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K. S. Rangasamy College of Arts and Science (Autonomous),
Tiruchengode - 637 215

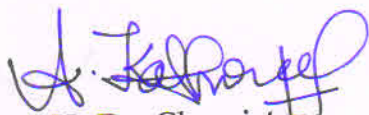
Department of Chemistry

List of New Courses Introduced

- Elective I: Spectroscopy II
- Elective II: Bio-Inorganic Chemistry

Encls:

1. Copy of Scheme of Examination
2. Syllabus Copy of New Courses
3. Mapping of Courses of New Courses


HoD - Chemistry



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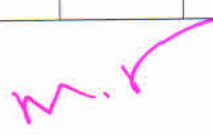
CoE

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Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Maximum Marks			Credit Points
				CA	CE	Total	
FIFTH SEMESTER							
PART III							
18UCHM501	Core VII: Inorganic Chemistry I	5	3	25	75	100	4
18UCHM502	Core VIII: Organic Chemistry I	5	3	25	75	100	5
18UCHM503	Core IX: Physical Chemistry I	4	3	25	75	100	4
18UCHM504	Core X: Analytical Chemistry	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
19UCHMP501	Core Practical IV: Gravimetric Estimation and Organic Preparation	5	6	25	75	100	3
PART IV							
18UCHSB501	SBC III: Polymer Chemistry	2	3	25	75	100	2
18UCHE501	Extension Activity	-	-	-	-	-	2
NON CREDIT							
18ULS501	Career Competency Skills III	1	-	-	-	-	-
Total		30				700	28


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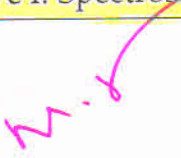
Elective I

The department offers the following three subjects as elective courses for Fifth semester

S.No	Semester	Paper code	Paper name
1.	V	18UCHEL501	Elective I: Spectroscopy I
2.	V	18UCHEL502	Elective I: Spectroscopy II


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Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Maximum Marks			Credit Points
				CA	CE	Total	
FIFTH SEMESTER							
PART III							
18UCHM601	Core XI: Inorganic Chemistry II	6	3	25	75	100	5
18UCHM602	Core XII: Organic Chemistry II	6	3	25	75	100	5
18UCHM503	Core XIII: Physical Chemistry II	6	3	25	75	100	4
	Elective II	4	3	25	75	100	4
18UCHPR601	Project & Viva-Voce	5		25	75	100	4
PART IV							
18UCHSB501	SBC IV: Agricultural Chemistry	2	3	25	75	100	2
18ULS601	Career Competency Skills	1	-	-	-	-	-
Total		30				600	24

Elective II

The department offers the following three subjects as elective courses for Sixth semester

S.No	Semester	Paper code	Paper name
1.	VI	18UCHEL601	Elective II: Green Chemistry and Nano Chemistry
2.	VI	18UCHEL602	Elective II: Bio-Inorganic Chemistry

18UCHEL502	ELECTIVE I: SPECTROSCOPY II	SEMESTER V	
COURSE OBJECTIVES: The course aims <ul style="list-style-type: none"> • To illustrate the principles and concepts of ESR spectroscopy • To paraphrase the concepts and applications of Mossbauer spectroscopy • To prognosticate the chemicals compounds using AAS techniques • To interpret the compounds using flame photometry techniques • To recognize the utilization of fluorescence and phosphorescence techniques 			
Credits: 4		Total Hours: 40	
Unit	Content	Hours	CO
I	ESR Spectroscopy: Introduction - Zeeman splitting - hyperfine splitting - g value - McConnell's equation - Kramer's degeneracy - spin orbital coupling - dipole-dipole interaction. Isotropic, rhombic and axial spectra of Copper II system	8	CO1
II	Mossbauer Spectroscopy: Introduction - Principle - basic concepts - Doppler shift - Resonance conditions - Recoil effect - Isomer shift - electric quadrupole splitting - magnetic dipole splitting - applications	8	CO2
III	Atomic Absorption Spectroscopy: Introduction - Principle - Grotrian Diagrams - Detection of non-metals by AAS - Difference between AAS & Flame emission spectroscopy - Instrumentation - Applications - Advantages and disadvantages.	8	CO3
IV	Flame photometry: Introduction - General principles - Instrumentation - Effect of Solvent - Factors affecting the intensity - Multielement analysis - Interferences- Applications - Limitations.	8	CO4
V	Fluorimetry and Phosphorimetry: Introduction - Comparison of Absorption and Fluorescence methods - Singlet and Triplet states - Excited state processes in molecules - Instrumentation - Application - Determination of Vitamins - Application of Phosphorimetry - Comparison of Fluorimetry and Phosphorimetry.	8	CO5


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Text books:


1. Gurdeep R. Chatwal, Sham K. Anand, 2017, **Spectroscopy (Atomic and Molecular), Fifth Edition**, Himalaya Publishing House.
2. Colin N. Banwell, Elaine M. McCash, 2016, **Fundamentals of Molecular Spectroscopy [Fourth Edition]**, McGraw Hill Education

Reference books:

1. Parikh V.M. 2002. **Absorbion spectroscopy of organic molecules**, Mehta publishers, Pune.
2. Williams D.W. and Flemming I. 1987. **Spectroscopic methods in organic chemistry**, McGraw-Hill, U.K.
3. Kalsi P.S. 2007. **Spectroscope of organic compounds**, New Age Int. Pvt. Ltd. New Delhi.


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COURSE OUTCOMES (CO)

After completion of the course, the students will be able to


CO1	Utilize the ESR techniques to interpret the spectrum of unknown compounds
CO2	Recall the working principles of Mossbauer spectroscopy
CO3	Detect the metals and non-metals using AAS technique
CO4	Analyse the multiple types of elements by flame photometry
CO5	Determine the compounds like vitamins by the concepts of Fluorimetry and phosphorimetry

Mapping:


CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	M	L
CO2	L	M	M	H	H
CO3	L	H	L	M	H
CO4	H	L	H	M	L
CO5	M	H	M	L	H


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18UCHEL602	ELECTIVE II : BIO-INORGANIC CHEMISTRY	SEMESTER-VI	
COURSE OBJECTIVES: The course aims <ul style="list-style-type: none"> • To nurture the importance of metals in biological systems • To render the role of metals and its complexes in the synthesis of drugs • To impart the functions and properties of various metals • To bestow the work of topical agents • To forge the wreck of radioactivity in chemotherapy 			
Credits: 4		Total Hours: 40	
UNIT	CONTENTS	HOURS	CO
I	Metal ions in biological systems: Essential and trace metals - alkaline and alkaline earth metals in biological systems, role of iron in living systems, biologically important complexes of Iron (transport proteins) - haemoglobin, myoglobin - Structure of haemoglobin and myoglobin. Bohrs effect - Nitrogen fixation, in vitro nitrogen fixation and in vivo nitrogen fixation.	8	CO1
II	Co-ordination Compounds and Complexation: Platinum complexes as anticancer drugs - cis-platin and trans-platin - Complexes of gold for Rheumatoid arthritis. Lithium complexes for mental health. Role of copper, zinc, mercury, arsenic and antimony in drugs. Biological functions and toxicity of chromium, manganese, cobalt, nickel and iodine.	8	CO2
III	Role of Medicinal Inorganic Compounds: Medicinal inorganic complexes - Alum, Phosphoric acid, Ferric ammonium citrate. Preparation, Properties and uses. Biological role of inorganic compounds - Sodium, Potassium, Calcium and Iodine. Na-K pump. Metal deficiency and diseases, Metal excess and toxicity.	8	CO3
IV	Topical Agents: Protectives - Calamine, Talc, Zinc Oxide, Zinc Stearate, Titanium dioxide. Astringents - Zinc sulphate, Alum. Anti-infectives: Boric acid, Hydrogen peroxide, Iodine. Dental Products: Anti-caries Agents - Role of Fluorides as anti-caries agents, Sodium fluoride.	8	CO4


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V	Inorganic Radio-Pharmaceuticals: Radioactivity, Units of radioactivity, radiation dosimetry, Hazards and precautions in handling of radiopharmaceuticals and storage. Chemotherapy: Radio diagnostic agents - MRI scanning - Chelating Agents (with special reference to EDTA) and therapy based on in vivo chelation of radio nucleotides - Dosage and toxicity.	8	CO5
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Text Books:

1. Bertini, H. B. Gray, S. J. Lippard and J. S. Valentine, **Bioinorganic Chemistry**; University Science Books.
2. Dr Asim K Dass, **Bioinorganic Chemistry 2007**, Books and Allied (P) Limited.
3. Keith F. Purcell and John C. Kotz, **Inorganic Chemistry**, 3rd Edition


COURSE OUTCOMES (CO)

After completion of the course, the students will be able to

CO1	Recite the role of metal ions in biological systems
CO2	Quote the pharmaceutical behavior of metal complexes
CO3	Persuade the biological role of inorganic complexes
CO4	Hark the functions of various topical agents
CO5	Illustrate the chemistry of radio-pharmaceuticals


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Mapping:

CO \ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	L	H
CO2	L	H	L	H	M
CO3	M	H	H	L	H
CO4	H	L	H	M	L
CO5	M	L	M	H	L

H-High M-Medium L-Low



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