

K. S. Rangasamy College of Arts and Science (Autonomous),

Tiruchengode - 637 215

Department of Chemistry

Courses focus on Employability/ Entrepreneurship/ Skill Development

Courses focus on Employability

- Core IV: Spectroscopy
- Elective I: Polymer chemistry I

Courses focus on Entrepreneurship

- Elective II: Polymer chemistry II

Courses focus on Skill Development

- Elective I: Principles and applications of drug design and discovery
- Elective II : Bio-inorganic chemistry II

**Encls:**

1. Copy of Scheme of Examination
2. Syllabus copy of courses highlighting the focus on Skill Development along with course outcomes
3. Mapping of courses to Skill Development

*[Handwritten Signature]*  
 HoD - Chemistry

*[Handwritten Signature]*  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA

*[Circular Stamp]*  
 K. S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)  
 TIRUCHENGODE - 637 215  
 CONTROLLER OF EXAMINATIONS

*[Handwritten Signature]*  
 CoE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.

M.Sc., SCHEME OF EXAMINATION

Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Max Marks			Credit Points
				CA	CE	Total	
<b>FIRST SEMESTER</b>							
<b>Part A</b>							
18PCHM101	Core I: Organic Chemistry I	5	3	25	75	100	5
18PCHM102	Core II: Inorganic Chemistry I	5	3	25	75	100	5
18PCHM103	Core III: Physical Chemistry I	5	3	25	75	100	4
18PCHM104	Core IV: Spectroscopy	4	3	25	75	100	4
18PCHMP101	Core Practical I: Organic Chemistry Practical I	5	6	40	60	100	3
18PCHMP102	Core Practical II: Inorganic Chemistry Practical I	5	6	40	60	100	3
<b>Non Credit</b>							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
<b>Total</b>		30				600	24
<b>SECOND SEMESTER</b>							
<b>Part A</b>							
18PCHM201	Core V: Organic Chemistry II	5	3	25	75	100	5
18PCHM202	Core VI: Inorganic Chemistry II	5	3	25	75	100	5
18PCHM203	Core VII: Physical Chemistry II	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18PCHMP201	Core Practical III: Organic Chemistry Practical II	5	6	40	60	100	3
18PCHMP202	Core Practical IV: Physical Chemistry Practical I	4	6	40	60	100	3

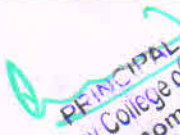
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India



Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>700</b>	<b>26</b>
THIRD SEMESTER							
PART - A							
18PCHM301	Core VIII: Organic Chemistry III	6	3	25	75	100	5
18PCHM302	Core IX: Inorganic Chemistry III	6	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18PCHMP301	Core Practical V: Inorganic Chemistry Practical II	5	6	40	60	100	3
18PCHMP302	Core Practical VI: Physical Chemistry Practical II	5	6	40	60	100	3
18PPHCHI301	IDC I: Solid State Physics	4	3	25	75	100	4
<b>Total</b>		<b>30</b>				<b>600</b>	<b>24</b>
FOURTH SEMESTER							
PART - A							
18PCHM401	Core X: Analytical Chemistry	5	3	25	75	100	5
18PCHM402	Core XI: Physical Chemistry III	5	3	25	75	100	5
18PCHPR401	Project & Viva -Voce	5	-	50	150	200	6
<b>Total</b>		<b>15</b>				<b>400</b>	<b>16</b>
<b>Grand Total</b>						<b>2300</b>	<b>90</b>

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



3

  
 Mr. M. S. ... M.A., M.Phil.  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode, Tamil Nadu, India

### Elective I


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

Paper code	Semester	Paper name
18PCHEL201	II	Elective I: Polymer Chemistry I
18PCHEL202	II	Elective I: Bio-inorganic chemistry I
18PCHEL203	II	Elective I: Principles and applications of drug design and discovery


### Elective II

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

Paper code	Semester	Paper name
18PCHEL301	III	Elective II: Photochemistry
18PCHEL302	III	Elective II: Bio-inorganic chemistry II
18PCHEL303	III	Elective II: Polymer Chemistry II

  
Dr. M. Prasad  
K.S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, India



  
Mr. M. PRASAD, M.Sc., M.B.A., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science  
Tiruchengode - 637 215, Tamil Nadu



18PCHEL201	ELECTIVE I: POLYMER CHEMISTRY I	SEMESTER - II
------------	---------------------------------	---------------

**COURSE OBJECTIVE:**

The course aims

- To know the basic concepts of polymer, coordination in polymer, properties of commercial polymers and polymer processing
- To gain knowledge about Coordination polymerization and the catalysts that enhances
- To recognize the properties of polymer and its measurements
- To understand the processing of polymers and its types
- To provide the knowledge about properties and chemistry behind commercial polymers

Credits: 4

Total hours: 40

UNIT	CONTENTS	Hrs	CO
I	<b>Basic Concepts:</b> Monomers, functionality of monomers and polymers, degree of polymerization, Linear, branched and network Polymers. <b>Condensation Polymerization:</b> Mechanism of stepwise polymerization. Kinetics and statistics of linear stepwise polymerization. <b>Addition polymerization:</b> Free radical, cationic and anionic polymerization. Polymerization conditions. Polymerization in homogeneous and heterogeneous systems.	8	CO1
II	<b>Co-ordination Polymerization:</b> Zeigler-natta catalyst-kinetics, mono and bi metallic mechanism of co-ordination polymers. <b>Co-polymerization:</b> Block and graft co-polymers, kinetics of co polymerization. Types of co-polymerization. Evaluation of monomer. Monomer Reactivity ratio. Rate of co-polymerization.	8	CO2
III	<b>Molecular Weight and Properties:</b> Poly dispersion - average molecular weight concept, number, weight and viscosity average molecular weights. Measurement of molecular weights - Gel permeation chromatography and light scattering. Polymer structure and physical properties - crystalline melting point $T_m$ . The glass transition temperature. Factors affecting $T_g$ and $T_m$ .	8	CO3


IV	<b>Polymer Processing:</b> Plastics, elastomers, resins and fibres. Compounding processing technique, calendaring, die-casting, rotational casting, film casting, injection moulding, blow moulding extrusion, moulding, thermo forming, foaming, reinforcing and fibre spinning.	8	CO4
V	<b>Properties of Commercial Polymers:</b> Polyethylene, polyvinylchloride, polyamides, polyesters, polyurethane, polycarbonate, phenolic resins, epoxy resins. Contact lens, dental polymers, artificial heart, volve, kidney, skin and blood cells.	8	CO5

**Text Books:**

1	<i>Billmeyer, F.W.</i> 2003. <b>Text Book of Polymer Science.</b> [Third Edition]. John Wiley & Sons, New York.
2	<i>Gowariker, V.R. Viswanathan, N.V and Sreedha J.</i> 2015. <b>Polymer Science.</b> [Second Edition]. New Age International Ltd, New Delhi.

**Reference Books:**

1	<i>Allcock, H. R and Lamber, F.W.</i> 2004. <b>Contemporary Polymer Chemistry.</b> [Third Edition]. Prentice Hall, New Delhi.
2	<i>Flory, P. J.</i> 1995. <b>Principles of Polymer Chemistry.</b> [First edition-16 <sup>th</sup> reprint]. Cornell University press, New York.
3	<i>Odian, G.</i> 2007. <b>Principles of Polymerization.</b> [Fourth Edition]. John Wiley & Sons, New York.

  
**PRINCIPAL**  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu. INDIA

*M.V*  
 Mr. M. PRASAD, M.Sc., M.B.A., M.P.Ed.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.





## COURSE OUTCOMES (CO)


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

CO1	Recall the basic concepts and types of polymers
CO2	Understand the role of catalyst and techniques of polymerization
CO3	Know about the properties and measurement of molecular weights
CO4	Estimate the processing techniques of polymer
CO5	Demonstrate the properties of commercial polymers


## MAPPING:

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

H-High M-Medium L-Low

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu. INDIA



  
Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamilnadu, India.

K. S. Rangasamy College of Arts and Science (Autonomous),

Tiruchengode - 637 215

Department of Chemistry

Courses focus on Employability/ Entrepreneurship/ Skill Development

Courses focus on Employability

- Core IV: Spectroscopy
- Elective I: Polymer chemistry I

Courses focus on Entrepreneurship

- Elective II: Polymer chemistry II

Courses focus on Skill Development

- Elective I: Principles and applications of drug design and discovery
- Elective II : Bio-inorganic chemistry II

Encls:

1. Copy of Scheme of Examination
2. Syllabus copy of courses highlighting the focus on Skill Development along with course outcomes
3. Mapping of courses to Skill Development

*[Handwritten Signature]*  
 HoD - Chemistry

*[Handwritten Signature]*  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA

*[Stamp]*  
 K. S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)  
 TIRUCHENGODE - 637 215  
 CONTROLLER OF EXAMINATIONS

*[Handwritten Signature]*  
 CoE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.



M.Sc., SCHEME OF EXAMINATION

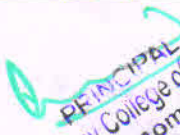
Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Max Marks			Credit Points
				CA	CE	Total	
<b>FIRST SEMESTER</b>							
<b>Part A</b>							
18PCHM101	Core I: Organic Chemistry I	5	3	25	75	100	5
18PCHM102	Core II: Inorganic Chemistry I	5	3	25	75	100	5
18PCHM103	Core III: Physical Chemistry I	5	3	25	75	100	4
18PCHM104	Core IV: Spectroscopy	4	3	25	75	100	4
18PCHMP101	Core Practical I: Organic Chemistry Practical I	5	6	40	60	100	3
18PCHMP102	Core Practical II: Inorganic Chemistry Practical I	5	6	40	60	100	3
<b>Non Credit</b>							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
<b>Total</b>		30				600	24
<b>SECOND SEMESTER</b>							
<b>Part A</b>							
18PCHM201	Core V: Organic Chemistry II	5	3	25	75	100	5
18PCHM202	Core VI: Inorganic Chemistry II	5	3	25	75	100	5
18PCHM203	Core VII: Physical Chemistry II	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18PCHMP201	Core Practical III: Organic Chemistry Practical II	5	6	40	60	100	3
18PCHMP202	Core Practical IV: Physical Chemistry Practical I	4	6	40	60	100	3

PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India

Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>700</b>	<b>26</b>
THIRD SEMESTER							
PART - A							
18PCHM301	Core VIII: Organic Chemistry III	6	3	25	75	100	5
18PCHM302	Core IX: Inorganic Chemistry III	6	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18PCHMP301	Core Practical V: Inorganic Chemistry Practical II	5	6	40	60	100	3
18PCHMP302	Core Practical VI: Physical Chemistry Practical II	5	6	40	60	100	3
18PPHCHI301	IDC I: Solid State Physics	4	3	25	75	100	4
<b>Total</b>		<b>30</b>				<b>600</b>	<b>24</b>
FOURTH SEMESTER							
PART - A							
18PCHM401	Core X: Analytical Chemistry	5	3	25	75	100	5
18PCHM402	Core XI: Physical Chemistry III	5	3	25	75	100	5
18PCHPR401	Project & Viva -Voce	5	-	50	150	200	6
<b>Total</b>		<b>15</b>				<b>400</b>	<b>16</b>
<b>Grand Total</b>						<b>2300</b>	<b>90</b>

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



3

  
 Mr. M. S. ... M.A., M.Phil.  
 K.S. Rangasamy College of Arts & Science  
 (Autonomous)  
 Tiruchengode, Tamil Nadu, India



### Elective I


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

Paper code	Semester	Paper name
18PCHEL201	II	Elective I: Polymer Chemistry I
18PCHEL202	II	Elective I: Bio-inorganic chemistry I
18PCHEL203	II	Elective I: Principles and applications of drug design and discovery


### Elective II

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

Paper code	Semester	Paper name
18PCHEL301	III	Elective II: Photochemistry
18PCHEL302	III	Elective II: Bio-inorganic chemistry II
18PCHEL303	III	Elective II: Polymer Chemistry II

  
Dr. M. Prasad  
K.S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, India




  
Mr. M. PRASAD, M.Sc., M.B.A., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science  
Tiruchengode - 637 215, Tamil Nadu

18PCHEL303	ELECTIVE II: POLYMER CHEMISTRY II	SEMESTER - II	
<p><b>COURSE OBJECTIVES:</b> The course aims</p> <ul style="list-style-type: none"> <li>• To know the basic concepts of polymer, coordination in polymer, properties of commercial polymers and polymer processing</li> <li>• To gain knowledge about Coordination polymerization and the catalysts that enhances</li> <li>• To recognize the properties of polymer and its measurements</li> <li>• To understand the processing of polymers and its types</li> <li>• To cognize the properties and chemistry behind commercial polymers</li> </ul>			
Credits: 4		Total hours: 40	
UNIT	CONTENTS	Hrs	CO
I	<p><b>Dendrimers and hyper branched polymers:</b> Properties of Dendrimers and Hyper branched Polymers and their Blends: Dendrimers and their structure, synthesis of Dendrimers, Hyper branched Polymers and their structure. Synthesis of hyper branched polymers, branching and polydispersity, conformation, general concepts of polymer blends. Blends of Dendritic polymers with thermoplastics.</p>	8	CO1
II	<p>Polymer nano composites Polyamide/clay nano composites- Synthesis, characterization and properties of Nylon 6-clayhybrid. Polystyrene/clay nano composites- Surface initiated polymerization, syndiotactic polystyrene/ clay nano composites, properties. Poly(butylenes terephthalate) (PBT) based nano composites, Epoxy nano composites on layered silicates. Polypropylene layered silicate nano composites.</p>	8	CO2
III	<p>Synthesis of Biomedical polymers for drug delivery Polymers as biomaterials, biomedical applications of synthetic polymers, synthetic polymers for biomedical applications, poly(<math>\alpha</math>-hydroxyesters), poly(lactic acid), poly(anhydrides), poly(phosphazenes), controlled drug delivery, methods of drug delivery</p>	8	CO3

  
**PRINCIPAL**  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



  
**Dr. M. PRASAD, M.Sc., M.B.A., M.Phil.**  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamil Nadu, India.



IV	Conducting polymers Correlation of chemical structure and electrical conductivity. Structure of conducting polymers Polyacetylene, polypyrrole, polythiophene, polyanilines, p-phenylene sulphide, polyphenylene vinylene. Different methods of synthesis of polyaniline. solution polymerization, interfacial polymerization, electrochemical synthesis, enzyme synthesis and photo induced polymerization of aniline. Applications of conducting polymers: Membranes and ion exchanger, corrosion protection, gas sensors, biosensors, electrocatalysis.	8	CO4
V	<b>Engineering plastics</b> Acrylonitrile butadiene styrene (ABS), Polycarbonates (PC), Polyamides (PA), Polybutylene terephthalate (PBT), Polyethylene terephthalate (PET), Polyphenylene oxide (PPO), Polysulphone (PSU), Polyetherether ketone (PEEK). Polyimides, Polyphenylene Sulphide (PPS), Syntheticroute, structure, properties and uses.	8	CO5

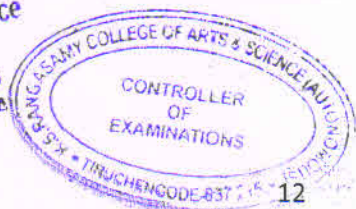
**Text Book:**

1	Gabriel, O. Shonaike & Suresh G. Advani, 2003. <b>Advanced polymeric materials</b> , CRC press.
---	---

**Reference Books:**

1	<i>Allcock, H. R and Lamber, F.W. 2004. Contemporary Polymer Chemistry. [Third Edition]. Prentice Hall, New Delhi.</i>
2	<i>Flory, P. J. 1995. Principles of Polymer Chemistry. [First edition-16<sup>th</sup> reprint]. Cornell University press, New York.</i>
3	<i>Odian, G. 2007. Principles of Polymerization. [Fourth Edition]. John Wiley &amp; Sons, New York.</i>

**PRINCIPAL**  
**K. S. Rangasamy College of Arts & Science**  
 (Autonomous)  
**TIRUCHENGODE - 637 215**  
 Namakkal-Dt, Tamil Nadu, INDIA



**Mr. M. PRASAD**, M.Sc., M.B.A., M.A.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamil Nadu, India

## COURSE OUTCOMES (CO)


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

CO1	Recall the basic concepts and types of polymers
CO2	Understand the role of catalyst and techniques of polymerization
CO3	Know about the properties and measurement of molecular weights
CO4	Estimate the processing techniques of polymer
CO5	Demonstrate the properties of commercial polymers


## MAPPING:

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

H-High M-Medium L-Low

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



  
Mr. M. PRASAD, M.Sc., M.B.A., ...  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamilnadu, India.



K. S. Rangasamy College of Arts and Science (Autonomous),

Tiruchengode - 637 215

Department of Chemistry

Courses focus on Employability/ Entrepreneurship/ Skill Development

Courses focus on Employability

- Core IV: Spectroscopy
- Elective I: Polymer chemistry I

Courses focus on Entrepreneurship

- Elective II: Polymer chemistry II

Courses focus on Skill Development

- Elective I: Principles and applications of drug design and discovery
- Elective II : Bio-inorganic chemistry II

Encls:

1. Copy of Scheme of Examination
2. Syllabus copy of courses highlighting the focus on Skill Development along with course outcomes
3. Mapping of courses to Skill Development

*[Handwritten Signature]*  
 HoD - Chemistry

*[Handwritten Signature]*  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA

*[Circular Stamp]*  
 K. S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)  
 TIRUCHENGODE - 637 215  
 CONTROLLER OF EXAMINATIONS

*[Handwritten Signature]*  
 CoE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.

M.Sc., SCHEME OF EXAMINATION

Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Max Marks			Credit Points
				CA	CE	Total	
<b>FIRST SEMESTER</b>							
<b>Part A</b>							
18PCHM101	Core I: Organic Chemistry I	5	3	25	75	100	5
18PCHM102	Core II: Inorganic Chemistry I	5	3	25	75	100	5
18PCHM103	Core III: Physical Chemistry I	5	3	25	75	100	4
18PCHM104	Core IV: Spectroscopy	4	3	25	75	100	4
18PCHMP101	Core Practical I: Organic Chemistry Practical I	5	6	40	60	100	3
18PCHMP102	Core Practical II: Inorganic Chemistry Practical I	5	6	40	60	100	3
<b>Non Credit</b>							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
<b>Total</b>		30				600	24
<b>SECOND SEMESTER</b>							
<b>Part A</b>							
18PCHM201	Core V: Organic Chemistry II	5	3	25	75	100	5
18PCHM202	Core VI: Inorganic Chemistry II	5	3	25	75	100	5
18PCHM203	Core VII: Physical Chemistry II	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18PCHMP201	Core Practical III: Organic Chemistry Practical II	5	6	40	60	100	3
18PCHMP202	Core Practical IV: Physical Chemistry Practical I	4	6	40	60	100	3

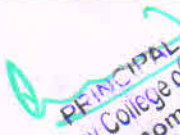
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India



Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>700</b>	<b>26</b>
THIRD SEMESTER							
PART - A							
18PCHM301	Core VIII: Organic Chemistry III	6	3	25	75	100	5
18PCHM302	Core IX: Inorganic Chemistry III	6	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18PCHMP301	Core Practical V: Inorganic Chemistry Practical II	5	6	40	60	100	3
18PCHMP302	Core Practical VI: Physical Chemistry Practical II	5	6	40	60	100	3
18PPHCHI301	IDC I: Solid State Physics	4	3	25	75	100	4
<b>Total</b>		<b>30</b>				<b>600</b>	<b>24</b>
FOURTH SEMESTER							
PART - A							
18PCHM401	Core X: Analytical Chemistry	5	3	25	75	100	5
18PCHM402	Core XI: Physical Chemistry III	5	3	25	75	100	5
18PCHPR401	Project & Viva -Voce	5	-	50	150	200	6
<b>Total</b>		<b>15</b>				<b>400</b>	<b>16</b>
<b>Grand Total</b>						<b>2300</b>	<b>90</b>

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



3

  
 Mr. M. S. Ramesh, M.A., M.Phil.,  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode, Tamil Nadu, India

### Elective I


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

Paper code	Semester	Paper name
18PCHEL201	II	Elective I: Polymer Chemistry I
18PCHEL202	II	Elective I: Bio-inorganic chemistry I
18PCHEL203	II	Elective I: Principles and applications of drug design and discovery


### Elective II

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

Paper code	Semester	Paper name
18PCHEL301	III	Elective II: Photochemistry
18PCHEL302	III	Elective II: Bio-inorganic chemistry II
18PCHEL303	III	Elective II: Polymer Chemistry II

  
Dr. M. Prasad  
K.S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, India



  
Mr. M. PRASAD, M.Sc., M.B.A., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science  
Tiruchengode - 637 215, Tamil Nadu



18PCHM104	CORE IV: SPECTROSCOPY	SEMESTER - I
-----------	-----------------------	--------------

**COURSE OBJECTIVES:**


The course aims

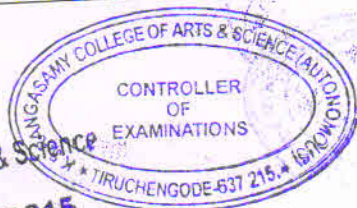
- To inculcate the basic principles of UV-Vis and IR spectroscopy techniques and its applications.
- To provide information about the various types of NMR spectroscopic techniques and factors affecting it.
- To acknowledge 2D NMR techniques and predict the spectra of simple molecules
- To estimate the mass spectroscopic techniques and its uses to study rearrangement reactions
- To identify spectra of organic compounds

Credits: 4


Total hours: 40

UNIT	CONTENTS	Hrs	CO
I	<p><b>UV-VIS:</b> Ultraviolet - Visible spectroscopy - types of electronic transitions -chromophores and auxochromes - factors influencing positions and intensity of absorption bands - absorption spectra of dienes, polyenes and alpha, beta- unsaturated carbonyl compounds - Woodward - Fieser rules.</p> <p><b>IR Spectroscopy:</b> Vibrational frequencies and factors affecting them - identification of functional groups - intra and inter molecular hydrogen bonding - finger print region - Far IR region - metal ligand stretching vibrations.</p>	8	CO1
II	<p><b>NMR Spectroscopy:</b> Basic idea - Nuclear spin - magnetic moment of a nucleus - nuclear energy levels in the presence of magnetic field, relative populations of energy levels - macroscopic magnetization - basic principles of NMR experiments - CW and FT NMR - <sup>1</sup>H NMR - chemical shift and coupling constants - factors influencing proton chemical shifts and vicinal proton - proton coupling constants - <sup>1</sup>H NMR spectra of simple organic molecules. AX and AB spin system - spin decoupling - nuclear Overhauser effect - proton exchange.</p>	8	CO2

  
**PRINCIPAL**  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu. INDIA



4

  
**Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.**  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.




III	<b><sup>13</sup>C NMR and Two - Dimensional NMR spectroscopy:</b> <sup>13</sup> C NMR - proton decoupled and off-resonance <sup>13</sup> C NMR spectra - factors affecting <sup>13</sup> C chemical shifts - <sup>13</sup> C NMR spectra of simple organic molecules - Basic principles of two-dimensional NMR spectroscopy - COSY, NOESY, HMBC and HSQC spectra and their applications.	8	CO3
IV	<b>Mass spectrometry:</b> Principles - instrumentation - measurement techniques - meta stable peak - N-rule - (EI & FAB) - presentation of spectral data - molecular ions - isotope ions - Fragmentation process - symbolism (scission only) - even and odd electron ions - scission with rearrangement - Retro Diels-Alder rearrangement - McLafferty rearrangement - Mass spectra of hydrocarbons, alcohols, phenols, aldehydes, ketones, carboxylic acids, thiols, ether and amines.	8	CO4
V	<b>Spectroscopic identification of organic compounds:</b> Problems involving the identification of organic compounds using UV, IR and NMR and mass spectrometry.	8	CO5

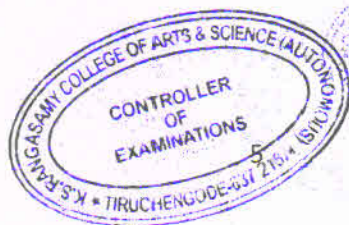
**Text Books:**


1	<i>Dyer, D.</i> 1978. <b>Application of absorption spectroscopy of organic compounds</b> , Prentice -Hall, Englewood, Cliffs.
2	Gary M. Lampman, George S. Kriz, James R. Vyvyan, Donald L. Pavia. 2014. <b>Introduction to Spectroscopy. [Fifth Edition]</b> . Cengage Learning
3	<i>Kemp, W.</i> 2008. <b>Organic spectroscopy. [Third Edition]</b> . Macmillan Education, UK.

**Reference Books:**

1	<i>Lambert J.B, H. F. Shurrell, and R. G. Cooks.</i> 1987. <b>Introduction to organic spectroscopy</b> , Mac Millan.
2	<i>Silverstein R. M and F. X. Webster.</i> 2014. <b>Spectrometric identification of organic compounds. [Seventh Edition]</b> . John Wiley.

  
**PRINCIPAL**  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



  
**Mr. M. PRASAD, M.Sc., M.B.A., M.P.E.**  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamil Nadu, INDIA



## COURSE OUTCOMES (CO)


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

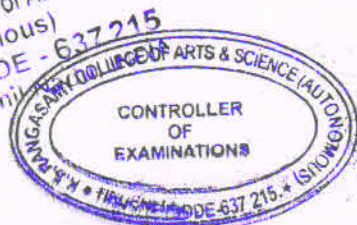
CO1	Study the interactions of electromagnetic radiation and matter and their applications in spectroscopy.
CO2	Apply formalisms based on molecular symmetry to predict spectroscopic properties.
CO3	Analyze and interpret spectroscopic data collected by the methods discussed in the course.
CO4	Operate common laboratory instruments used for chemical analysis and describe and understand the capabilities of instrumental methods.
CO5	Apply formalisms based on molecular symmetry to predict spectroscopic properties.


## MAPPING:

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

H-High M-Medium L-Low

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu



  
Mr. M. PRASAD, M.Sc., M.B.A., M.P.H.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu

K. S. Rangasamy College of Arts and Science (Autonomous),

Tiruchengode - 637 215

Department of Chemistry

Courses focus on Employability/ Entrepreneurship/ Skill Development

Courses focus on Employability

- Core IV: Spectroscopy
- Elective I: Polymer chemistry I

Courses focus on Entrepreneurship

- Elective II: Polymer chemistry II

Courses focus on Skill Development

- Elective I: Principles and applications of drug design and discovery
- Elective II : Bio-inorganic chemistry II

Encls:

1. Copy of Scheme of Examination
2. Syllabus copy of courses highlighting the focus on Skill Development along with course outcomes
3. Mapping of courses to Skill Development

*[Handwritten Signature]*  
 HoD - Chemistry

*[Handwritten Signature]*  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA

*[Stamp]*  
 K. S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)  
 TIRUCHENGODE - 637 215  
 CONTROLLER OF EXAMINATIONS

*[Handwritten Signature]*  
 CoE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.



M.Sc., SCHEME OF EXAMINATION


Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Max Marks			Credit Points
				CA	CE	Total	
<b>FIRST SEMESTER</b>							
<b>Part A</b>							
18PCHM101	Core I: Organic Chemistry I	5	3	25	75	100	5
18PCHM102	Core II: Inorganic Chemistry I	5	3	25	75	100	5
18PCHM103	Core III: Physical Chemistry I	5	3	25	75	100	4
18PCHM104	Core IV: Spectroscopy	4	3	25	75	100	4
18PCHMP101	Core Practical I: Organic Chemistry Practical I	5	6	40	60	100	3
18PCHMP102	Core Practical II: Inorganic Chemistry Practical I	5	6	40	60	100	3
<b>Non Credit</b>							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
<b>Total</b>		30				600	24
<b>SECOND SEMESTER</b>							
<b>Part A</b>							
18PCHM201	Core V: Organic Chemistry II	5	3	25	75	100	5
18PCHM202	Core VI: Inorganic Chemistry II	5	3	25	75	100	5
18PCHM203	Core VII: Physical Chemistry II	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18PCHMP201	Core Practical III: Organic Chemistry Practical II	5	6	40	60	100	3
18PCHMP202	Core Practical IV: Physical Chemistry Practical I	4	6	40	60	100	3

PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India

Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>700</b>	<b>26</b>
THIRD SEMESTER							
PART - A							
18PCHM301	Core VIII: Organic Chemistry III	6	3	25	75	100	5
18PCHM302	Core IX: Inorganic Chemistry III	6	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18PCHMP301	Core Practical V: Inorganic Chemistry Practical II	5	6	40	60	100	3
18PCHMP302	Core Practical VI: Physical Chemistry Practical II	5	6	40	60	100	3
18PPHCHI301	IDC I: Solid State Physics	4	3	25	75	100	4
<b>Total</b>		<b>30</b>				<b>600</b>	<b>24</b>
FOURTH SEMESTER							
PART - A							
18PCHM401	Core X: Analytical Chemistry	5	3	25	75	100	5
18PCHM402	Core XI: Physical Chemistry III	5	3	25	75	100	5
18PCHPR401	Project & Viva -Voce	5	-	50	150	200	6
<b>Total</b>		<b>15</b>				<b>400</b>	<b>16</b>
<b>Grand Total</b>						<b>2300</b>	<b>90</b>

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



3

  
 Mr. M. S. ... M.A., M.Phil.  
 K.S. Rangasamy College of Arts & Science  
 (Autonomous)  
 Tiruchengode, Tamil Nadu, India



### Elective I


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

Paper code	Semester	Paper name
18PCHEL201	II	Elective I: Polymer Chemistry I
18PCHEL202	II	Elective I: Bio-inorganic chemistry I
18PCHEL203	II	Elective I: Principles and applications of drug design and discovery


### Elective II

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


Paper code	Semester	Paper name
18PCHEL301	III	Elective II: Photochemistry
18PCHEL302	III	Elective II: Bio-inorganic chemistry II
18PCHEL303	III	Elective II: Polymer Chemistry II

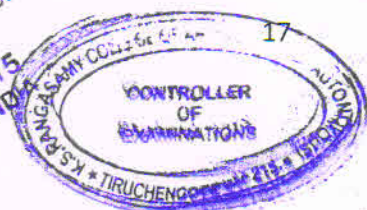
  
Dr. M. Prasad  
K.S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, India

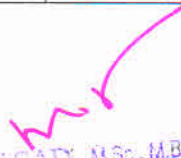


  
Mr. M. PRASAD, M.Sc., M.B.A., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science  
Tiruchengode - 637 215, Tamil Nadu

18PCHEL302	ELECTIVE II: BIO-INORGANIC CHEMISTRY II	SEMESTER - III	
<b>COURSE OBJECTIVES:</b>			
The course aims			
<ul style="list-style-type: none"> <li>To understand the importance of inorganic compounds in medicinal chemistry</li> <li>To gain knowledge about essential trace elements in biological systems</li> <li>To estimate the vitality of chemicals in gastro intestinal tracks</li> <li>To know about chemicals that are important as electrolytes</li> <li>To evaluate the chemistry of radioactive chemicals in dosimetry</li> </ul>			
<b>Credits: 4</b>		<b>Total hours: 40</b>	
UNIT	CONTENTS	Hrs	CO
I	<b>Essential and trace Elements in Biological Systems:</b> Structure and functions, effect of metal deficiency. Toxicity: mercury, cadmium, lead, beryllium, selenium and arsenic. Chelation therapy: Metals used for diagnosis and chemotherapy. Crown ether complexes of Na <sup>+</sup> and K <sup>+</sup> - ATP and ADP. Platinum complexes as anticancer drugs. Pt-DNA binding, complexes of gold, copper, zinc, mercury, arsenic and antimony as drugs.	8	CO1
II	<b>Topical Agents:</b> Protectives - Calamine, Talc, Zinc Oxide, Zinc Stearate, Titanium dioxide, Silicon Polymers and Dimethicone. Astringents - Zinc sulphate, Alum. Anti-infectives - Boric acid, Hydrogen peroxide, Iodine, Potassium permanganate, Chlorinated Lime. Dental Products - Anti-caries Agents - Role of Fluorides as anti-caries agents, Sodium fluoride. Dentifrices - Calcium carbonate, dibasic calcium phosphate, Zinc chloride.	8	CO2
III	<b>Gastro-intestinal agents:</b> Acidifiers and Antacids - Dilute hydrochloric acid, sodium acid phosphate, sodium bicarbonate, aluminium hydroxide gel, dried aluminium hydroxide gel, magnesium oxide (Magnesia), magnesium hydroxide mixture, magnesium trisilicate. Adsorbents and related drugs - Light kaolin, heavy kaolin, and activated charcoal. Laxatives - Magnesium sulphate, sodium phosphate.	8	CO3
IV	<b>Electrolytes:</b> Major intra and extra cellular electrolytes -	8	CO4

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



  
 Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamil Nadu, India.



	Physiological role of Chloride, Phosphate, Bicarbonate, Sodium, Potassium, Calcium and Magnesium. Electrolytes used for replacement therapy - Sodium chloride, Potassium chloride, Calcium chloride, Calcium lactate, Tribasic calcium phosphate; Physiological acid-base balance: Sodium dihydrogen phosphate, Sodium acetate, Sodium bicarbonate and their importance; Dialysis fluids - Haemodialysis fluids.		
V	<b>Inorganic Radio-Pharmaceuticals:</b> Radioactivity, Units of radioactivity, radiation dosimetry, Measurement of radioactivity, Hazards and precautions in handling of radiopharmaceuticals, storage, radio pharmaceutical preparations and standards of radioactive material iodine-131 ( $I^{131}$ ), Cobalt -58 ( $Co^{58}$ ). Radio opaque contrast medium -barium sulphate.	8	CO5

**Text Books:**

1	Artherden, L.M. Bentley and Driver's, 2003. <b>Textbook of Pharmaceutical Chemistry</b> , [Eighth edition]. Oxford University Press, New Delhi. 2003.
2	Block, J.H. Roche, Soine, E.T.O. and Wilson, C.O. 1986. <b>Inorganic Medicinal &amp; Pharmaceutical Chemistry</b> , [First edition], Varghese publishing house, Mumbai.
3	Rao, K.S. and Suresh, C.V. 2011. <b>Pharmaceutical Inorganic Chemistry</b> , Pharma Med Press.
4	Kasture, A.V. Wadodkar, S.G. 2008. <b>Pharmaceutical Chemistry-I</b> , [Twenty Fifth edition]. Nirali Prkashan.
5	Rajasekaran, V. N. 2005. <b>Text Book of Pharmaceutical Inorganic Chemistry Theory and Practical</b> , [Second edition]. Sun Publication, Chennai.

**Reference Books:**

1	Chatwal, 2007. <b>Pharmaceutical Chemistry Inorganic</b> , [Third edition]. Himalaya publishing house, Mumbai.
2	Miessler, G.L. and Tarr, D.A. 2005. <b>Inorganic Chemistry</b> , Pearson Education.
3	Cowan, J. A.1997. <b>Inorganic biochemistry</b> , Wiley-VCH, New York.
4	Chenchu Lakshmi, N.V., 2012. " <b>Pharmaceutical Inorganic Chemistry: Theory and Practice</b> " [first edition]. Pearson Education, Dorling Kindersley (India) Pvt. Ltd.

## COURSE OUTCOMES (CO)

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

CO1	Recall the essential and trace elements in biological systems
CO2	Estimate the topical agents and its role in biological system
CO3	Demonstrate the chemical compounds as gastro intestinal agents
CO4	Predict the role of chemical compounds as electrolytes
CO5	Assess the utilization of inorganic Radio-Pharmaceuticals


## MAPPING:

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

H-High M-Medium L-Low

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



  
Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India.



**K. S. Rangasamy College of Arts and Science (Autonomous),**

**Tiruchengode - 637 215**

**Department of Chemistry**

**Courses focus on Employability/ Entrepreneurship/ Skill Development**

**Courses focus on Employability**

- Core IV: Spectroscopy
- Elective I: Polymer chemistry I

**Courses focus on Entrepreneurship**

- Elective II: Polymer chemistry II

**Courses focus on Skill Development**

- Elective I: Principles and applications of drug design and discovery
- Elective II : Bio-inorganic chemistry II

**Encls:**

1. Copy of Scheme of Examination
2. Syllabus copy of courses highlighting the focus on Skill Development along with course outcomes
3. Mapping of courses to Skill Development

*[Handwritten Signature]*  
**HoD - Chemistry**

*[Handwritten Signature]*  
**PRINCIPAL**  
**K. S. Rangasamy College of Arts & Science**  
**(Autonomous)**  
**TIRUCHENGODE - 637 215**  
**Namakkal-Dt. Tamil Nadu, INDIA**

**K. S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)**  
**CONTROLER OF EXAMINATIONS**  
**TIRUCHENGODE-637 215, TAMIL NADU, INDIA**

*[Handwritten Signature]*  
**CoE**  
**Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.**  
**Controller of Examinations**  
**K.S. Rangasamy College of Arts & Science (Autonomous)**  
**Tiruchengode - 637 215, Tamilnadu, India.**

M.Sc., SCHEME OF EXAMINATION

Subject Code	Subject	Hours of Instruction	Exam Duration (Hours)	Max Marks			Credit Points
				CA	CE	Total	
<b>FIRST SEMESTER</b>							
<b>Part A</b>							
18PCHM101	Core I: Organic Chemistry I	5	3	25	75	100	5
18PCHM102	Core II: Inorganic Chemistry I	5	3	25	75	100	5
18PCHM103	Core III: Physical Chemistry I	5	3	25	75	100	4
18PCHM104	Core IV: Spectroscopy	4	3	25	75	100	4
18PCHMP101	Core Practical I: Organic Chemistry Practical I	5	6	40	60	100	3
18PCHMP102	Core Practical II: Inorganic Chemistry Practical I	5	6	40	60	100	3
<b>Non Credit</b>							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
<b>Total</b>		30				600	24
<b>SECOND SEMESTER</b>							
<b>Part A</b>							
18PCHM201	Core V: Organic Chemistry II	5	3	25	75	100	5
18PCHM202	Core VI: Inorganic Chemistry II	5	3	25	75	100	5
18PCHM203	Core VII: Physical Chemistry II	4	3	25	75	100	4
	Elective I	4	3	25	75	100	4
18PCHMP201	Core Practical III: Organic Chemistry Practical II	5	6	40	60	100	3
18PCHMP202	Core Practical IV: Physical Chemistry Practical I	4	6	40	60	100	3

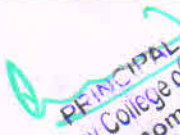
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA



Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India



Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-Credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>700</b>	<b>26</b>
THIRD SEMESTER							
PART - A							
18PCHM301	Core VIII: Organic Chemistry III	6	3	25	75	100	5
18PCHM302	Core IX: Inorganic Chemistry III	6	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18PCHMP301	Core Practical V: Inorganic Chemistry Practical II	5	6	40	60	100	3
18PCHMP302	Core Practical VI: Physical Chemistry Practical II	5	6	40	60	100	3
18PPHCHI301	IDC I: Solid State Physics	4	3	25	75	100	4
<b>Total</b>		<b>30</b>				<b>600</b>	<b>24</b>
FOURTH SEMESTER							
PART - A							
18PCHM401	Core X: Analytical Chemistry	5	3	25	75	100	5
18PCHM402	Core XI: Physical Chemistry III	5	3	25	75	100	5
18PCHPR401	Project & Viva -Voce	5	-	50	150	200	6
<b>Total</b>		<b>15</b>				<b>400</b>	<b>16</b>
<b>Grand Total</b>						<b>2300</b>	<b>90</b>

  
 PRINCIPAL  
 K. S. Rangasamy College of Arts & Science  
 (Autonomous)  
 TIRUCHENGODE - 637 215  
 Namakkal-Dt. Tamil Nadu, INDIA



3

  
 Mr. M. S. ... M.A., M.Phil.  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode, Tamil Nadu, India

### Elective I


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

Paper code	Semester	Paper name
18PCHEL201	II	Elective I: Polymer Chemistry I
18PCHEL202	II	Elective I: Bio-inorganic chemistry I
18PCHEL203	II	Elective I: Principles and applications of drug design and discovery


### Elective II

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

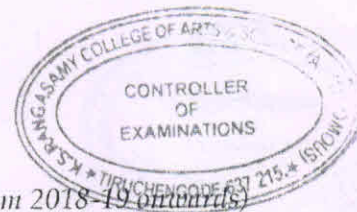
Paper code	Semester	Paper name
18PCHEL301	III	Elective II: Photochemistry
18PCHEL302	III	Elective II: Bio-inorganic chemistry II
18PCHEL303	III	Elective II: Polymer Chemistry II

  
Dr. M. Prasad  
K.S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, India



  
Mr. M. PRASAD, M.Sc., M.B.A., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science  
Tiruchengode - 637 215, Tamil Nadu





M.Sc., Chemistry (Students admitted from 2018-19 onwards)

18PCHEL203	<b>ELECTIVE I: PRINCIPLES AND APPLICATIONS OF DRUG DESIGN AND DISCOVERY</b>	<b>SEMESTER - II</b>
------------	---	----------------------

**COURSE OBJECTIVES:**

The course aims

- To enable students to identify compounds in biological system
- To describe the various drug - receptor interactions
- To provide information the drug molecules and its chemistry
- To enumerate steps to synthesize a drug molecule by various methods
- To know about drug Identification and Validation Steps in drug discovery

Credits: 4

Total hours: 40

UNIT	CONTENTS	Hrs	CO
I	<b>Drug Design and Discovery:</b> Historical background - drug targets: lipids, carbohydrates, proteins, enzymes, and nucleic acids as drug targets and receptors. Receptor Pharmacology - Agonists and Antagonists (partial and full) - Allosteric Modulators - Pharmacokinetics and pharmacodynamics: administration, absorption, distribution, metabolism, elimination of drugs - bioavailability of drugs - side effects - Case study: serotonin and dopamine receptors and transferring drugs.	8	CO1
II	<b>Drug Identification and Validation Steps in drug discovery:</b> Leads identification - Hits - Drug validation - Natural products as drugs - molecular recognition in drug design - thermodynamic considerations - physical basis and inter molecular interactions between drugs and targets like electrostatic interactions - ionic bonds - hydrogen bonds - Inductive interactions - dispersive forces. Stereochemistry in drug designing - stereospecificity of drug targets - Eudesmic ratio - Examples of Eutomers and Distomers.	8	CO2
III	<b>Retrosynthetic strategies for Drug Synthesis:</b> Introduction to retrosynthetic analysis and disconnection approach - synthons acceptor and donor - synthetic equivalents-umpolung - planning a synthesis - relay and convergent routes - Guidelines for disconnection - one group C-X and	8	CO3

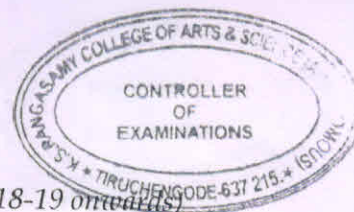
43

PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA




M. PRASAD, M.Sc., M.B.A.,  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, INDIA.

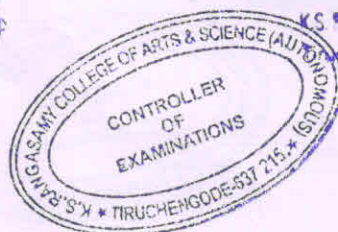





M.Sc., Chemistry (Students admitted from 2018-19 onwards)

	C-C disconnections - Chemoselectivity. Two group C-C disconnections in dicarbonyls - Case Study: Synthesis of Amelfolide.		
IV	<b>Computer Aided Drug Design:</b> Molecular modeling in drug design - Energy Minimization methods - both Molecular Mechanics and Quantum mechanical Methods - Energy minimization - Conformational analysis -Structure based and Ligand based Drug design - QSAR - parameters - Quantitative models of QSAR - Hansch methods - free Wilson model - 3D pharmacophore modeling - Docking - rigid and flexible methods of docking - Prediction of Binding modes - Protein Ligand binding free energies - Docking Score - validation.	8	CO4
V	<b>Quantum Mechanical Methods:</b> Electronic structure calculations - Geometry Optimization - Potential Energy Surface - Global and Local Minima - Identification of Transition states - Semiempirical and Density Functional Methods - Calculation of atomic Charges, Electrostatic Potential Maps.	8	CO5
<b>Text Books:</b>			
1	Andrew, R. Leach, Valerie J Gillet, 2007. <b>An Introduction to Cheminformatics</b> , Revised Edition, Springer, Netherland.		
<b>Reference Books:</b>			
1	Larsen et al, 2004. <b>Text book of Drug design and Discovery</b> , [Fourth Edition]. London and New York, Taylor and Francis.		
2	Graham L. Patrick, 2009. <b>An Introduction to Medicinal Chemistry</b> , [Fourth Edition]. Oxford University Press.		

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt. Tamil Nadu, INDIA  
44



  
Mr. M. PRASAD, M.Sc., M.B.A.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India





M.Sc., Chemistry (Students admitted from 2018-19 onwards)

### COURSE OUTCOMES (CO)


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


CO1	Know the concepts of drug design and discovery
CO2	Assess the prediction of drug identification and validation steps in drug discovery
CO3	Recall the retrosynthetic strategies for drug synthesis
CO4	Predict the processes in computer aided drug design
CO5	Cognize the quantum mechanical methods in principles and applications of drug design and discovery

### MAPPING:

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

H-High M-Medium L-Low

  
PRINCIPAL  
K. S. Rangasamy College of Arts & Science  
(Autonomous)  
TIRUCHENGODE - 637 215  
Namakkal-Dt., Tamil Nadu, INDIA

  
Mr. M. PRASAD, M.Sc., M.Phil., Ph.D.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamilnadu, India.

