UNIVERSITY OF WARWICK

Proposal Form for New or Revised Modules (MA1 - version 7 - April 2014)

Approval information	
Approval Type	☐ Revised module ☒ New module ☐ Discontinue module
Date of Introduction/Change	01/10/2018
If new, does this module replace another? If so, enter module code and title:	ES182 Multimedia Technology and part of ES4D2 Antenna, Propagation and Wireless Communications Theory
If revised/discontinued, please outline the rationale for the changes:	
Confirmation that affected departments have been consulted:	Changes were made in consultations between the School of Engineering and WMG. Computer Science have been consulted via the CSE Steering Group.

Module Summary	
1. Module Code (if known)	ES2D4
2. Module Title	Multimedia Technology and Signal Propagation
3a. Lead department:	School of Engineering
3b. Teaching Split (if known):	100% School of Engineering
4. Name of module leader	Dr Duncan Billson
5. Level	UG: ☐ Level 4 (Certificate) ☒ Level 5 (Intermediate) ☐ Level 6 (Honours) PG: ☐ Level 7 (Masters) ☐ Level 8 (Doctoral) See Guidance Notes for relationship to years of study
6. Credit value(s) (CATS)	15
7. Principal Module Aims	To present the fundamental science underpinning technologies associated with multimedia devices and understand the basics of signal propagation
8. Principal Learning Outcomes	By the end of the module the student should be able to:

Module Summary	
	• Solve transmission line problems (including matching problems). • Solve problems involving electromagnetic plane wave propagation and reflection and/or transmission at interfaces • Perform antenna calculations. • Understand the fundamentals of acoustics • Understand the fundamentals of optics. • Explain Human Perception • Appreciate the way technology is leading to a multimedia revolution. • Describe technologies behind everyday devices such as mobile phones, digital still/video cameras etc.
9. Timetabled Teaching Activities (summary)	30 hours of lectures, 2 hours of revision lectures, 2 x 4 hours of laboratory exercises. **Total of 40 hours.**
10. Departmental Web-link	http://www2.warwick.ac.uk/fac/sci/eng/eso/modules/year2
11. Other essential notes	Advice and feedback hours are available for answering questions on the lecture material (theory and examples) and past examination questions.
12. Assessment methods (summary)	70% written examination (3 hrs); 2 x 15% marked laboratory reports (8 pages length each). Students must pass the examination, and pass the coursework overall.

For use by Strategic Planning and Analytics Office only - Do not fill in this section

Level	JACS3 Code	Teaching Split
		If not provided in 3b above

External Credit Level		Scheme	

Module Context

13. Please list all departments involved in the teaching of this module. If taught by more than one department, please indicate percentage split.

School of Engineering

14. Availability of module

Degree Code	Title	Study Year	C/OC/ A/B/C	Credits
H113	BEng Engineering	2	A/B	15
H114	MEng Engineering	2	A/B	15
H216	BEng Civil Engineering	2	A	15
H217	MEng Civil Engineering	2	A	15
H605	BEng Electrical and Electronic Engineering	2	A	15
H606	MEng Electrical and Electronic Engineering	2	A	15
H63W	BEng Electronic Engineering	2	A	15
H63X	MEng Electronic Engineering	2	A	15
HH35	BEng Systems Engineering	2	C	15
HH31	MEng Systems Engineering	2	C	15
HN11	BSc Engineering and Business Studies	2	A/B	15

15. Minimum number of registered students required for module to run

20

16. Pre- and Post-Requisite Modules

None.

Module Content and Teaching

17. Teaching and Learning Activities *(totals for module – please see guidance)*

Module duration (weeks)	10
Lectures	30 x 1 hours
Seminars	None
Tutorials	None
Project Supervision	None
Demonstration	None
Practical Class/Workshops	2 laboratory exercises (2 x 4 hours = 8 hrs)
Supervised time in studio/workshop	None
Fieldwork	None
External visits	None
Work based learning	None

Module Content and Teaching		
Placement	None	
Year abroad	None	
Other activity *(please describe): e.g. distance-learning, intensive weekend teaching etc.*	• 2 x 1 hr = 2 hours revision lectures • 110 hours of guided independent learning	
18. Assessment Method (Standard)		
Type of assessment	**Length**	**% weighting**
Written Examinations	3 hours	70
Practical Examinations	None	
Assessed essays/coursework	Written report on each of the two laboratories (8 pages length for each report).	2 x 15
18a. Final chronological assessment *(please see guidance*)	examination.	

19. Methods for providing feedback on assessment.
• Support through advice and feedback hours. • Written feedback on marked laboratory reports. • Cohort-level feedback on final exam.
20. Outline Syllabus
Transmission lines and matching Maxwell's equations, the electromagnetic plane wave and polarisation Plane wave propagation in lossless and lossy media and reflection at interfaces Antenna fundamentals Basic Communications (e.g. history and current technology - Wifi / Bluetooth) Acoustics (fundamental theory, propagation mechanisms) Acoustic materials (e.g. piezoelectric) and devices (e.g. loudspeakers, microphones) The human ear Optics (fundamental principles, materials) The optical spectrum (IR, UV, visible) Geometrical optics / optical systems / lenses / aberrations The human eye and colour theory Optical sources (e.g. black Body radiation, LED) and sensors (e.g. photodiodes) Displays (physics, materials and technology) including human touch Memory types (including basic magnetism, magnetic storage) Batteries
21. Illustrative Bibliography

F.W. Ulaby and U. Ravaioli, Fundamentals of Applied Electromagnetics, 7th edition, Pearson, 2015.
Leon Gunter, The Physics of Music and Color, New York; Springer 2012

22. Learning outcomes

Successful completion of the module leads to the learning outcomes. The learning outcomes identify the knowledge, skills and attributes developed by the module.

Learning Outcomes should be presented in the format "By the end of the module students should be able to..." using the table at the end of the module approval form:

Please, see the table at the end of the module approval form.

Resources

23. List any additional requirements and indicate the outcome of any discussions about these.

N/A

Approval

24. Module leader's signature	Dr Duncan Billson
25. Date of approval	Teaching Policy Committee 31 March 2017
26. Name of Approving Committee (include minute reference if applicable)	School of Engineering and WMG Teaching Policy Committee
27. Chair of Committee's signature	Professor Gillian Cooke
28. Head of Department(s) signature	Professor Nigel Stocks

Examination Information		
A1. Name of examiner (if different from module leader)		
A2. Indicate all available methods of assessment in the table below		
% Examined	**% Assessed by other methods**	**Length of examination paper**
70	15% Laboratory Report 1 15% Laboratory Report 2	3 hours
A3. Will this module be examined together with any other module (sectioned paper)? If so, please give details below.		
No.		
A4. How many papers will the module be examined by?	☒ 1 paper	☐ 2 papers
A5. When would you wish the exam take place (e.g. Jan, April, Summer)?	Summer	
A6. Is reading time required?	☐ Yes	☒ No
A7. Please specify any special exam timetable arrangements.		
N/A		
A8. Stationery requirements		
No. of Answer books?	2	
Graph paper?	Yes	
Calculator?	Yes	
Any other special stationery requirements (e.g. Data books, tables etc)?	Engineering Data Book	
A9. Type of examination paper		
Seen?	☐ Yes	☒ No
Open Book?	☐ Yes	☒ No
Restricted?	☐ Yes	☒ No
If restricted, please provide a list of permitted texts:		

LEARNING OUTCOMES		
(By the end of the module the student should be able to....)	**Which teaching and learning methods enable students to achieve this learning outcome? (reference activities in section 15)**	**Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 16)**
Solve transmission line problems (including matching problems)	Lectures and laboratories	Examination and laboratory report
Solve problems involving electromagnetic plane wave propagation and reflection and/or transmission at interfaces	Lectures	Examination
Perform antenna calculations.	Lectures	Examination
Understand the fundamentals of optics.	Lectures	Examination and Laboratory report
Understand the fundamentals of acoustics	Lectures	Examination
Explain Human Perception	Lectures	Examination
Appreciate the way technology is leading to a multimedia revolution.	Lectures	Examination
Understand technologies behind everyday devices such as mobile phones, digital still/video cameras etc	Lectures	Examination