

Course outline

Course name: Engineering Materials

Course code: ChEg4131

Degree Program: B.Sc. in Chemical Engineering

Year: IV

Semester: II

ECTS credits: 3

Instructor: Tesfaye K.

Email: engnertesfa@gmail.com

Competences to be acquired

The course will cover Physical, mechanical, electrical and chemical properties of metals, semiconductors, ceramics, polymers and composites, with an emphasis on understanding fundamental issues. Relationships between the processing, micro and macro structure of materials with their properties. At the end the students have the above knowledge.

Course Description/Course Contents

Introduction, Atomic Structure and Inter-atomic Bonding, Structures of Metals and Ceramics, Polymer structures, Imperfections in Solids, Diffusion, Mechanical Properties, mechanism of deformations in crystalline materials, Deformation and Strengthening Mechanisms, Failure, Phase Diagram, Phase Transformations, Corrosion and Degradation, Electrical Properties of Materials, Thermal Properties, Magnetic Properties, Optical Properties, selection of engineering materials.

Assessment/Evaluation

Continuous Assessment.....50%

Quizzes (at least three).....15

Assignment (at least three).....15

Tests (at least two).....10

Presentation (at least two).....10
Final exam.....50%

Text Book:

William D. Callister, Jr. Fundamentals of Materials Science and Engineering; An Integrated Approach, 2nd. Ed.,

Reference Books

J. F. Shackelford, Introduction to Materials science for Engineers, 4th Ed. Prentice Hall International, Inc., 1998 Lawrence H. Van Vlack Materials for Engineering,