STEAM POWER ENGINEERING

PROF. VINAYAK N. KULKARNI
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IIT Guwahati

PRE-REQUISITES : Basic UG-level Thermodynamics

INTENDED AUDIENCE : Undergraduate students of Mechanical Engineering Industry personnel associated from Thermal power plant; Faculty members associatedwith Mechanical /Chemical/ Automobile Engineering.

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