STEAM POWER ENGINEERING

PROF. VINAYAK N. KULKARNI
Department of Mechanical Engineering
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TYPE OF COURSE : Rerun | Core | UG
COURSE DURATION : 8 weeks (20 Jul'20 - 11 Sep'20)
EXAM DATE : 27 Sep 2020

PRE-REQUISITES : Basic UG-level Thermodynamics
INTENDED AUDIENCE : Undergraduate students of Mechanical Engineering Industry personnel associated from Thermal power plant; Faculty members associated with Mechanical /Chemical/ Automobile Engineering.
INDUSTRIES APPLICABLE TO : Thermax, NTPC

COURSE OUTLINE :
This course deals with steam power plants. One part of the course is about Simple steam power cycle, reheat, regeneration and superheating. Further actual cycle with component efficiencies would also be discussed. Then each component of the plant is discussed in detail. Initially, types of steam generators and their parts are highlighted. Then steam turbine, its type, efficiency and arrangements are focused. Thus this course would provide an understanding on electricity generation or transportation application using steam as working medium.

ABOUT INSTRUCTOR :
Prof. Vinayak N. Kulkarni is an Associate Professor in the Department of Mechanical Engineering of Indian Institute of Technology, Guwahati since January 2015. He completed his undergraduate studies in Mechanical Engineering from the Shivaji University, Maharashtra, India. His post graduation and PhD is from Aerospace Engineering Department of Indian Institute of Science Bangalore. His teaching interests are Basic and Applied thermodynamics, Gas Dynamics, Aircraft propulsion and fluid mechanics. His research interests are Experimental and computational compressible flows, IC engines and non-conventional energy.

COURSE PLAN :
Week 1: Vapour Power Cycles: Carnot cycle, Rankine cycle, reheat cycle
Week 2: Vapour Power Cycles: Regenerative cycle, steam cycles for nuclear power plant, back-pressure and extraction turbines and cogeneration
Week 3: Vapour Power Cycles: Low temperature power cycles, ideal working fluid and binary/multi-fluid cycles
Week 4: Steam Generator: Subcritical and supercritical boilers, fluidized bed boilers, fire-tube and watertube boilers, mountings and accessories
Week 5: Steam Turbine: Impulse and reaction stage, degree of reaction, velocity triangle,
Week 6: Steam Turbine: efficiencies Velocity and pressure compounding,
Week 7: Steam Turbine: Reheat factor and nozzles
Week 8: Cooling Tower: Hygrometry and psychrometric chart