

CBEg 6162- Advanced Chemical Engineering Thermodynamics

Semester II, 2019/20 A.Y

Instructor: Dr.Eng. Shegaw Ahmed

ECTS: 7

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Course objectives: This course aims to provide graduate student with the under-standing on equilibrium and statistical thermodynamics and apply them to analyze chemical engineering problems. It will discuss topics of interest from viewpoint of statistical thermodynamics. It introduces the basic thermodynamic concepts of multiphase equilibrium and multicomponent system. It also aims to connect the principles, concepts and laws/postulates of classical and statistical thermodynamics to applications that require quantitative knowledge of thermodynamic properties from a macroscopic and molecular level as well as nano-scale.
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COURSE CONTENTS

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- *Introduction*
- *Postulates and equilibrium criteria*
- *Gibbs-duhem relations and energy minimum principles*
- *Alternative fundamental relations-thermodynamic potentials*
- *Maxwell's Relation and Jacobian Methods*
- *Phase Stability of thermodynamic system*
- *Introduction to statistical thermodynamics and possible quantum states of a system*
- *Fluctuation and equivalence of ensembles*
- *Reaction equilibrium*

References:

- Y.V.C. Rao, *Postulational and Statistical Thermodynamics*.
- Kalyan Annamalai, *Advanced Thermodynamics Engineering*
- Desmond E Winterbone, *Advanced Thermodynamics for Engineers*
- P.K. Nag., *Basic and applied Thermodynamics*

Assessment/Evaluation System:

- *Assignments and projects: 50%*
- *Exam:50%*