POLYMERUPDATE ACADEMY

EDUCATIONEM RESPONSUM EST

POLYMER MATERIALS AND PROCESSING

PROF. (DR.) D. D. KALE

B.Tech., M.Chem.Engg.,Ph.D.

Honorary Chancellor - Polymerupdate Academy

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POLYMER MATERIALS AND PROCESSING

Polymers are known to be extremely versatile material. They can be either rigid or flexible. Polymers are processed by a variety of techniques which make them unique. This course covers the basic properties of plastics and their respective processing techniques. The course is suitable as a refresher material for students pursuing polymer technology courses globally.

The course is prepared in a very simple and illustrious way and is designed for everyone who desires to learn or understand the basics of polymer processing. People working in the polymer processing industry, marketing polymer products as well as entrepreneurs and students who are pursuing or intend to pursue studies in polymer engineering will find this course of great useful.

LECTURE 1 - BASICS OF POLYMER BEHAVIOUR

Lecture 1 presents Polymer Chemistry and polymeric behaviour in terms of molecular weight, crystallinity etc.

LECTURE 2 - THERMOPLASTIC MATERIALS

Lecture 2 covers brief properties of some important thermoplastic materials such as polyethylene (LDPE, LLDPE and HDPE), Polypropylene, PVC, Polystyrene, HIPS, ABS, Nylon and PET. Some discussion on additives has also been covered.

LECTURE 3 - THERMOSET MATERIALS

Lecture 3 briefly discusses some important thermoset materials like unsaturated polyester, epoxy, epoxy vinyl and phenolic resin.

LECTURE 4 - EXTRUSION

Lecture 4 describes the salient features of extrusion process covering basic machinery, theoretical concepts for the performance of extruder, blown film, cast film, coextrusion of films, biaxial orientation wire coating etc. and twin screw extruders as well as planetary extruders.

LECTURE 5 - INJECTION MOULDING

Lecture 5 discusses various aspects on injection molding covering basic machine, operation, moulds, multicavity moulds, clamping unit etc., co injection and other special injection molding processes as well as some trouble shooting aspects.

LECTURE 6 - BLOW MOULDING

Lecture 6 describes briefly basics of blow molding, extrusion & injection blow molding process, materials and some trouble shooting aspects.

LECTURE 7- THERMOFORMING

Lecture 7 covers thermoforming process discussing process, materials, products made and trouble shooting.

LECTURE 8 - ROTATIONAL MOULDING

Lecture 8 is related to rotational molding process describing process, materials, machinery and troubleshooting aspects.

LECTURE 9 - COMPRESSION MOULDING

Lecture 9 discusses the compression molding process, machinery, materials, RTM and other variants of compression molding operation.

LECTURE 10 - CASTING PROCESS

Lecture 10 describes casting process covering solid surfaces (artificial marble) and continuous casting.

LECTURE 11 - FOAMING

Lecture 11 covers the foaming process discussing the process, machinery and trouble shooting.

LECTURE 12 - CALENDERING

Lecture 12 introduces the calendering process that covers the basics of the process, the products required and the machinery used etc

LECTURE 13 - FIBRE SPINNING

Lecture 13 describes the fibre spinning process discussing the terms associated with fibres, spinning methods and materials.

LECTURE 14 - RADIATION PROCESS

Lecture 14 discusses various aspects of the radiation process.

LECTURE 15 - FINISHING OPERATIONS

Lecture 15 covers finishing operations such as machining, joining, welding, adhesive bonding, lamination, printing decorating and painting. These are used in making the finished product.

LECTURE 16 - DYES AND MOULDS

Lecture 16 discusses some general important aspects of moulds and dies.

LECTURE 17 - PULTRUSION

Lecture 17 covers the process of Pultrusion which a is a continuous process for fibre reinforced plastics (FRPs) using thermoset materials. The machinery, materials are discussed. Some aspects of filament winding are also covered.

LECTURE 18 - 3-D PRINTING

Lecture 18 covers relatively new process, 3D printing. Different methods and materials used in this process are covered.

LECTURE 19 - COMPOSITES

Lecture 19 discusses some aspects of composites and their processing.

INSTRUCTOR

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Born on November 16, 1945, Prof. (Dr.) D. D. Kale is a Chemical Engineer and has obtained his Ph. D. from University of Salford, UK.

With a teaching experience of over 40 years, Prof. (Dr.) D. D. Kale retired from University of Mumbai's Department of Chemical Technology, UDCT, Mumbai in 2005 as a Professor of Polymer Technology and as a Head of the Department of Polymer Engineering.

At present, he is a technical advisor to Giriraj Group, Mumbai and in the past has also been a consultant to several plastics industries.

He is a member of high power expert committee to Government of Maharashtra on various environmental issues and is on the expert panel for centers of excellence by DCPC. (Dr.) D. D. Kale is also a member of committee to define single use plastics set up by Ministry of Chemicals and fertilizers, New Delhi.

He has been a Visiting Professor in South Korea.

After superannuation in 2005, he has worked with Reliance Industries Ltd. for a tenure of three years.

His research interests include polymer processing, rheology, product design and recycling. He has guided 28 Ph. D. and 65 Masters Students. He has published more than 100 papers in peer reviewed journals and has one patent to his credit. He has presented papers in several International conferences such as IUPAC and has travelled widely.

He is associated with many professional bodies such as PLASTINDIA, All India Plastics Manufacturers Association, (AIPMA), IPI and SPE etc.

Prof. (Dr.) D. D. Kale has trained more than 5000 undergraduate and post graduate students in India and overseas. He has also trained more than 1000 industry personnel and has successfully authored two books. He was Honorary Editor of the journal, "Chemical Engineering Journal" published by I.I.Ch.E., India.

WORK EXPERIENCE:

- Jan 2018 till date - Technical Director, Euressia Polymers, Mumbai.
- Feb 1, 2010 to - May 2012 - Director, Shroff S R Institute of Chemical Technology, Vataria, Taluka Valia, Bharuch, Gujarat, India
- Aug 1, 2011 to Dec. 2012 - Visiting Professor, IIT Gandhinagar
- Jan 1, 2006 to Dec 31, 2008 - Advisor, Reliance Industries Ltd.
- Jan. 31, 1991 - Nov 30, 2005 - Professor of Polymer Technology, Head, Plastics and Paints Technology Division UICT, University of Mumbai.

AWARDS AND HONORS:

1. Elected as a Fellow of Maharastra Academy of Science (1998)
2. Received the Teaching Services Award (Best Teacher) of Mumbai University, 2003-2004
3. Received the Prof. K. S. Armugam National Award for Innovative Research in the Field of Engineering and Technology by the Indian Society for Technical Education (ISTE) New Delhi (2004)
4. Received 'Life Time Achievement Award' from Color Society, (2015)

OTHER INFORMATION:

*Editor 'Chemical Engineering Journal' published by I.I.Ch.E. (1992 - 94)
*Designed course work for
(i) Plastics for non-plastic personnel,
(ii) Flexible packaging
(iii) Coloration of plastics
(iv) Chemical Engineering for plant personnel

*Headed the Knowledge Management group of I.P.I.
*Member of Board of Studies for Polymer Engg. Course of many Universities.

Has organized more than 10 Refresher Courses for Industry on behalf of Professional Bodies like IPI, SPE, Indian Institute of Chemical Engineers, Indian Small Scale Paint Association.

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THANK YOU

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