

CH S 555: POLYMER CHEMISTRY

COURSE OUTCOME:

- This is an introductory course on highly useful materials, namely the polymers. The course content is of interdisciplinary interest.
- It deals with types, techniques of preparation and characterization of plastics, rubber and fibre materials.
- The applications of these materials in daily life, engineering and biomedical field have been emphasized.
- The students are exposed to the problems of polymer waste management and the strategies developed to minimize plastic pollution.

UNIT- I: [12 Hours]

Terminology and basic concepts: Monomers, Functionality, repeat UNITS, degree of polymerization. General structure and naming of polymers. **Classification** based on various considerations-source, preparation methods, thermal behavior, chain structure etc.

Types –Homopolymers and copolymers; Linear, branched and network polymers.

Techniques of polymerization: Techniques of preparation of addition and condensation polymers.

Kinetics of polymerization: Kinetics of addition and condensation polymerization. Kinetics of copolymerization.

UNIT- II:

[12 Hours]

Stereochemistry of polymers: Geometric and optical isomerism in polymers. Structure, properties and preparation of stereoregular polymers.

Expressions for average molecular weights. Molecular weight distribution and Polydispersity.

Determination of molecular weight: Osmometry, viscometry, ultracentrifugation and GPC methods

Thermal Characterization: Glass Transition and melting-correlation with structure- Factors affecting T_g and T_m. Techniques of thermal characterization: DSC, DTA, DTG and TGA techniques.

UNIT- III:

[12 Hours]

Structural features, properties and uses of commercial polymers: polyethylene, polypropylene, polystyrene, PVC, polyesters, polyamides, polyurethanes and polycarbonates and regenerated cellulose.

Properties and uses of Specialty polymers- Composites, Conducting polymers and Biomedical polymers.

Polymer degradation and stability-thermal, oxidative, photo, chemical and radiation affected degradation. Plastic waste management-incineration, recycling and biodegradation.

Polymer processing Techniques-Compounding- role of additives. Casting, calendaring, moulding, foaming, reinforcing and spinning techniques.

REFERENCES:-

1. Text book of Polymers- F.W.Billmeyer (Wiley)
2. Contemporary Polymer Chemistry-H.R. Allcock and F.W. Lampe (Prentice Hall).
3. Polymer Science and Technology-J.R. Frird (Prentice Hall).
4. Polymer Science: V.R. Gowariker, N.V.Viswanathan & T.Sreedhar
5. Principles of Polymer Science- P.Bahadur and N.V.Sastry (Narosa Publishers)

Mangalore University
Mangalagangothri - 574 199



Department of Studies in Chemistry

and

Department of Industries & Commerce

Government of Karnataka, Mangalore District Industries Centre

Jointly Organise an International Webinar

on

Prospectives of Entrepreneurship for Chemists (PEC 2020)

December 17 - 19, 2020



• Free Registration. • e - certificates to participants

Online Platform

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Resource Persons



Dr. Ram Bhat
Sr. Director

Millennium Research Laboratories, Inc, USA



Dr. Bhaskar Naik
Founder & MD., Petropath Ltd.,
Owner of Naik Laboratories, Bengaluru



Dr. Vijayaraj K. K.
Senior Manager

R&D, Jubilant OraxImago, Canada



Sri. Gokuldas Nayak
Joint Director,
Dept. of Industries & Commerce
Govt. of Karnataka



Dr. V. Pardhasaradhi

VP and Agrosiences Business Unit Head
Eurofins Advinus Ltd., Bengaluru



Dr. Shridhara K.
Technical Coordinator
ArkGen Pharma Pvt. Ltd., Bengaluru



Dr. Shashidhar

Director
Kohlen Laboratories LLP, Mysore

Patron

Prof. P. S. Yadapadithaya, Hon'ble Vice Chancellor

Prof. Boja Poojary
Convenor

Prof. G. K. Nagaraja
Chairman

Sri K. Raju Mogaveera, KAS
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Dr. M. R. Maddani



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Program Schedule

Thursday, 17-12-2020

- 10.00am-10.30am Inauguration
- 10.30am-11.30am **Lecture 1: Dr. Ram Bhat, Sr. Director, Millennium Research Laboratories, Inc, USA**
Title The Next Challenges and Opportunities
- 11.45am-12.45pm **Lecture 2: Dr. Bhaskar Naik, Founder & MD., Petropath Drilling Fluids India Pvt Ltd, Owner of Naik Laboratories, Bengaluru**
Title Small & Medium Size Enterprise Opportunities for Chemistry Graduates

Friday, 18-12-2020

- 09.00am-10.00am **Lecture 3: Dr. Vijayaraj K. K., Senior Manager R&D, Jubilant Draximage, Canada**
Title Molecular Imaging & Wonderful Opportunities for Chemistry Professionals
- 10.15am-11.15am **Lecture 4: Dr. V. Pardhasaradhi, Vice President – Agroscience Services Eurofins Advinus Limited, Bengaluru**
Title Environmental Risk Assessment of Chemicals
- 11.30am-12.30pm **Lecture 5: Dr. Shridhara K, Technical Coordinator ArkGen Pharma Pvt., Ltd., Bengaluru**
Title How to become a successful Entrepreneur

Saturday, 19-12-2020

- 10.30am-11.30am **Lecture 6: Sri. Gokuldas Nayak, Joint Director Dept. of Industries & Commerce, Govt. of Karnataka**
Title State Government Support to MSMEs
- 11.45am-12.45pm **Lecture 7: Dr. Shashidhar, Director, Kohlen Laboratories LLP, Mysore**
Title Employee to entrepreneur-taking the leap
- 12.45pm-01.15pm Valedictory



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Resource Persons

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 Dr. V. Pardhasaradhi VP and Agrotech Business Unit Head Cerealis Advance Ltd., Bengaluru	 Sri. Gokuldas Nayak Joint Director Dept. of Industries & Commerce Govt. of Karnataka	 Dr. Shridhara K. Technical Coordinator ArkGen Pharma Pvt. Ltd., Bengaluru
 Dr. Shashidhar Senior Kohlen Laboratories LLP, Mysuru	Patron Prof. P. S. Yadapadithaya, Hon'ble Vice Chancellor	
Prof. Boja Poojary Convener	Prof. G. K. Nagaraja Chairman	Sri K. Raju Mogaveera, IAS Registrar
Organizing Committee		
Prof. Balakrishna Kalluraya	Prof. B. Narayana	Prof. B. Vishalakshi
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12.45pm-01.15pm	Valedictory

Department of Studies in Chemistry, Mangalore University and Department of Industries & Commerce, Government of Karnataka, Mangalore District Industries Centre jointly organised an international webinar on Prospectives of Entrepreneurship for Chemists (PEC 2020) during December 17 - 19, 2020.

As the title of webinar indicates, this webinar was mainly focussed on enlightening the prospectives of entrepreneurship to chemists. In this context, Eminent Scientists from various industries and organizations across India and abroad were invited as resource speakers to deliver the lectures.

Day 1 activities were initiated by inaugurational function. Sri. Gokuldas Nayak, Joint Director, Dept. of Industries & Commerce, Govt. of Karnataka was our guest of honor. Prof. P. S. Yadapadithaya presided over the Inauguration function on 17th December 2021. After the Inauguration, Dr. Ram Bhat, Sr. Director, Millennium Research Laboratories, Inc, USA, delivered the lecture on 'The Next Challenges and Opportunities'. The 2nd lecture was delivered by Dr. Bhaskar Naik, Founder & MD., Petropath Drilling Fluids India Pvt

Ltd, Owner of Naik Laboratories, Bengaluru on the topic 'Small & Medium Size Enterprise Opportunities for Chemistry Graduates'.

On Day 2, Dr. Vijayaraj K. K., Senior Manager R&D, Jubilant DraxImage, Canada delivered the lecture on 'Molecular Imaging & Wonderful Opportunities for Chemistry Professionals'. Subsequently, Dr. V. Pardhasaradhi, Vice President – Agrosience Services, Eurofins Advinus Limited, Bengaluru presented on the topic 'Environmental Risk Assessment of Chemicals'. The 3rd lecture on Day 2 was presented by Dr. Shridhara K., Technical Coordinator, ArkGen Pharma Pvt., Ltd., Bengaluru on 'How to become a successful Entrepreneur?'

On Day 3, the first lecture was given by Sri. Gokuldas Nayak, Joint Director, Dept. of Industries & Commerce, Govt. of Karnataka on the topic 'State Government Support to MSMEs'. Later on, Dr. Shashidhar, Director, Kohlen Laboratories LLP, Mysore delivered the lecture on 'Employee to entrepreneur-taking the leap'.

Faculties of various institutions, Graduate and Post graduate chemistry students, Guest faculties and other invitees participated in the webinar. Overall around 300 participants benefited from this webinar. Feedback from participants showed that, they enjoyed the webinar and appreciated all the resource persons and lectures delivered. All the resource persons were very happy to interact with participants. Finally the webinar ended up with valedictory program.

