



Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Networking Embedded Systems

Module Details

Short Title:	Networking Embedded Systems DRAFT
Full Title:	Principles of Networking Embedded Systems
Module Id:	4665

Official Code:		NFQ Level:	9	ECTS Credits:	5
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Coordinator:	FERGUS O REILLY
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Description:	This module will review the properties of fundamental communication protocols. Modeling techniques widely used to analyse communication protocols and networks are examined and developed. These are applied in case studies of network design and evaluation. Finally, a range of protocols for self-organisation in embedded networks is developed, to provide the student with an understanding of how to create embedded networks.
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Learning Outcomes:
<i>On successful completion of this module the learner will be able to...</i>
<ol style="list-style-type: none"> 1. critically evaluate and select communication protocols for networked embedded systems based on application requirements 2. model individual communication protocols and evaluate their likely performance based on suitable performance metrics 3. describe different protocols for self-organisation in embedded networks and analyse their suitability for different application requirements 4. model network designs using suitable tools and evaluate the performance of the designs

Pre-requisite learning		
Module Recommendations <i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>		
3388	CTEC8003	Networks

Incompatible Modules
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>
No incompatible modules listed

Module Requirements
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>
No requirements listed



Module Content & Assessment

Indicative Content

- **Review of Networking Principles**

Review of networking principles including network topologies, protocol stacks, MAC, link layer, network and routing protocols, transport and application protocols, network management

- **Network Modelling, Tools, and Evaluation**

Communication network modelling and performance evaluation, queuing theory, graph algorithms, computer simulation tools

- **Principles of Embedded and Self-organising Networks**

Concepts of self-organisation for embedded networks, channel allocation, address allocation, routing, reliable and fault-tolerant networking

- **Network Design and Modelling Case Studies**

Example network design and modelling case study based on a project based learning approach

Assessment Breakdown	%
Course Work	60%
End of Semester Formal Examination	40%

	Outcome addressed	% of total	Assessment Date
Formal End-of-Semester Examination	1,2,3	40%	Semester End

Coursework Breakdown				
Type	Description	Outcome addressed	% of total	Assessment Date
Written Report	Report on modelling and evaluation of communication protocols	1	30	Week 6
Written Report	Report on modelling a network design for a given case study	2,4	30	Sem End

The institute reserves the right to alter the nature and timings of assessment



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Module Workload & Resources

Workload	Full-time mode			
Type	Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	Lecture	3	Every Second Week	1.50
Lab	Laboratory	3	Every Second Week	1.50
Independent & Directed Learning (Non-contact)	Directed Learning	4	Every Week	4.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Workload	Part-time mode			
Type	Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	lecture	3	Every Second Week	1.50
Lab	laboratory	3	Every Second Week	1.50
Independent & Directed Learning (Non-contact)	Directed Learning	4	Every Week	4.00
Total Weekly Learner Workload				7.00

Resources

Recommended Book Resources

- William Stallings 2006, *Data and Computer Communications*, 8th Ed Ed., Prentice Hall [ISBN: 0123704901]

Supplementary Book Resources

- Gregory J. Pottie, William J. Kaiser 2009, *Principles of Embedded Networked Systems Design*, Cambridge University Press [ISBN: 978-0521095235]
- Andrew S Tanenbaum 2002, *Computer Networks*, 4th Ed Ed., Prentice Hall [ISBN: 0132009161]
- Behrouz A Forouzan 2007, *Data Communications and Networking*, 4th Edition Ed., McGraw Hill Higher Education [ISBN: 007-125442-0]