PRIFYSGOL glyndŵr UNIVERSITY

MODULE SPECIFICATION FORM*

Module Title:	**Digital Communications**	Level:	**6**	Credit Value:	**10**

Module code: (if known)	**ENG614**	Cost Centre:	**GAEE**	JACS2 code:	H640

Semester(s) in which to be offered:	**1**	With effect from:	**July 2015**

Office use only: To be completed by AQSU:	Date approved: **July 2015** Date revised: Version No: 1

Existing/New: **Existing**	Title of module being replaced (if any):

Originating Academic area:	**Engineering and Applied Physics**	Module Leader:	**B. Klaveness**

Module duration (total hours)	100	**Status:** core/option/elective (identify programme where appropriate):	**Free-standing 10-credit component comprising half of ENG638 (Communications Engineering).**
Scheduled learning and teaching hours	36		
Independent study hours	64		
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	**0%**

Programme(s) in which to be offered: **Enginering European Programme** (Non Award Bearing)	Pre-requisites per programme (between levels):	**None**

Module Aims:

To synthesise information from a variety of sources in order to characterise and evaluate digital communication systems and hence anticipate future developments in applications and technology.

Expected Learning Outcomes

Knowledge and Understanding:
At the completion of this module, the student should be able to:

1. Analyse the operating principles and structures of different computer networks;
2. Evaluate the performance of common industrial data networks;
3. Analyse the trends in digital communications techniques in order to produce integrated system structures which will support the range of industrial applications anticipated in the future. *(KS 9)*

Key skills for employability

1. Written, oral and media communication skills,
2. Leadership, team working and networking skills
3. Opportunity, creativity and problem solving skills
4. Information technology skills and digital literacy
5. Information management skills
6. Research skills
7. Intercultural and sustainability skills
8. Career management skills
9. Learning to learn (managing personal and professional development, self management)
10. Numeracy

Assessment: *Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%).*

Assessment One: the student will be allocated, or will select, a case study of a particular communications system application in order to investigate it in depth. For example, a comparison between wired and wireless computer networks for industrial process data.
It covers all outcomes.
(This corresponds to assessment 1 – case study - of ENG638.)

Assessment number (use as appropriate)	Learning Outcomes met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Case Study	100%		2000

Learning and Teaching Strategies:

The module will be presented to the learner through a series of lectures and tutorials. A case study will be used as part of an investigative exercise to support learning. Students will also be required to support these studies with further reading and Internet searches.

Syllabus outline:

Digital Communication: Serial and parallel standards, synchronous/ asynchronous, media access techniques. UARTS and computer interfaces. ISO standard for open system, IEEE-802.x comparative, bridge/router gateway. Message and packet switching, X25, 21 C system, public telecommunications organisation. Transmission rates/sampling, media access/traffic algorithms. Principles, dedicated line/channel of telephone, video conferencing, Internet, modem/direct connection, service providers. Blue-tooth, domestic networks, T.V. based data communications including duplex (interactive) operation.

Mobile Communication: Cellular radio. Global System for Mobile Communications (GSM). Code-division multiple access (CDMA). Wireless local area networks (WLAN), WiFi. Multiple inputs multiple outputs (MIMO).

Applications: Analysis, using case studies, of industrial communication structures and trends.

Bibliography:

Essential reading:
Duck, M. (2006) *Data Communications for Engineers*, Addison-Wesley.

Recommended reading:
Othman, M. (2008) *Principles of mobile computing and communications,* **Boca Raton.**