

MODULE DESCRIPTOR

Guidelines for completion are available¹ as are Red Guides on developing a new module and Delivering a module².

1. Module Code	MSDE 447	2. Title of new module	Digital Signal Processing
3. Subject Division <i>where relevant</i>	Engineering		
4. Module level <i>4, 5, 6 etc.</i>	6	5. Module Tutor	Yeun Cheul Jeung
6. Credit points <i>10, 20,30 etc</i>	10	7. Year long or semester based	Semester, March
8. Type of module <i>eg standard, dissertation, work-based study</i> <i>A full list of module types is provided in the guidelines¹.</i>	Standard		
9. Location(s) of delivery <i>For collaborative delivery, please state name(s) of institution(s) with country and start month(s) for each. A full list is available on the SITS help file in eLP</i>	SeoulTech, Korea, September		

MODULE DESCRIPTIONS

- 10. Synopsis of module** (SITS Module Descriptor Sequence 0001)
A brief overview of aims, learning outcomes, learning, teaching, assessment, & feedback methods, and rationale

This module provides the student with the basic ability to design an electronics circuit through the application of digital devices. Digital switching, digital controllers, and digital signal processing are all covered from both a SW and HW perspective. Students practice solving engineering problems, by applying the theory taught during lectures, in hands-on labs which enhance their understanding of the topics covered.

The module will be delivered via a combination of lectures, labs, and directed/independent learning. Assessment consists of labs, assignments, and an examination. The student will receive formative feedback throughout the lectures and labs.

- 11. Indicative reading list or other learning resources** (SITS 0002)

- 1) Course notes on Electronics, Seoul Tech.
- 2) Course notes on Digital Signal Processing, Seoul Tech

¹ <http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/>

² <http://northumbria.ac.uk/sd/central/library/marcel/redguides/browse/?view=Standard>

- 3) Digital Signal Processing: A practical approach, 2nd Ed., Emmanuel C. Ifeachor, Prentice Hall, 2001
- 4) Programmable Logic Controllers, 5th Ed., W. Bolton, Newnes, 2009.

12. Outline syllabus (SITS 0003)

A list of module contents

Introduction to Digital Systems

Digital vs. Analogue, digital system architecture, specific digital devices including PLC, PLD, DSP

Introduction to PLC/PLD's

Applications of: programming and implementation

Digital Signal Processing Theory

Z-transforms, Digital transfer functions, ADC-DAC

Digital Signal Processing Applications

Programming in MATLAB, Implementation of various digital processing applications including filtering.

13. Aims of module (SITS 0004)

Broad statement of educational intent and overall purpose of module

To help students understand HW/SW structure of digital systems, cultivate skills to make use of appropriate software packages, and practice implementation of systems by developing solutions to engineering problems.

14. Learning outcomes (SITS 0005)

State what expected to know and/or be able to do at end of module

1. Cover mathematical methods relevant to the Engineering subjects (A2).
2. Define problems and identify the key issues/parameters affecting their solution (B1).
3. Produce innovative solutions to problems through the application of engineering principles (B3).
4. Use relevant instrumentation and test equipment and evaluate the accuracy of data obtained (C3).
5. Design a component, system or process and demonstrate its feasibility through testing or simulation (C5).
6. Present a critical evaluation or technical analysis, formally or informally (C6).
7. Manipulate and sort data and present results in the most appropriate way(D1).
8. Apply an engineering approach to the solution of problems using scientific principles (D2).

15. Pre-requisite(s) (SITS 0006)

Any module which must already have been taken at a lower level, or any stipulated level of prior knowledge required

MSDE 312 Signals and Systems

16. Co-requisite(s) (SITS 0007)

Modules at this level which must be taken with this module

None

17. Distance learning delivery (SITS 0008)

If the module is offered (wholly or in part) by distance learning, please give detail of delivery arrangements and the specific resources required e.g. materials, communication facilities, hardware, software etc.

None

18. Learning and teaching strategy (SITS Module Descriptor Sequence 0009)

Students are expected to read the module descriptor and determine what knowledge and which skills are necessary to pass the various assessments. Formal lectures provide the essential guidance as well as some explanation of the more difficult aspects. Time will be made available during the scheduled lectures to answer questions arising from directed learning using the source materials indicated. Practical laboratory work will be used to support the theory learned in the lectures. Assessment is achieved through a mid point quiz and a final examination that are closely related to lectures as well as 2 assignments carried out in the laboratory.

19. Assessment and feedback strategy (SITS Module Descriptor Sequence 0010)

Please provide details of assessment (formative and summative) and indicate how students will be provided with feedback on their performance. (A breakdown of summative tasks is also provided in section 23.) If the module or an assessment component is exempt from the Anonymous Marking Policy please indicate this below.

a. Summative assessment and rationale for tasks

The final exam worth 55% provides students with a range of problems to solve and tests their individual ability to logically analyze a problem and develop a solution. A set of assignments worth 30% is designed to provide students hands-on experiments to help understand the topics covered in the lectures. A mid-term quiz worth 15% will be given to check students learning progress.

b. Additional formative assessment – detail of process and rationale

Formative assessment will be via verbal feedback during the lab periods when the students will be working on experiments. Use of oral questions during teaching to assess the understanding of a topic will also be made..

c. Indication of how students will get feedback and how this will support their learning

Feedbacks will be in the form of verbal (formative) during the lecture and lab periods. Summative feedbacks will be via written comments in the student's assignment works and lab reports, and verbal comments on exam question solutions.

20. Implications for Choice (SITS Module Descriptor Sequence 0011)

Possible follow-on modules, or exclusions, or modules which require this one as a pre-requisite

Prerequisite for MSDE474 Engineering Optics

21. Notional Student Workload (NSW) for each mode of delivery

(SITS Module Descriptor Sequence 0012)

Complete a separate table where the distribution of NSW differs for a particular delivery pattern - Mode of Delivery FT

Activity type*	Hours	KIS category	KIS category hours
Lecture	40	Scheduled	
Seminar			
Tutorial			
Project Supervision			
Demonstration			
Practical classes and workshops	20		
Supervised time in studio/ workshop			
Fieldwork			
External visits			
Work based learning			
Guided independent study	40	Independent	
Placement		Placement	
Year abroad			
Total workload <i>200 hours for 20 credit module, 100 for 10 credit module etc.)</i>	100		

SUMMATIVE ASSESSMENT**22. Form of Reassessment***Either synoptic or non-synoptic reassessment*

	Y/N
Synoptic reassessment <i>One form of reassessment that tests all module learning outcomes</i>	Y
Non-synoptic reassessment <i>Where module referred overall, individual failed components of assessment are reassessed</i>	

23. Component Assessment*To be completed for each component of assessment*

Sequence <i>001, 002 etc.</i>	Activity type ³ <i>indicate ONE of the following types: AO Attendance only CP Clinical Placement CW Coursework EXAM PRE Presentation</i>	Brief description of assessment <i>e.g. type/ length of exam, type/ word limit of coursework</i>	Weighting % or Pass/Fail (for grade only components) <i>Note: % weightings should add up to 100% for module overall</i>	Final assessment Y/N
001	CW	Assignments (Continuous Assessment)	30	
002	EXAM	Mid-term quiz/1hr	15	
003	EXAM	Final formal examination /3hours	55	Y

³ For KIS reporting, CP and PRE will be aggregated together as 'Practical' assessment types

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24. **Date of SLE Approval**

25. **Subject code**
 This ensures that the correct area receives appropriate funding and should be completed in consultation with the School Registrar or nominee. Advice can also be sought from Financial Planning.

26. **Module mark scheme assigned⁴**

27.	Component mark scheme assigned³	
	<ul style="list-style-type: none"> For each component listed in section 23 indicate the mark scheme attached. Note that for synoptic mark schemes (ie MOD1, MOD3 and M50SY only) an additional component should be entered for the reassessment with sequence 900 and assessment type SYN. 	
	001	

28.	Date of entry onto SITS	
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29.	LOG OF CHANGES POST APPROVAL		
	<i>Please indicate any changes to the approved module descriptor from 2012/13 onwards</i>		
	Section No.	Brief description of change	Date of approval
			Semester and year of first implementation

³A list of marking schemes (module and component) can be accessed from <http://northumbria.ac.uk/sd/central/ar/qualitysupport/approval/forms/>