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Student Manual

Excellence In Higher Education for Liberian Development

Developed by:

The University of Michigan

PLAYLIST

Engineering Graphics - List of Open Educational Resources

Creator: Open.Michigan, University of Michigan (Updated 29 Mar 2013)

Description:

Open Educational Resources are learning materials that are free, public, and shared under licenses that allow people to copy, translate, adapt, and share with others.

Tags: graphics, Engineering

1. The Cain Project in Engineering and Professional Communication , **Designing Effective Graphics Using MATLAB** [http://cnx.org/content/m15939/latest/]
   Notes: Type: Article; Found Using: Connexions.org

   Description: This PowerPoint file of 40 slides explains the types of graphs (line graphs, column or bar charts, pie charts, and ribbon graphs) that may be prepared with Matlab software. It tells how to choose the right one for the type of data to be displayed, taking into consideration the engineer's purpose, audience, and context. It also demonstrates the commands used to make the graphs legible and easy to interpret.

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2. Saylor.org, **Computer-Aided Design** [http://www.saylor.org/courses/me104/]
   Notes: Type: Course; Found Using: Saylor.org

   Description: CAD, or computer-aided design, is a powerful modeling tool that technical professionals use. With CAD, architects can draw up building plans and engineers can develop component and system designs. Some CAD programs even allow users to perform stress analysis, demonstrating how well a proposed structure will fare when put to use. For example, when does a load become too big? How much weight can be put onto a bridge before it becomes structurally unsound? Using CAD, professionals can create precise engineering drawings in both 2- and 3-D, complete with dimensions and specifications, in a neat and readable format. This modeling method has taken design to a whole new level of efficiency and accuracy.

   Terms of Use: Various, see course page

3. Massachusetts Institute of Technology, **Introduction to Design Computing** [http://ocw.mit.edu/courses/architecture/4-500-introduction-to-design-computing-fall-2008/]
   Notes: Type: Course; Found Using: OERCommons.org

   Description: Explores the role of computer visualization as a representational medium. Visualization is widely used in scientific, engineering, and design disciplines to help people understand complex phenomena and constructs. The key intellectual challenge is to develop the right visual metaphors for conveying information in the most effective way. Through programming projects and applications work, real and imaginary environments are constructed, probed, and displayed. Also covers the relevant computer graphics methods and data representations. Required of Course IV majors. This course will introduce students to architectural design and computation through the use of computer modeling, rendering and digital fabrication. The course focuses on teaching architectural design with CAD drawing, modeling, rendering and rapid prototyping. Students will be required to build computer models that will lead to a full package of architectural explorations within a computational environment.
   Link: **http://ocw.mit.edu/courses/architecture/4-500-introduction-to-design-computing-fall-2008/**

   Explores the role of computer visualization as a representational medium. Visualization is widely used in scientific, engineering, and design disciplines to help people understand complex phenomena and constructs. The key intellectual challenge is to develop the right visual metaphors for conveying information in the most effective way. Through programming projects and applications work, real and imaginary environments are constructed, probed, and displayed. Also covers the relevant computer graphics methods and data representations. Required of Course IV majors. This course will introduce students to architectural design and computation through the use of computer modeling, rendering and digital fabrication. The course focuses on teaching architectural design with CAD drawing, modeling, rendering and rapid prototyping. Students will be required to build computer models that will lead to a full package of architectural explorations within a computational environment.

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4. Massachusetts Institute of Technology, **Computer Graphics** [http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2003/06/]

   Notes: Type: Course; Found Using: OERCommons.org

   Description: Introduction to computer graphics hardware, algorithms, and software. Topics include: line generators, affine transformations, line and polygon clipping, splines, interactive techniques, perspective projection, solid modeling, hidden surface algorithms, lighting models, shading, and animation. Substantial programming experience required. 6.837 offers an introduction to computer graphics hardware, algorithms, and software. Topics include: line generators, affine transformations, line and polygon clipping, splines, interactive techniques, perspective projection, solid modeling, hidden surface algorithms, lighting models, shading, and animation. Substantial programming experience is required.

5. Massachusetts Institute of Technology, **Digital Design Fabrication** [http://ocw.mit.edu/courses/architecture/4-510-digital-design-fabrication-fall-2008/]
Notes: Type: Course; Found Using: OERCommons.org

Description: This class serves as an introductory subject in advanced computing, rapid prototyping, and CAD/CAM fabrication for architects. It focuses on the relationship between design and various forms of computer modeling as input, and CAD/CAM tools as output material. It presents the process of design and construction using CAD files introduced by the office of Gehry Partners during the construction of the Guggenheim Museum in Bilbao, Spain. It is taught in phases starting with rapid prototyping and ending with digital mockups of building components fabricated from CAD files on a one-to-one scale.

6. Massachusetts Institute of Technology, **Introduction to Modeling and Simulation** [http://ocw.mit.edu/courses/materials-science-and-engineering/3-021j-introduction-to-modeling-and-simulation-spring-2011/]
Notes: Type: Course; Found Using: OERCommons.org

Description: Basic concepts of computer modeling in science and engineering using discrete particle systems and continuum fields. Techniques and software for statistical sampling, simulation, data analysis and visualization. Use of statistical, quantum chemical, molecular dynamics, Monte Carlo, mesoscale and continuum methods to study fundamental physical phenomena encountered in the fields of computational physics, chemistry, mechanics, materials science, biology, and applied mathematics. Applications drawn from a range of disciplines to build a broad-based understanding of complex structures and interactions in problems where simulation is on equal-footing with theory and experiment. Term project allows development of individual interest. Student mentoring by a coordinated team of participating faculty from across the Institute.

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