

Mechanical and Biomedical Engineering Service Learning Module

A range of service learning modules are available at NUI Galway whereby students undertake accredited activity of specific relevance to their chosen subject for the benefit of the community

Teaching Context	
Subject	Mechanical and Biomedical Engineering
Department	Mechanical and Biomedical Engineering
Participants	3 rd Year Mechanical and Biomedical Engineering students
Pedagogy	Service learning / community based learning
Method	Community consultation followed by practical project
Participants	70 students
Hours	16 Hours Service
Credits	3 ECTS
Materials	Classroom teaching plans
Assessment	The maintenance and submission of a service log to invoke reflection. Final assessment is in the form of a public poster presentation that demonstrates design skills and outcome achieved.
Length	2 semesters
Community Partners	Students take responsibility in initiating community partnership
Optional/Mandatory	Mandatory
First Piloted	2003/2004

Introduction

Service learning seeks to reinvigorate the civic mission of higher education and instil in students a sense of social responsibility and civic awareness. It is a pedagogical tool that encourages students to learn and explore issues vital to society inside and outside the classroom. Students learn from engaging with communities by active participation.

Service Learning in Mechanical and Biomedical Engineering

The Mechanical and Biomedical Engineering degree at NUI Galway has a service learning module incorporated into its programme, giving students experiential learning while applying academic knowledge. CAIRDE, *Community Awareness Initiatives Responsibility-Directed by Engineers*, was designed as a way for students to identify a need in their community and define a project with very distinct goals.

The key objectives of service learning are to create opportunities to integrate and relate theory to practice, to enhance partnerships between the university and the wider community and to increase the civic, academic, personal and professional capacity of students through experiential learning.

Academic Basis

During the service learning module, students attain practical knowledge in their field by engaging in services that address genuine community needs. Spending one semester out of their third year undertaking the module, students dedicate a minimum of 16 hours to a design project. This time is spent in lengthy consultations with their community partner, followed by practical work resulting in a product design or prototype.

An additional minimum of four hours for reflecting on the experience and creating a technical poster for presentation to the University community is also incorporated. Annually the posters are put on public display and presented to peers and lecturers.

Assessment

Each project and poster is assessed against rigorous criteria, based on the theoretical studies the students have already undertaken. An essential element of the service learning programme is also the reflective process where students document the value of their contribution and the effect of their participation in the course on their personal development.

Student Benefit

The module helps show students how engineers make contributions to their communities and provides them with an opportunity to interact with people from different backgrounds in a consultative role. It gives students a different perspective on engineering by approaching problem solving from the point of view of the community/client.

Through working with the community, the students develop their communication skills and their abilities to consult and include the client's needs in their designs. In addition, they get the valuable experience of presenting academic posters describing their projects. Overall, this unique learning experience is a valuable contribution to their CV.

Students are also able to become members of *Engineers Without Borders* which acts as a network for students and professional engineers who wish to improving the quality of life of disadvantaged communities worldwide through education and implementation of sustainable engineering projects.

Community Benefit

The service learning module brings practical benefit to the community. One of the longest running service learning programmes at NUI Galway, it has allowed students to solve some critical problems for key groups and organisations.

Among the solutions brought to the community has been a portable and lightweight wheelchair ramp designed for IHCPT, the Irish Pilgrimage Trust caring for young people with special needs. Students have also designed the 'Topper Off'r', a simple instrument which allows a stroke patient or amputees to slice the top off a hard boiled egg with little effort. Other innovations have included a walking stick that can also pick up dropped items, a device for opening jars, an exercise machine for the elderly, a light sensor for the visually impaired and an assistive chair lift.

Academic Comment

Professor Abhay Pandit, Department of Biomedical Engineering, who piloted the module in 2003, believes that service to society and within community should be a part of the student experience. He comments, "Students by default live in a cocoon of privilege and if we don't challenge that privilege we are not doing what we should. As a university we have a duty to engage students with the community and to create an ethos that involves understanding and supporting the wider community. By using a different approach to teaching, both students and the community can benefit from the experience."