

A Guide to ... Finding Online Resources for Learning and Teaching in Engineering

One of the challenges facing engineers who teach using a virtual learning environment (VLE) or other e-learning platform is that of sourcing relevant high quality resources that fully exploit the potential offered by computers for interaction and multimedia presentations. Such resources are time-consuming and costly to produce, so it is sensible to put some effort into trying to find existing resources that can be shared before undertaking to create them from scratch. Google can be a great aid in this, especially some of the specialised searches (e.g. the image search, or the advanced search options that allow you to specify licensing restrictions), however other information resources are available that focus more specifically on the needs of engineering education.

The online information resources described in this guide can be thought of as virtual library catalogues or repositories for locating electronic material for explaining engineering concepts. The emphasis of most of the material is on content rather than delivery: these virtual libraries contain resources that can be used by academics when they are putting a course together for their students*. These learning resources might be used during a lecture to illustrate an explanation, they might be provided as supplementary resources for students to explore, or they might be delivered through a virtual learning environment such as Moodle, WebCT or Blackboard: successful integration of the resource into the course will depend on the teacher. Several of the resources listed here also offer advice on the policy and practice of teaching engineering.

Jorum <http://www.jorum.ac.uk/>



Jorum is a free online repository for staff in UK Universities and Colleges which aims to facilitate the sharing and reuse of learning and teaching materials. The repository contains resources varying from simple images and single page documents to collections of web pages with embedded interactive material. The latter type of material is in a format that allows it to be imported into VLEs (although you can also treat them just as zip archives). While all the material is subject to copyright, and there are restrictions on its use which mean that it can only be used for display to registered students on password protected sites, the material can be edited and tailored to local requirements. To get access to the Jorum, it is first necessary for your institution to sign a sublicense agreement (a list of UK HE institutions who have already registered is available on the website), and then you as an individual need to register so that you can sign on using your Athens login details. There are currently a few hundred resources in the Jorum classified as engineering topics.

Merlot Engineering Portal <http://engineering.merlot.org/>



Merlot is a US-based catalogue of online material and includes an Engineering Portal that will take you straight to the relevant section for the engineering community. You can search or browse by subject heading and the advanced search allows you to specify the resource type (e.g. simulation, tutorial, quiz/test etc.), the target audience (e.g. college, graduate school), whether or not the material is free, and many other options. For some of the materials described, Merlot provides full peer reviews, brief comments (i.e. a star rating and remarks from users of the resource), and assignments that show how the materials could be used in teaching.

Merlot contains several hundred resources relevant to engineering, and this can be expanded on by using the federated search facility. This will search Merlot and a group of

* A complementary *Guide to helping your students find information online* provides a selection of online information resources for students.

other similar digital libraries, for example the Ariadne knowledge pool in Europe (<http://www.ariadne-eu.org/>) and the Education Network Australia (<http://www.edna.edu.au>) so that resources from all these repositories can be discovered from the same web page: <http://fedsearch.merlot.org/> .

NEEDS <http://www.needs.org/>

NEEDS is another US-based digital library with links to online learning materials in engineering and the related areas of science and maths. In partnership with TeachEngineering, a US initiative focusing on teaching engineering subjects at school level, NEEDS is developing the Engineering Pathway portal (<http://www.engineeringpathway.com/ep/>) to provide information about teaching engineering at all levels.

OpenCourseWare: MIT <http://ocw.mit.edu/>, **Open University** <http://www.open.ac.uk/openlearn/> and others

Pioneered by MIT, the idea of OpenCourseWare is similar to that of Open Source Software: that the materials used in University level education should be available for anyone to view, reuse, modify, and build on. MIT has been placing educational materials used in its courses online since 2002; the result is a collection of PowerPoint slides, lecture notes, study materials, assignments, etc., that are available for educational use under certain conditions. They are, however, designed for use on specific MIT courses and so a certain amount of modification would be necessary for them to be used in other contexts.

The UK's Open University is engaged in a project to make much of its material available in a similar manner. They are providing material that is more neutral in its presentation, and not as tied to a specific course as the MIT resources are. Access for learners is available through the OpenLearn LearningSpace; the LabSpace provides tools and resources for educators, for example allowing you to download the course material presented in the LearningSpace so that you can adapt it and use it in your own courses.

There are several other OpenCourseWare related initiatives, see for example the OpenCourseWare finder at <http://opencontent.org/ocwfinder/> , and the OpenCourseWare Consortium at <http://www.ocwconsortium.org/> .

Wikipedia <http://en.wikipedia.org/>

Wikipedia is a free online encyclopaedia "that anyone can edit". As you would expect from a resource where a professor of engineering has the same rights to create and modify entries as a high school student, the quality of articles is variable. There are issues around students treating Wikipedia as an authoritative or primary source, however, some articles are good, and contain useful material (such as images, mathematical derivations etc.) that are difficult to create from scratch. The articles in Wikipedia are licensed in a way that allows you to take them and use them in your own learning environment, where you can fix any errors and where they will be protected from vandalism.

Last, but not least

Finally, we hope that this guide will be useful, it is not intended to be comprehensive: not every available resource has been included and some information about the resources (e.g. whether you have access to them) will vary depending on your institution. Don't forget to **consult your library** for advice on other resources which are more tailored to your needs and institutional subscriptions.