UNIVERSITI TEKNOLOGI MARA

PST442: PLASTICS MATERIALS AND APPLICATIONS

Course Name (English)	PLASTICS MATERIALS AND APPLICATIONS APPROVED
Course Code	PST442
MQF Credit	2
Course Description	This syllabus involves the study of various types of plastics materials which are commonly used nowadays to impart an awareness of the range of polymeric materials available commercially. A review of the theory of plastics materials and their classification into thermosetting and thermoplastic categories are explored and emphasized. Both thermosetting and thermoplastics (commodity and engineering) are studied. The studies include the introduction to each polymer and their methods of polymerization. Physical and chemical properties for each polymer and utilization of the products for commercial used are also presented.
Transferable Skills	At the end of this course students are able to choose materials suitable to their applications for production of products.
Teaching Methodologies	Lectures, Tutorial
CLO	CLO1 Identify the various types of polymers being produced industrially and the industrial application of the polymers in relation to their properties. CLO2 Describe the various methods of polymerization of the polymers and the processing used to produce products. CLO3 Relate the properties of the polymers to the structure and basic principles of polymer chemistry.
Pre-Requisite Courses	No course recommendations

Topics
1. 1. Introduction 1.1) 1.1 General background of plastics materials 1.2) 1.2 Glassy and rubbery plastics 1.3) 1.3 Crystalline and amorphous plastics 1.4) 1.4 Molecular weight (Mn, Mw and MWD) 1.5) 1.5 Raw materials for polymer industry 1.6) 1.6 Classification of polymers (introduction) 1.7) 1.7 Thermoplastics (Commodity & Engineering plastics) 1.8) 1.8 Thermosets 1.9) 1.9 Processing of industrial polymer
2. 2. Thermoplastics Materials 2.1) 2.1 Commodity plastics 2.2) 2.1.1 Polyethylene (PE) 2.3) 2.1.2 Polypropylene (PP) 2.4) 2.1.3 Polystyrene (PS) 2.5) 2.1.4 Polyvinyl Chloride (PVC) 2.6) 2.2 Engineering plastics 2.7) 2.2.1 Olefin copolymer 2.8) 2.2.1.1 Styrene-Acrylonitrile Copolymers (SAN) 2.9) 2.2.1.2 Acrylonitrile-Butadiene-Styrene Terpolymers (ABS) 2.10) 2.2.2 Acrylic polymer 2.11) 2.2.2.1 Polyacrylates 2.12) 2.2.2.2 Polymethyl Methacrylates (PMMA) 2.13) 2.2.3 Polyvinyl compound 2.14) 2.2.3.1 Polyvinyl Acetate 2.15) 2.2.3.2 Polyvinyl Alcohol 2.16) 2.2.4 Ether polymer

2.17) 2.2.4.1 Polyacetal
2.18) 2.2.4.2 Polyphenylene Oxide (PPO)
2.19) 2.2.5 Polyesters
2.20) 2.2.5.1 Polyethylene Terephthalate (PET)
2.21) 2.2.5.2 Polybutylene Terephthalate (PBT)
2.22) 2.2.5.3 Polycarbonate (PC)
2.23) 2.2.6 Polyamide -Aliphatic & Aromatic Polyamides
2.24) 2.2.7 Heat Resistant Polymers –
2.25) 2.2.7.1 Polyphenylene Sulphides (PPS)
2.26) 2.2.7.2 Polysulphones
2.27) 2.2.7.3 Polyetherether Ketone (PEEK)

3. 3. Thermosets
3.1) 3.1 Formaldehyde Resin
3.2) 3.1.1 Phenol-Formaldehyde Resins (phenolics resins)
3.3) 3.1.2 Urea-Formaldehyde Resins
3.4) 3.1.3 Melamine-Formaldehyde Resins
3.5) 3.2 Unsaturated Polyester
3.6) 3.3 Epoxy Resins

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Assignment	30%	CLO1
Quiz	Quiz	10%	CLO3
Test	Test	20%	CLO2

Reading List

Reference Book Resources

- **J A Brydson 1999, *Plastics Materials*, 7th Ed., Elsevier [ISBN: 9780080514086]**
- **Robert J. Young,Peter A. Lovell 2011, *Introduction to Polymers, Third Edition*, 3rd Ed., CRC Press [ISBN: 9780849339295]**
- **M.S. Bhatnagar 2004, *A.T.B. Of Polymers Vol-III*, 1st Ed., S. Chand [ISBN: 8121923840]**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources