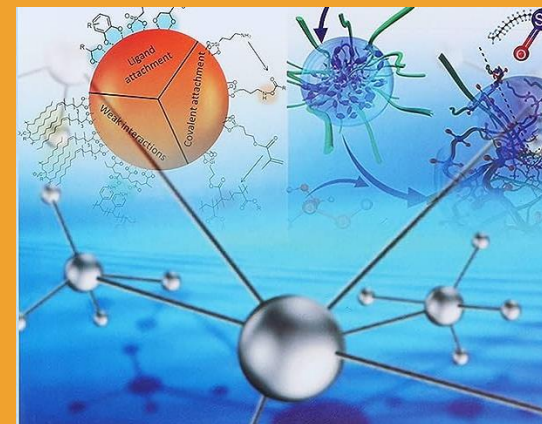


Sree Narayana College Chengannur, Alappuzha

(Affiliated to University of Kerala NAAC accredited with 'B' Grade)



POST GRADUATE DEPARTMENT OF CHEMISTRY

ORGANISING COMMITTEE

- SRI.VELLAPPALLY NADESAN (PATRON)
- MS.SHEREEN K.(PRINCIPAL IN CHARGE)
- DR.SMITHA SASIDHARAN
(IQAC COORDINATOR)
- Smt.NEETU PRADEEP
(COURSE COORDINATOR)
- DR.VENU.S
(HEAD, DEPARTMENT OF CHEMISTRY)
- DR.JISHA SREEDHARAN
- DR.ANJU.K.S
- DR.RESHMI.R

Certificate Course on “FUNDAMENTALS OF POLYMER SYNTHESIS AND CHARACTERISATION TECHNIQUES ”

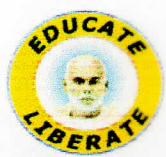
- COURSE DETAILS
- THE COURSE IS OPENED TO ALL PG & UG STUDENTS
- COURSE DURATION: 30Hrs(THEORY-24Hrs & PRACTICAL-6Hrs)
- COURSE FEE:Rs.250/-
- ASSESSMENT:ASSIGNMENT AND MCQ

Course Coordinator:
Smt.Neetu Pradeep
Assistant Professor
Department of Chemistry
S.N.College, Chengannur
Contact:8281797929

Sree Narayana College, Chengannur, named after the great social reformer Sree Narayana Guru, is a major centre for higher education to the rural community in the vicinity. The college was established in 1981. The vision of our College is to provide 'Liberation through Education' and 'Enlightenment through Education'. The college offer five undergraduate and three post graduate courses.

The Post Graduate Department of Chemistry ever since its establishment remains one of the major departments of the college, which offers high quality teaching. The department is equipped with a wide range of facilities to aid the students to do well in their performance. We cordially invite the interested undergraduate and post graduate students to join the Certificate course on '**Fundamentals of Polymer Synthesis and Characterization Techniques**' implemented by the Post Graduate Department of Chemistry in association with IQAC, S N College Chengannur.

The certificate course "**Fundamentals of Polymer Synthesis and Characterization Techniques**" is likely to be a valuable asset for anyone who is interested in a career in the polymer industry. The course will provide students the opportunity to network with professionals in the polymer industry. This can be helpful in finding a job or internship after graduation. Polymer science characterization will give you a competitive edge in the job market. Many employers are looking for candidates with specialized knowledge and skills in polymer characterization. This includes using a variety of analytical techniques, such as spectroscopy, microscopy, and rheology. These skills will be valuable in a variety of careers in the polymer industry.



Sree Narayana College Chengannur

Affiliated to the University of Kerala

NAAC Accredited with B Grade

Minutes of the Meeting of Board of Studies

Attendees:-

1. Smt. Shereen K (Principal)
2. Dr. K Sreelatha (Chairman, Board of studies)
3. Dr. Smitha Sasidharan (IQAC Coordinator)
4. Dr. Venu S (Head, Department of Chemistry)
5. Smt. Neetu Pradeep (Course Coordinator)
6. Dr. Ambily Chandran (External Member)

Venue: Principal's Chamber

Date & Time: 15/12/2021 at 2.00pm


Agenda:

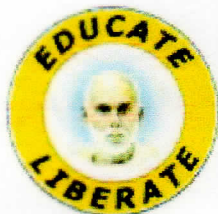
1. Review of Certificate course proposal

Minutes:

1. Reviewed the certificate course proposal submitted by Department of Chemistry.
2. Approved the syllabus and proposal of the certificate course on "Fundamentals of Polymer Science & Rubber Technology"




PRINCIPAL
SREE NARAYANA COLLEGE
CHENGANNUR



Estd: 1981
Sree Narayana College Chengannur
Alapuzha, Kerala

POST GRADUATE DEPARTMENT OF CHEMISTRY
CERTIFICATE COURSE: FUNDAMENTALS OF POLYMER SYNTHESIS AND
CHARACTERISATION TECHNIQUES (CH21PSCT)

Relevance of fundamentals of polymer synthesis and characterization techniques:

The study of polymer synthesis and characterization techniques is essential for understanding the properties of polymers and for developing new polymer-based materials. The study of polymer synthesis and characterization techniques is a challenging but rewarding field. It offers the opportunity to work on cutting-edge research and to develop new materials that can improve our lives. The course covers a wide range of topics, including:

- The different types of polymers
- The mechanisms of polymer synthesis
- The characterization of polymers
- The properties of polymers
- The applications of polymers

Objectives:

This course aims to provide students to acquaint the students to:

- **Learn how to characterize polymers:** NMR, Raman, Mass and IR-Spectra for characterization of molecular structure of polymeric materials.
- **Learn the fundamental principles of polymer synthesis:** This course will teach you about the different methods that are used to synthesize polymers, such as polymerization, crosslinking, and grafting.
- **Gain hands-on experience with polymer synthesis and characterization:** This course will give you the opportunity to gain hands-on experience with polymer synthesis and characterization, through experiments and lab work.

The course also includes a number of practical exercises, such as:

- Synthesizing polymers
- Characterizing polymers
- Applying polymers to solve real-world problems

FUNDAMENTALS OF POLYMER SYNTHESIS AND CHARACTERISATION TECHNIQUES

- **UNIT 1 - INTRODUCTION TO POLYMERS** (6 Hrs)
- Definition - Monomer, polymer and polymerisation - classification of polymers on the basis of (i) origin - Natural, semi synthetic, synthetic, (ii) Physical properties and applications - Rubbers, plastic, fibres (iii) Thermal response - thermoplastics, thermosetting (iv) Structure - Homopolymers (linear, branched, cross link or network), Copolymers (Random, Alternate, Block, Graft) (v) Crystallinity - non-crystalline (amorphous), semi-crystalline (vi) Mode of formation - Addition, Condensation Polymerisation (definition and examples only) (vii) Methods of polymerization - Bulk, Solution, Suspension Polymerisation (definition and examples only) Chemistry of polymerization: Chain polymerization, free radical, ionic, co-ordination, step polymerization, polyaddition and polycondensation, miscellaneous ring opening and group transfer polymerizations. Chemistry of polymerization: Chain polymerization, free radical, ionic, co-ordination, step polymerization, polyaddition and polycondensation, miscellaneous ring opening and group transfer polymerizations.
- **UNIT 2: POLYMERIZATION TECHNIQUES AND PROCESSING** (6 Hrs)
- Bulk, solution, suspension, emulsion, melt condensation and interfacial poly condensation polymerizations. polymer processing - calendaring - die-casting, rotational casting - compression moulding - injection moulding - blow moulding - extrusion moulding and reinforcing.
- **UNIT 3: Spectroscopic and chromatography techniques in polymer** (6 Hrs)
- Basic principle of spectroscopy, molecular, atomic and electronic spectra, Lambert-Beer's law, Frank-Condor principle, electromagnetic radiation and its properties, interaction of radiation with matter, statistical method of analysis. Principles and applications in structural determination of polymers (functional group, tacticity, molecular structure, purity, unsaturation etc.) by Infra-red spectroscopy, UV-Vis spectroscopy, nuclear magnetic resonance spectrometer (¹H NMR).
- Paper chromatography, thin layer chromatography, high performance liquid chromatography, gel permeation chromatography (GPC), gas chromatography and size exclusion chromatography.

➤ **UNIT 4: MICROSCOPIC AND X-RAY TECHNIQUES**

(3 Hrs)

Optical microscopy, electron microscopy (SEM, TEM, AFM) and XRD: basics principle and applications in polymers characterization, Contact angle and measurement.

➤ **UNIT 5: THERMO-MECHANICAL CHARACTERIZATION**

(3 Hrs)

Principle and applications of Thermal gravimetric analysis (TGA), Differential thermal analysis (DTA). Differential scanning calorimeter (DSC), Dynamic mechanical analyser (DMA) and thermal mechanical analyser (TMA) in polymer analysis or determination of molecular mass and chemical structure of polymers.

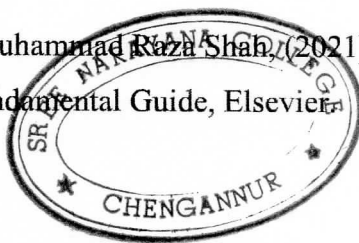
PRACTICALS

(6 Hrs)

- To verify Lambert-Beer's law by UV-Vis. spectrophotometer. Quantitative determine of chemical impurities in polymer sample by UV-Vis. spectrophotometer.
- Calculate weight percentage of inorganic and organic ingredient in polymeric compound.
- Analyze thermal behaviour of polymers by TGA.
- Contact angle and measurement of polymer
- Identification of additives present in a processed polymer by Paper and thin layer chromatography.
- Separation, characterization, and purity determination of polymers by TLC and Paper chromatography.

REFERENCES:

- Willard H.H., Merrit L.L., Dean J.A. (1988) Instrumental method of analysis, Wads worth Publishing Company.
- Kaushik N.K., Shukla S. K., (2023) Thermal Analysis Techniques and Applications, IK International Pvt. Ltd.
- Skoog D.A, (1997) Principle of Instrumental Analysis, Harcourt College Pub.
- Shah V., (2007) Handbook of Plastic Testing, Technology, Wiley-Inter science.
- Banwell C.N., McCash E.M., (2008) Fundamentals of Molecular Spectroscopy, Fourth Edition, Tata McGraw-Hill.
- Muhammad Malik, Jimmy Mays, Muhammad Raza Shah, (2021) Molecular Characterization of Polymers: A Fundamental Guide, Elsevier



SREE NARAYANA COLLEGE
CHENGANNUR

SREE NARAYANA COLLEGE CHENGANNUR
DEPARTMENT OF CHEMISTRY

Certificate Course on "Fundamentals of Polymer Synthesis and Characterisation Techniques" (CH21PSCT)

Duration: 3 months

Year: 2021-22

Student Enrolment for the certificate course

Sl.No.	Candidate code	Name of Candidate
1	63520128001	AJMI FATHIMA N <i>Ajmi</i>
2	63520128002	AMNA FATHIMA <i>Amna</i>
3	63520128003	AMRUTHA JAYAKUMAR
4	63520128005	ANJANA SUNIL <i>Anjana</i>
5	63520128006	ANJU VISWANATHAN
6	63520128007	ANJUMOL PAUL <i>Anjumol</i>
7	63520128008	ARJUN P <i>Arjun</i>
8	63520128009	ARYAMOL S <i>Aryamol</i>
9	63520128010	DEVIKRISHNA <i>Devika</i>
10	63520128011	GREESHMA G <i>Greeshma</i>
11	63520128012	RESHMI M RAJU <i>Reshmi</i>
12	63520128013	SANJAY KRISHNAN S <i>Sanjay</i>
13	63520128014	SNEHA <i>Sneha</i>
14	63520128015	SREEJITH S <i>Sreejith</i>
15	63520128016	SREELEKSHMI R <i>Sreelekshmi</i>
16	63520128017	SUKANYA SUKHADEVAN <i>Sukanya</i>
17	63520128018	VINAYAPRIYA A <i>Vinaya</i>
18	63520128019	VRINDA <i>Vrinda</i>
19	63521128001	AJIL S B <i>Ajil</i>
20	63521128002	ANJANA T V <i>Anjana</i>



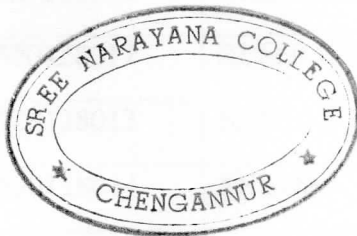
21	63521128003	ANUGRAHA A S	<i>Anugraha</i>
22	63521128004	ARABHI A R	<i>Arabhi</i>
23	63521128005	CHIPPY HARISH	<i>Chippy</i>
24	63521128006	GOWRI PRASAD	<i>Gowri</i>
25	63521128007	KRISHNA S V	<i>Krishna</i>
26	63521128008	MEENAKSHY A	<i>Meenakshy</i>
27	63521128009	MEENU REMESH	<i>Meenu</i>
28	63521128010	RESHMA R.S	<i>Reshma</i>
29	63521128011	ROHINI S PILLAI	<i>Rohini</i>
30	63521128012	SHAMLA P S	<i>Shamla</i>
31	63521128013	SRADHA R	<i>Sradha</i>
32	63521128014	SREELEKSHMI M S	<i>Sreelekshmi</i>
33	63521128015	SRUTHY S	<i>Sruthy</i>
34	63521128016	VISMAYA V	<i>Vismaya</i>

Neetu

Course Coordinator

[Signature]

Head of the Department



[Signature]
 PRINCIPAL
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 CHENGANNUR



ATTENDANCE REGISTER FOR THE

MONTH OF December 20 21

No.	NAME	Designation	Date													Working Days	Days Present	Days Absent	Remarks																	
			1	2	3	4	5	6	7	8	9	10	11	12	13					14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Ami Fatima N		X	X						X	X						X																	5	5	Ami
2	Anna Fatima		X	X						X	X						X																	5	5	Anna
3	Amrutha Jayakumar		X	X						X	X						X																	5	5	Amrutha
4	Anjana Sural		X	X						X	X						X																	5	5	Anjana
5	Anju Viswanathan		X	X						X	X						X																	5	5	Anju
6	Arjunol Paul		X	X						X	X						X																	5	5	Arjunol
7	Arjun P		X	X						X	X						X																	5	5	Arjun
8	Arjunol S		X	X						X	X						X																	5	5	Arjun
9	Devikushaa		X	X						X	X						X																	5	5	Devika
10	Gurushma G		X	X						X	X						X																	5	5	Gurushma
11	Keshmi M Raju		X	X						X	X						X																	5	5	Keshmi
12	Sanyas Keshwan S		X	X						X	X						X																	5	5	Sanyas
13	Sneha		X	X						X	X						X																	5	5	Sneha
14	Sneijith S		X	X						X	X						X																	5	5	Sneijith
15	Sneekshmi R		X	X						X	X						X																	5	5	Sneekshmi
16	Suktanya Subodhan		X	X						X	X						X																	5	5	Suktanya
17	Vinaya Priya A		X	X						X	X						X																	5	5	Vinaya
18	Vainika		X	X						X	X						X																	5	5	Vainika
19	Ajil S-B		X	X						X	X						X																	5	5	Ajil
20	Anjana T.V		X	X						X	X						X																	5	5	Anjana
21	Anugraha A.S		X	X						X	X						X																	5	5	Anugraha
22	Anabhi A.R		X	X						X	X						X																	5	5	Anabhi
23	Chippy Harish		X	X						X	X						X																	5	5	Chippy
24	Gowri Prasad		X	X						X	X						X																	5	5	Gowri
25	Kushna S.V		X	X						X	X						X																	5	5	Kushna
26	Meenakshy A		X	X						X	X						X																	5	5	Meenakshy
27	Meenu Ramesh		X	X						X	X						X																	5	5	Meenu
28	Pethma R.S		X	X						X	X						X																	5	5	Pethma
29	Rohini S Pillai		X	X						X	X						X																	5	5	Rohini
30	Shamla P.S		X	X						X	X						X																	5	5	Shamla
31	Sneha R		X	X						X	X						X																	5	5	Sneha
32	Sneekshmi M.S		X	X						X	X						X																	5	5	Sneekshmi
33	Srethy S		X	X						X	X						X																	5	5	Srethy
34	Vismaya V		X	X						X	X						X																	5	5	Vismaya

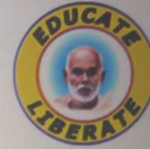


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Sree Narayana College Chengannur
Alappuzha, Kerala

Aided College Affiliated to the University of Kerala

NAAC accredited with Grade B



CERTIFICATE

This is to certify that has
successfully completed the certificate course on “Fundamentals of Polymer Synthesis and
Characterisation Techniques” conducted by the Post Graduate Department of Chemistry,
Sree Narayana College Chengannur during 2021-2022

Dr. Venu S
Head, Department of Chemistry

Dr. Shereen K
Principal in Charge