AE802 HIGH PERFORMANCE COMPOSITES STRUCTURES 3-0-0-3

Mechanical Behavior of Polymers,structure and characterization of polymers, Optical, Electrical, Thermal and Chemical Properties, Additives for the Preparation of Plastic Materials,Durability of thermosetting and thermoplastic polymers under aviation and space environments. Scope of high performance and ultra-high performance polymers in aviation industry. Imperfections of composites under mechanical and thermal fatigue, humidity, lightening strike, ultra violet radiation, ultra high vacuum and high energy radiation,Radiation Hazards andRadiation Dose Tolerance of composite materials.

Simulation of test facilities in laboratory. State of the art technologies to repair composite defects. Importance of nano composite and nano adhesive bonding. Significance of fire resistant polymeric composites and electrically conductive structural composites.

Theory of aviation and space environment condition, Space environment impacts on space craft structure. Ionizing and non-ionizing radiation at Low Earth Orbit (LEO) and Geo Synchronous Earth Orbit (GEO). Solar radiation absorbance, transmittance, and reflectanceCharged plasma and atomic oxygen in space. Different thermosetting and thermoplastic polymers and their applications as structural and semi structural components for aviation and spacecraft.

TEXT BOOKS/ REFERENCES:

1. Johannes Karl Fink, *High Performance Polymers*, ISBN: 978-0-8155-1580-7 -Library of Congress, William Andrew Inc., 2008
2. Yu Bai and Thomas Keller, *High Temperature Performance of Polymer Composites*, ISBN: 978-3-527-32793-5, Wiley-VCH Verlag GmbH & Co., 2014
3. Eric Baer, *High Performance Polymers: Structures, Properties, Composites, Fibers*, ISBN-13: 978-1569900024, Amazon Prime, 1991
4. Omari V. Mukbaniani, Marc J. M. Abadie and Tamara Tatrishvili, *High-Performance Polymers for Engineering-Based Composites*, ISBN 9781771881197 - CAT# N11265, CRC Press, 2015