

## MODULE SPECIFICATION

Please contact your College Learning and Teaching Team for guidance completing this form:  
 Colleges of Arts & Social Sciences and of Business & Law – [cass-tandlteam@salford.ac.uk](mailto:cass-tandlteam@salford.ac.uk)  
 College of Health and Social Care – [chsc-teaching@salford.ac.uk](mailto:chsc-teaching@salford.ac.uk)  
 College of Science and Technology – [cst-tl@salford.ac.uk](mailto:cst-tl@salford.ac.uk)

This form is available to download from [http://www.governance.salford.ac.uk/page/aqa\\_forms](http://www.governance.salford.ac.uk/page/aqa_forms)).

Date of completion of this version of Module Specification: 19/12/2014				
Date of approval by the USP: 26/01/2016				
1. Module Title: (Full title and short title no more than 30 characters) Pure & Applied Mathematics for Physics			2.CRN: 31141 (S1)	
3.University module code: F300 10027		4.HESA/JACS subject area code <sup>1</sup> : F300		
5.Level: Level 4	6.Credit Value: 20	7.ECTS Value <sup>ii</sup> : 10	8.Length of module in semesters: 1	9.Month(s) in which to be offered <sup>iii</sup> : September
10.Module Status <sup>iv</sup> Existing	11.Title of Module being replaced ( <i>if any</i> ):		12.With effect from <sup>v</sup> (academic year): September 2016	
13.Originating School: School of Computing, Science & Engineering		14.Module Leader(s) Dr Graham S McDonald		
15.Programme(s) in which to be offered <sup>vi</sup> : BSc (Hons) Pure & Applied Physics BSc (Hons) Pure & Applied Physics with Professional Experience				
16.Pre-requisites ( <i>between levels</i> ): None		17.Co-requisites ( <i>within a level</i> ): None		
18.Indicative learning hours (breakdown of hours required) <sup>vii</sup> 200				
Lecture	48	Fieldwork		
Seminar		External visits		
Tutorial	48	Work based learning		
Project supervision		Guided independent study		92
Demonstration Practical classes and workshops		Placement		
Supervised time in studio/workshop		Year abroad		
Other – please specify <sup>viii</sup> Computer Aided Learning Laboratory				12
19.Percentage of module taught by School(s) other than originating School: 0%				
20.Aims of Module <sup>ix</sup> : (maximum of 5) <ol style="list-style-type: none"> <li>To review essential fundamental mathematical techniques relevant to physics.</li> <li>To introduce the subjects of algebra, trigonometry, functions, geometry, vectors, complex numbers and calculus, with emphasis on their applications to physics.</li> <li>To provide the mathematical training in support of all physics level 4 modules.</li> <li>To develop an awareness of the importance of mathematics in a quantitative description of physics.</li> <li>To provide remedial tutorials and computer-aided learning to assist students who have under-achieved in Mathematics at A level.</li> </ol>				

## 21. Intended Learning Outcomes<sup>x</sup>

### Knowledge and Understanding (maximum of 5)<sup>xi</sup>

On successful completion the student will be able to:

1. Solve numerate problems in the fields of algebra, properties of elementary functions, co-ordinate systems, vector algebra, complex numbers, differentiation and integration.
2. Apply these mathematical techniques in relevant area of physics and engineering.

### Transferable/Key Skills and other attributes (maximum of 5)

On completion the student will have had the opportunity to:

3. Demonstrate Application of numerical and mathematical skills.
4. Demonstrate Problem Solving skills using mathematics.

## 22. Module mark calculation: Method A

### 23. Assessment components (in chronological order of submission/examination date)

Denote final assessment component in box marked **final assessment component (99)**

Type of assessment	Identify which ILO is met by number <sup>xii</sup>	Weighting %	Duration	Word count	Component pass required <sup>xiii</sup>	E Submission	Assessment organised by
Set Exercises	1,2,3,4	50			No	No	School
					Choose an item.	Choose an item.	Choose an item.
<b>Final assessment component (99)</b> Class Tests	1,2,3,4	50			No	No	School
24. Is ethical approval for the module required?	No		25. Is ethical approval for an assessment component required? <sup>xiv</sup>		No		

## 26. Learning, teaching and assessment strategies:

This module is taught by weekly lectures supported by regular problem classes and small group tutorials. In addition, there are supplementary tutorials and computer-aided learning classes specifically for students on the Pure & Applied Physics degrees. Assessment is by a series of short tests and set exercises conducted during tutorial classes.

A set of problem solving exercises is provided for guided independent learning, which forms the basis of formative assessment and feedback in the tutorial classes.

## 27. Syllabus outline:

- Algebra: Equations, identities and inequalities. Functions and functional notation. Quadratic equations. Partial fractions. Indices and logarithms. Simultaneous linear equations. Graphing simple functions. Binomial theorem.
- Trigonometry: Degrees, radians, arcs and sectors. Trig. Functions, trig identities and trig equations.
- Hyperbolic Functions: Definitions, graphs, properties, evaluation and inverses.
- Geometry: Co-ordinate systems. Lines. Conic sections.
- Vectors: Position vectors. Components of vectors. Addition, subtraction, multiplication by a scalar.
- Magnitude of a vector and unit vectors. Scalar and vector products (including applications).
- Complex Numbers: Operations with complex numbers. Geometric representation and the Argand diagram. Polar and exponential forms. Powers and roots of complex numbers.
- Ordinary Differentiation: Differentiation of elementary functions. Techniques of ordinary differentiation.

Differentiation of implicit functions. Applications of differentiation.

- Partial Differentiation: Techniques of partial differentiation. Small increments (error analysis). Exact differentials. Rates of change problems.
- Integration: Integration as the reverse of differentiation and as the limit of a sum. Standard integrals I. Techniques of integration.

28. Indicative texts and/or other learning materials/resources<sup>xv</sup>:

After initial approval, up to date reading lists can be accessed at <https://salford.rl.talis.com/index.html>

**Note:** This replaces the LaSU reading lists from September 2015 onwards.

For Office Use only:

Teaching and Learning Team Comments:	
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- i See UoS guidance notes on selecting JACS codes ([http://www.planning.salford.ac.uk/jacs\\_codes/](http://www.planning.salford.ac.uk/jacs_codes/)) see HESA JACS Codes webpage <http://www.hesa.ac.uk/index.php/content/view/356/233/>
- ii The ECTS value is half of the module credit value
- iii Please indicate the month (s) in which delivery of the module will commence.
- iv Amendments to the title or credit value constitute a new module.
- v If the delivery month of the module is to be available for different intakes of a programme, please indicate this here. E.g. Module effective from Sept 2014 – to state the module is to be available for Sept 2014 intake & Feb 2014 intake.
- vi The module will only be attached to programmes specified in this section. Any approved module can be available as a stand-alone module.
- vii These categories are used for the Key Information Set which currently applies only to full time undergraduate students only but please include for all students – for more information including definitions see [http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/contact\\_hours.pdf](http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/contact_hours.pdf) and [http://www.hesa.ac.uk/component/option.com\\_studrec/task.show\\_file/Itemid,233/mnl,13061/href.Calculations\\_methods.html/#LearningandTeaching](http://www.hesa.ac.uk/component/option.com_studrec/task.show_file/Itemid,233/mnl,13061/href.Calculations_methods.html/#LearningandTeaching)
- viii The 'other' category should not be used for learning undertaken by full undergraduate students as 'other' is not used in KIS categories
- ix The aims should express the purpose of the module.
- x The intended learning outcomes should detail the knowledge, understanding and skills that students will be able to demonstrate on successful completion.
- xi In some circumstances it may be necessary to have more than 5 intended learning outcomes. You will be asked to provide your rationale for this in discussion at the USP.
- xii For example, if the assessment is an essay and the essay meets ILOs number 1-4 and 6-7, state 1-4,6-7
- xiii If Method B is used for module mark calculation, indicate Yes to specify the assessment component(s) to be passed in order to pass the module
- xiv Please specify component(s) for which ethical approval is required.
- xv The "Indicative texts and/or learning materials/resources" box should include a maximum of five items for new modules. These should be formatted using the University's agreed referencing style for the subject area (usually APA Harvard System 6<sup>th</sup>). See [http://www.salford.ac.uk/library/infolit/tool#referencing\\_tab](http://www.salford.ac.uk/library/infolit/tool#referencing_tab) for more information. The texts should normally be recent texts (i.e. within the last six years) unless they are a particularly "classic" text. For existing modules, the "Indicative texts and/or learning materials/resources" box should include a link for USP reviewers and readers to the comprehensive reading list at <http://lasu.salford.ac.uk>