oxford 1994 7th edn-2002.
8. Physical Chemistry by R.A. Alber and R.J.Silby, John Wiley 1995.
9. Physical Chemistry by G.H. Barrow, 5th edn, Mac Graw Hill, 1988,6th edn, 1996.
- 10.Physical Chemistry by W.J.Moore, 4th edn, Orient Longmans 1969.

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TEACHING AND EXAMINATION

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Unit I	34	15
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Total	100	45



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CCH 504- Analytical Chemistry- II

RATIONALE: This course is designed to enable students to acquire basic understanding of the basic principles of analytical chemistry.

LEARNING OUTCOMES:

- Understand the concept of Analytical chemistry.
- Develop an understanding of analytical chemistry and its applications.
- Gain knowledge about the analytical chemistry existing in and around the society.

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of Mid Term examinations for 30 marks and End Term Examination conducted by University examination for 70 marks.

Subject Code	Subject Title	Credits	Theory			Total Marks
			Hrs.	Max Marks		
				Mid Term	End Term	
CCH- 504	Analytical Chemistry – II	3	45	30	70	100

COURSE CONTENT

UNIT:- I : Good Laboratory Practices

Number of lectures: 15

Weightage:33%

- Introduction
- Validation of Analytical Methods
- Quality Assurance / Quality Control (Q.C)
- Laboratory accreditation
- Electronic records and electronic signatures
- Official organizations for GLP
- General S.O.P.

UNIT:- II : Electro analytical Techniques:

Number of lectures: 15

Weightage:34%

Potentiometry

- The scope of potentiometric titrations
- Precipitation and neutralization titrations
- Graphical method including Gran's plot for selecting end point
- Differential titration, Dead stop titration
- Ion selective Electrode, various types of Ion selective Electrodes

UNIT :- III : Chromatography

Number of lectures: 15

Weightage:33%

- Introduction
- Types of chromatography Column chromatography Paper chromatography / HPTLC
- Thin layer chromatography



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- Ion exchange chromatography
- Principle & Application of HPLC & GC

Suggested books: (Analytical chemistry)

1. Analytical Chemistry G.D. Christain
2. Fundamentals of Analytical Chemistry D.A.Skoog, D.M. West & F.J.Holler
3. Principles of Analytical Chemistry J.H. Kennedy
4. Analytical Chemistry – Principles & Techniques L.G.Hargis
5. Instrumental Methods of analysis: (CBS) H. H . Willard, L.L. Mirrit, J.A. Dean
6. Chemical Instrumentation: A Systematic approach- H.A. Strobel
7. The principals of ion-selective electrodes and membrane transport: W.E.Morf
8. Principles of Instrumental Analysis: Douglas A. Skoog., F. James Holler, Stanley R. Crouch, Cengage Learning; 6th Edition.
9. Quantitative Chemical Analysis: Daniel C. Harris, W H Freeman, New York.
10. Ion exchange and solvent extraction of metal compounds: Y. Macros, A.S.Kertes, Wiley, Interscience.

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TEACHING AND EXAMINATION

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Unit I	33	15
Unit II	34	15
Unit III	33	15
Total	100	45



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FCG 501- Basic English – V

RATIONALE: This course is designed to enable students to acquire basic understanding of English grammar. The course would help students to fortify their knowledge of English and strengthen their basic communication abilities.

LEARNING OUTCOMES:

- Develop language skills of reading through filling in appropriate words in blanks, correcting errors, choosing correct forms out of alternative choices, etc.
- Acquire interest in English language and literature through text book lessons.
- Acquire translation skill through translate from English to Gujarati / Hindi exercises
- Acquire the knowledge of different kinds of dialogue writing.

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of Mid Term examinations for 15 marks and End Term. Examination conducted by University examination for 35 marks.

Subject Code	Subject Title	Credits	Theory			Total Marks
			Hrs.	Max Marks		
				Mid Term	End Term	
FCG - 501	Basic English – V	2	24	15	35	50

Course Content

Unit 1	Number of lectures: 8	Weightage: 33%
Lesson1: <i>An Astrologer's Day</i> by R.K. Narayan		
Lesson 6 : <i>Education: India and America</i> by Anurag Mathur		
Poem11: <i>Where the mind is without Fear</i> by Rabindranath Tagore		
Poem12: <i>Stopping by Woodsona Snowy Evening</i> by Robert Frost		
Poem13: <i>Sonnet 29</i> by William Shakespeare		
Unit 2	Number of lectures: 4	Weightage: 17%
Text Based Vocabulary		
Enhancing English Reading Skills		
<ul style="list-style-type: none">• Importance of Reading Skill• Structure of paragraph• Skimming and Scanning• Reasons For poor Reading Skills		



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Unit 3	Numberoflectures:8	Weightage: 33%
Translation from English to Gujarati / Hindi		
Unit 4	Numberoflectures:4	Weightage: 17%
Capitalization and punctuation Marks in official Correspondence		

REFERENCES

1. High School English Grammar – Wrenn & Martin
2. Contemporary English Grammar – David Green

INSTRUCTION STRATEGIES

1. Interactions with the students to understand the level of students
2. Explaining & discussing English language structures.
3. Teaching the topics included in the syllabus with the help of teaching aids like OHP, LCD (Powerpoint presentation), Notes, Question Banks, References and Reprints / Copy of Articles, Models, Diagrams
4. Assistance in solving of questions from our question bank.

TEACHING AND EXAMINATION

UNIT	Examination Scheme %Weightage	Teaching Scheme No. of Lecture
Unit 1	33	8
Unit 2	17	4
Unit 3	33	8
Unit 4	17	4
Total	100	24



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EGC 501 Good Laboratory Practice

Subject Code	Subject Name	Credit	Total Hours	External	Internal
EGC 501	Good Laboratory Practice	2	24 (12 Hour per unit)	---	50 Marks

Unit		Hours
1	Good Laboratory Practice I <ul style="list-style-type: none">- Introduction- GLP Principles- Preparation of Standard Operating Procedures (SOPs)- Documentation of laboratory work- Laboratory notebooks- Safety in laboratory- Storage and handling of chemicals- Glassware-cleaning and calibration of glassware- Sample preparation	12
2	Good Laboratory Practice II <ul style="list-style-type: none">- Quality Control and Quality Assurance- Validation of methods- Reporting and documentation of results- Types of Quality Standards for laboratories- Total Quality Management- Audits	12

Methodology of Teaching

- Class room sessions
- Explanation using multimedia projector
- Surprise test

Reference Books:

1. D. A. Skoog, D. M. West, F. J. Holler and S. R. Crouch, Fundamentals of Analytical Chemistry, 9th Ed., Brooks Cole, 2013.
2. Modern Analytical Chemistry, D. Harvey, McGraw Hill, 2000
3. R.M. Verma, Analytical Chemistry Theory and Practice, 3rd Ed., CBS Publishers, 1994.
4. R.S. Khandpur, Handbook of Analytical Instruments, 2nd Ed., Tata McGraw-Hill 2010.
5. Analytical Chemistry, Gary D. Christian, 6th Edition, John Wiley and Sons Inc. New Jersey

Method of assessment:

Theory Exam (Internal)	40 Marks
Attendance & assignment	10 Marks



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SE CH 501-A Synthesis of Dyes & Application

RATIONALE: This course is designed to enable students to acquire basic understanding of synthetic dyes and its applications.

Its origin and structure helps the potential application of the unexplored and unidentified chemicals in the dyes industry.

LEARNING OUTCOMES:

- Understand the concept of organic and dyes chemistry.
- Develop an understanding of the chemical systems around us.
- Gain knowledge about the structure, function and applications of various dyes.

Subject Code	Subject Title	Credits		Theory/Practical		Total Marks
		Theory	Practical	Hrs.	Max Marks	
					End Term (Practical)	
SE CH 501-A	Synthesis of Dyes & Application	1	1	36	50	50

COURSE CONTENT

THEORY Synthesis of Dyes

Number of lectures: 12

Weightage: 50%

- Synthesis & Preparation of Azo dyes – Various methods of Diazotizations, Sub-classes of Azo Dyes, Mono azo Dyes
- Synthesis & Preparation of Acid Dyes: Acid Orange II, Acid Orange IV. Mono azo Dyes
- Synthesis & Preparation of Mordant Dyes,, Eriochrome Black T, Methyl Orange
- Synthesis & Preparation of Nitro Dyes
- Synthesis & Preparation of Nitroso Dyes

PRACTICALS

Number of hours: 24

Preparation of Different Synthesis of Dyes Intermediate

- Synthesis of Azo Dyes
- Synthesis of Mono Azo Dyes
- Synthesis of Acid Dyes
- Synthesis of Mordant Dyes
- Synthesis of Nitro Dyes
- Synthesis of Nitroso Dyes

REFERENCES:

1.Synthetic organic chemistry by O.P. Agrawal
2. The chemistry of synthetic dyes and pigments by H. A. Lubes
3. Chemistry of synthetic dyes VOL I to VII by K. Venkatraman



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4. An introduction to synthetic dyes by D. W. Ranghekar & P. P. Singh
5. A hand book of synthetic dyes and their application by C. T. Bhastana & V. H. Raichura & others
6. Dyes stuff chemistry by Guru deep Chattwal
7. Synthetic Practical organic chemistry by O.P. Agrawal
8. Synthetic Practical Organic by A I Vogel
9. Fabrics Dyeing & Printing on Textile fibers by June Fish
10. Printing Technics on Textile fibers by Janet Admonds
11. Practicals of Organic Chemistry of Dyes and Pigments by Dr. P N Dave

TEACHING AND EXAMINATION

UNIT	Examination Scheme %Weightage	Teaching Scheme No. of Lecture
Unit 1	00	12
Unit 2	100	24
Total	100	36



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SE CH 501-B Polymer Synthesis

RATIONALE: This course is designed to enable students to acquire basic understanding of polymer synthesis and its applications.

Its origin and structure helps the potential application of the unexplored and unidentified polymers in the polymer and plastic industry.

LEARNING OUTCOMES:

- Understand the concept of polymer chemistry.
- Develop an understanding of the chemical systems around us.
- Gain knowledge about the structure, function and applications of various polymers.

Subject Code	Subject Title	Credits		Theory/Practical		Total Marks
		Theory	Practical	Hrs.	Max Marks End Term (Practical)	
SE CH 501-B	Polymer Synthesis	1	1	36	50	50

COURSE CONTENT

Number of lectures: 12	Weightage: 50%
THEORY:	
<ul style="list-style-type: none">• Preparation, properties and applications of: vinyl polymers: Polyethylene, PTFE, PVC, Polypropylene, Polystyrene and PMMA.• Elastomers: BR, SBR, NBR, CR, IIR, Thiokol, PU and Silicone rubber (no detailed manufacture methods). Structure and composition of natural rubber latex and preparation of RSS.• Comparative study of methods for synthesizing polymers. Viz. Bulk, solution, suspension and emulsion.	

PRACTICALS	Number of hours: 24
<ul style="list-style-type: none">• Synthesis of SBR rubber• Synthesis of Thiokol rubber• Prepare Polystyrene by bulk, solution• Prepare Polystyrene by suspension• Prepare Polystyrene by emulsion techniques and compare its yield efficiency.	

REFERENCES:

1.	Seymour R.B. Introduction to Polymer Chemistry, McGraw Hill, New York, 1971.
2.	Billmeyer, F.W. Text book of Polymer Science, Wiley Interscience, New York, 1971.
3.	Gowarikar V.R., Viswanathan N.V., Polymer Science, Wiley Eastern Limited, New Delhi,
4.	Paul C. Hiemenz, Polymer Chemistry.
5.	Brown R.P., Physical Chemistry of Rubbers, Chapman and Hall, London.
6.	Morton M., Noushand V. and Reinold, Handbook of Rubber Technology, New York.
7.	Morton Jones D.H., Polymer Processing, Chapman and Hall, London.
8.	Polymer Science and Technology: Plastics, Rubbers, Blends and Composites By Premamoy Ghosh



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TEACHING AND EXAMINATION

UNIT	Examination Scheme %Weightage	Teaching Scheme No. of Lecture
Unit 1	00	12
Unit 2	100	24
Total	100	36



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SE CH 501-C Medicinal Chemistry-III

Subject Code	Subject Title	Credits	Theory		Total Marks
			Hrs.	Max Marks	
				End Term	
SE CH 501-C	Medicinal Chemistry-III	2	24	50	50

COURSE CONTENT

Number of lectures: 12

Weightage: 50%

THEORY

- **Steroids:** Introduction, Nomenclature, stereochemistry, simple reactions of cholesterol, stigmasterol, ergosterol, diosgenin, solasodine, bile acids, biosynthesis of testosterone, 17 β estradiol, aldosterone from cholesterol.
- **Hormons:** Introduction to hormones, differences with Vitamins, Classification of hormones, synthesis and function of some hormones like thyroxin, adrenaline, diethylstilbesterol, stigmasterol.

Number of Practicals: 24

PRACTICALS

Preparation of standard solution used in estimation of drugs like

- NaOH and HCl
- Sodium thiosulphate
- Potassium Iodide
- Potassium permanganate
- Iodine solution
- Estimation of Glucose
- Estimation of Sulpha drugs
- Estimation of Aspirin
- Estimation of Penicillin
- Estimation of Ibuprofen

REFERENCES:

1.	Strategies for Organic Drug Synthesis & Design by Daniel Lednicher, John Wiley & sons,
2.	Organic Chemistry by L. Finar, Vol. I & II, ELBS/ Longman, London.
3.	Kar, A., Medicinal Chemistry, New Age International Publishers, New Delhi, 2007.
4.	Ladu, B. N., Mandel H.G. & E.L.Way, Fundamentals of Drug Metabolism & Disposition, William & Wilkins Co., Baltimore.
5.	Taylor, J. B and Triggler, D. J., Comprehensive Medicinal Chemistry II, Vol. 1-8, Quantitative Drug Design, Elsevier Ltd., 2007.

TEACHING AND EXAMINATION

UNIT	Examination Scheme %Weightage	Teaching Scheme No. of Lecture
Unit 1	00	12
Unit 2	100	24
Total	100	36



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PCH 501-Chemistry Practical-V

RATIONALE: This course is designed to enable students to acquire hand-on basic understanding of the chemical world, its origin and structure to help the potential application of the unexplored and unidentified compounds in the industry. These practical make the students capable and competent to work in chemistry related industries.

LEARNING OUTCOMES:

- Understand the concept of origin of chemistry.
- Develop an understanding of the chemical properties of compounds.
- Gain knowledge about the structure, function and applications of the chemicals compounds.

TEACHING AND EVALUATION SCHEME: The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. General viva-voce will be conducted to analyze the knowledge of the student.

Subject Code	Subject Title	Credits	Practical		Total Marks
			Hrs.	Max Marks	
PCH- 501	Chemistry Practical-V	6	12	200	200

Laboratory Course

PCH – 501 (Inorganic, Organic, Physical Chemistry)

This syllabus is to be completed by assigning four laboratory session per week, each of Three periods. The number of students in the laboratory batch should not exceed fifteen (15) the medium of instruction will be English in laboratory course

Inorganic Chemistry practical

(A) Alloy (gravimetry & volumetry to be done during regular lab; any one for the practical exam) (For exam Any one from preparation and estimation)

- 1) Brass alloy ----- Zn (Gravimetric) and Cu (Volumetric)
- 2) German silver alloy -----Ni (Gravimetric) and Cu (Volumetric)
- 3) Bronze alloy -----Sn (Gravimetric) and Cu (Volumetric)

(B) Synthesis by Convention Method

- 1) Ferrous Sulphate or Green vitriol ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$)
- 2) Sodium cobaltinitrate $\text{Na}_3 [\text{Co}(\text{NO}_2)_6]$
- 3) Tetra amine cupric sulphate
- 4) Hexa thio urea plumbous nitrate
- 5) Cuprous chloride



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Organic Chemistry practical

(A) Qualitative Analysis (Minimum 08)

Analysis of an organic mixture containing two components using water, NaHCO_3 , NaOH , HCl for Separation /or using distillation process for separation and identification with the Preparation of Suitable derivatives.

Soluble Components: - Oxalic Acid, Succinic Acid, Resorcinol, Urea, Thio Urea

Separation of two components from Organic Mixture Such as....

Solid-Solid -----Mixture

Solid- Liquid -----Mixture

Liquid-Liquid ----- Mixture

[Liquid component must be neutral in nature]

Physical Chemistry practical

Instruments, Kinetics & Distributions : (Any 08)

1. To determine normality and amount of HCl and CH_3COOH in the given solution by Conductometric titration against NaOH solution.
2. To determine the solubility product and solubility of sparingly soluble salts PbSO_4 by Conductometry.
3. To determine Normality and amount of each acid in the given mixture of HCl + CH_3COOH by pH metrically.
4. To determine the strength of strong and weak acid in a given mixture by Potentiometric titration using 0.1 N NaOH
5. To determine the concentration of Nickel in the given solution by Colourimetric estimation.
6. To determine the concentration of unknown solution from given KMnO_4 solution by Colourimetry.
7. To determine the order of the reaction between $\text{K}_2\text{S}_2\text{O}_8$ and KI .
8. To determine the order of the reaction between H_2O_2 and HI .
9. To determine the distribution coefficient of Iodine between $\text{CCl}_4/\text{CHCl}_3$ & water at a given temperature.
10. To study the distribution of Benzoic acid between Benzene and water at room temperature and prove the dimerization of Benzoic acid in Benzene.
11. Determination of viscosity of given different percentage aqueous solutions of glycerin and determination of concentration of unknown solution, using viscometer.
12. Determination of specific rotation of given substance by preparing 10%, 5% and 2.5% solutions of cane sugar and determination of concentration of its unknown solution by polarimeter.

INSTRUCTION STRATEGIES



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1. Explanation of Principles, protocols, expected result trends, handling of instruments and equipments, precautions and safety measures in class and demonstration of important steps.
2. Monitoring of the students performing the experiments.
3. Evaluation of results of each experiment.



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B.Sc Semester 5 Syllabus (W.E.F. June 2019)

Semester : V Pattern of University Practical Exam (2 days exam)

Time: 10:00am to 5:00pm (Including 30 minutes recess) Total Marks: 200

First Day

(A) Inorganic (50 marks)

- Estimation from Alloy (50 marks)

Or

- Inorganic Preparation (50 marks)

(B) Organic (50 marks) [nature (10) + 20 marks for each compound]

- Qualitative analysis of an organic mixture.

Second Day

(C) Physical (50 marks)

- Any one exercise should be selected for each candidate from syllabus.

(D) Viva-Voce and Journal

Viva-Voce on practical base (40 marks)

- Inorganic13 marks

- Organic13 marks

- Physical14 marks

Journal (10 marks)

Note: Certified practical journal is compulsory for practical exam.