

MODULE DESCRIPTOR

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

| | | | |
|--|-------------------------|---------------------------------------|---------------------|
| 1. Module Code | MSDE 312 | 2. Title of new module | Signals and Systems |
| 3. Subject Division <i>where relevant</i> | Engineering | | |
| 4. Module level <i>4, 5, 6 etc.</i> | 5 | 5. Module Tutor | Yeun C. Jeung |
| 6. Credit points <i>10, 20,30 etc</i> | 10 | 7. Year long or semester based | Semester |
| 8. Type of module <i>eg standard, dissertation, work-based study 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, March | | |

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

Signals convey information. Systems transform signals. This course introduces the mathematical models used to design and understand both. It is intended for students interested in developing a deep understanding of how to digitally create and manipulate signals to measure and control the physical world and to enhance human experience and communication.

Assessment of the module is made through a final exam and 3 problem solving assignments spread over the semester, which are designed to support the lecture material.

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

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|---|
| <p>1) Recommendations for purchase by students</p> <p>N/A</p> <p>2) Books</p> |
|---|

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

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

Structure and Interpretation of Signals and Systems, 1st edition, Lee and Varaiya, Addison Wesley, 2003

3) Journal Articles

N/A

4) Journals and Newspaper Titles

N/A

5) Databases and Websites

IEEE Xplore digital electronic library, accessed 3-2012, (online access granted though university campus systems only)

6) Any Other Resources

N/A

12. Outline syllabus (SITS 0003)

A list of module contents

Signals and Systems Structure including: Elements of computing and communications Systems,

Basic mathematical principles of signals and systems including: equation sets, functions, modelling, mappings, and representations,

State machines and linear time-invariant systems: linear state transition and output functions and zero initial state,

Frequency decomposition of signals: frequency response of linear time invariant systems,

Frequency domain concepts: as a complementary toolset: foundation of digital, embedded systems, computing, communications systems and control.

13. Aims of module (SITS 0004)

Broad statement of educational intent and overall purpose of module

The first major aim of the module (covering Learning Outcomes 1 and 2) is for the student to be able to design and build digital systems and structure modules of Internet Protocol elements for computing and communication systems.

The second major aim (covering Learning Outcome 3 and 4) is to enable students to analyse specifications for computing and communication systems.

14. Learning outcomes (SITS 0005)

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

Upon completion of the module the student will be able to:

1. The principles of design and techniques to develop products and related manufacturing processes. (A5)
2. Produce innovative solutions to problems through the application of Engineering principles. (B3)
3. Plan and conduct an investigative or development project subject to technical, time and commercial constraints. (C1)
4. Use creativity and, where appropriate, innovate in problem solving. (D3)

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 214 Engineering Mathematics

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)

The module consists of a number of sets of two 1.5 hour per week lectures over the semester. This module will be delivered using a mixture of lectures, exercises of problem solving and assignments to reinforce the theory provided in the lecture sessions.

Directed learning for individual sessions will include comprehensive learning guides available for mathematical analysis, modelling, notation, and domain models for signals and frequency response.

The application of this work to real life problems will be illustrated by using an application of computing and the telecommunications systems and by showing real solution applied.

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

This module is summative assessed with three assignments: integrated wave functions, feedback system design and transforms (worth 30%), and an end of semester final exam (worth 70%). The assignments will include the development of signals and systems for the practical realisation and verification of systems. The end of semester exam will cover the theoretical material and aspects of learning from the class sessions.

b. Additional formative assessment – detail of process and rationale

Formative assessment is made in the tutorials to provide feedback to students throughout the module. This will be in the form of problem solving supported by examples in class for lecture sessions.

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

Feedback on students learning will take the form of verbal feedback during the class sessions, additionally written feedback will be available in the form of worked solutions for class, quizzes and assignment questions.

Assignment feedback will be provided during class sessions and by way of an answer sheet on completion of the assignment.
 Examination feedback will be provided following the normal processes to show generically where the cohort has a strong or a weaker answer to the examination.

- 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

Pre-requisite for MSDE 346 and MSDE 329

- 21. Notional Student Workload (NSW) for each mode of delivery**
 (SITS Module Descriptor Sequence 0012)

| <i>Complete a separate table where the distribution of NSW differs for a particular delivery pattern - Mode of Delivery FT</i> | | | |
|--|-------|------------------|--------------------|
| Activity type* | Hours | KIS category | KIS category hours |
| Lecture | 35 | Scheduled | |
| Seminar | | | |
| Tutorial | 20 | | |
| Project Supervision | | | |
| Demonstration | | | |
| Practical classes and workshops | 5 | | |
| 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> | | | |

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</i> | Brief description of assessment <i>e.g. type/ length of</i> | Weighting % or Pass/Fail (for grade only components) <i>Note: % weightings</i> | Final assessment Y/N |
|----------------------------------|--|--|--|-------------------------|
| | | | | |

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

Module Descriptor

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|-----|----------------------------------|--|---|---|
| | EXAM PRE Presentation | <i>exam, type/ word limit of coursework</i> | <i>should add up to 100% for module overall</i> | |
| 001 | Exam | Final formal examination/ 3 hrs | 70 | Y |
| 002 | CW | 3 Short Assignments (throughout the semester up to 2-3 pages problem solving) | 30 | |

FOR OFFICE USE ONLY

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"> • <i>For each component listed in section 23 indicate the mark scheme attached.</i> • <i>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.</i> | |
| | 001 | |
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| 28. | Date of entry onto SITS | <input style="width: 450px; height: 30px;" type="text"/> |
|-----|--------------------------------|--|

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