

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITD&M) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Green energy and product design	Course No (will be assigned)				
Specialization	M. E.	Structure (LTPC)	L	T	-	3
Offered for	MDM / Ph.D/M.Des	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty	Dr. Naveen Kumar & Dr. B. Raja	Type	New <input checked="" type="checkbox"/>	Modification <input type="checkbox"/>		
Pre-requisite		To take effect from				
Submission date		Date of approval by AAC				
Objectives	To develop in-depth understanding of the various fundamental principles employed in harvesting the green energy. To gain insight into important techniques/ practices for applications in green energy products design. To develop experience on various test-standards and performance evaluation procedures for green energy products. To highlight the importance of techno- economic evaluations of the products/systems, with respect to different conversion methods, pay-back periods etc.					
Contents of the course (With approximate break up of hours) - 42 hrs	<p>Types of green energy, Basics of green energy production, Energy harvesting techniques. Heat exchange methods (6 hrs)</p> <p>Solar heaters, Cookers, Dryers, Solar concentrators, Applications, Performance evaluation, BIS Standards, Economics. Life cycle costing (10 hrs)</p> <p>Photovoltaics Basic principle of SPV conversion, types of solar cells, SPV system designing, load estimation, selection of inverter, battery sizing, array sizing, wiring for SPV system (7 hrs)</p> <p>Solar refrigerator, Thermoelectric refrigerator and generator, Applications, and performance evaluation, Fundamentals of fuel cells (8 hrs)</p> <p>Wind turbines, Design procedures and Performance evaluation. (4 hrs)</p> <p>Lighting Systems - luminance requirements, electronic ballast, occupancy sensors, energy efficient lighting control, fiber optic solar lighting system (7 hrs)</p>					
Text Books	<ol style="list-style-type: none"> 1. S. Kakaç and H.Liu, Heat exchangers: selection, rating, and thermal design, Second Edition, CRC Press, 2002 2. S.P. Sukhatme, J. K. Nayak, Solar Energy: Principles and Thermal Collection and Storage, Tata McGraw Hill, 2008 3. Mukund R.Patel, "Wind and Solar Power Systems Design Analysis and Operation" Taylor and Francis, 2006 4. J. A. Duffie and W. A. Beckman, Solar Engineering of Thermal Processes, second edition, John Wiley, New York, 1991 					
Reference Books	<ol style="list-style-type: none"> 1. P.Würfel, Physics of Solar Cells: From Basic Principles to Advanced Concepts, Wiley Publication, ISBN: 978-3-527-40857-3, 2009 2. D.M. Rowe , Handbook of Thermoelectrics, CRC Press, ISBN 0-8493-0146-7, 1995 3. Fuel Cell Handbook, by A. J. Appleby and F. R. Foulkers, Van Nostrand, 1989. 4. J.F. Manwell, J. G. McGowan, A. L. Rogers , Wind Energy Explained: Theory, Design and Application, 2nd Edition, ISBN: 978-0-470-01500-1, Wiley 2010 					