Indian Institute of Technology Guwahati Proposal for a New Course / Revision of a Course

Course Number & Title: EN667 – Advanced Energy Systems

L-T-P-C: 3-0-0-6

Type of Letter Grading (Regular Letter Grades / PP or NP Letter Grades): Regular letter grades

Kind of Proposal (New Course / Revision of Existing Course): New Course

Offered as (Compulsory / Elective): Elective course

Offered to: BTECH, MS (R) and PhD in Energy

Offered in (Odd/ Even / Any): Even

Offered by (Name of Department/ Center): School of Energy Science & Engineering

Pre-Requisite: Basics of Fluid Mechanics, Thermodynamics and Heat Transfer

Preamble / Objectives (Optional): This course provides the comprehensive view of various energy systems for power generation and refrigeration purposes and will act as a guide to solve practical energy systems problems. Furthermore, it would also help to provide a detailed knowledge about designing the various energy systems ranging from thermal energy storage, fuel cells etc.

Advanced power cycles; Renewable energy systems; Chemical exergy and combustion systems; Nuclear reactor technology; Fuel cells and electrolyzers; District heating and cooling systems; Exergy and energy analyses of advanced energy systems; Heat storage methods: Thermal and chemical; Case studies related to integrated energy systems; Exergoeconomic and enviroeconomic analyses.

Books (In case UG compulsory courses, please give it as "Text books" and "Reference books". Otherwise give it as "References".

Text Books: (Format: Authors, *Book Title in Italics font,* Volume/Series, Edition Number, Publisher, Year.)

1. A Bejan, Advanced Engineering Thermodynamics, 4th Edition, Wiley, 2016

2. I Dincer, M A Rosen, Exergy: Energy, Environment and Sustainable Development, Elsevier, 2020

Reference Books: (Format: Authors, *Book Title in Italics font,* Volume/Series, Edition Number, Publisher, Year.)

1. I Dincer, C Zamfirescu, *Advanced Power Generation Systems*, Elsevier, 2014.

- I Dincer, M A Rosen, Thermal Energy Storage Systems: Systems and Applications, 3rd Edition, Wiley, 2021
- G Naterer, I Dincer, C Zamfirescu, Hydrogen Production from Nuclear Energy, Springer, 2015
 A Bejan, G Tsatsaronis, M J Moran, *Thermal Design and Optimization*, Wiley, 1995