

## UNIVERSITY OF WARWICK

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

<b>Approval information</b>	
<b>Approval Type</b>	<input type="checkbox"/> New module <input checked="" type="checkbox"/> Revised module <input type="checkbox"/> Discontinue module
<b>Date of Introduction/Change</b>	1 October 2018
<b>If new, does this module replace another? If so, enter module code and title:</b>	N/A
<b>If revised/discontinued, please outline the rationale for the changes:</b>	The teaching (and thus the assessment) will aim to teach about the Design Process by replicating the process followed within a real company. Revised contact hours include reduced lectures and increased laboratory hours. Examination removed and assessment changed to Practical Group project, including peer assessment: 50%; Individual Practical component: 10%; Individual Essay (2500 words): 30%; Individual Reflective Report: 10%.
<b>Confirmation that affected departments have been consulted:</b>	Changes were made in consultation with the School of Engineering and WMG.

<b>Module Summary</b>	
<b>1. Module Code (if known)</b>	ES3A4
<b>2. Module Title</b>	CAD/CAM and Simulation
<b>3a. Lead department:</b>	Engineering
<b>3b. Teaching Split (if known):</b>	100% WMG
<b>4. Name of module leader</b>	Mrs Helen Neal
<b>5. Level</b>	UG: <input type="checkbox"/> Level 4 (Certificate) <input type="checkbox"/> Level 5 (Intermediate) <input checked="" type="checkbox"/> Level 6 (Honours) PG: <input type="checkbox"/> Level 7 (Masters) <input type="checkbox"/> Level 8 (Doctoral)  See Guidance Notes for relationship to years of study
<b>6. Credit value(s) (CATS)</b>	15

Module Summary													
<b>7. Principal Module Aims</b>	This module provides an overview of CAD/CAM for 3rd Year students. Both theoretical concepts and practical applications are covered. The CAM element links into the Manufacturing aims of the module while the CAD element links directly with the engineering aims. It also provides an introduction to discreet part simulation.												
<b>8. Principal Learning Outcomes</b>	<p><b>By the end of the module the student should be able to....</b></p> <ul style="list-style-type: none"> <li>• Design engineering components to meet design constraints.</li> <li>• Create Engineering Drawings to fully and clearly define manufacturing and assembly requirements of components.</li> <li>• Plan manufacturing operations and create manufacturing instructions for components.</li> <li>• Apply knowledge of CAD/CAM tools and technologies to propose strategies to enhance engineering design and manufacture in familiar products.</li> <li>• Recommend solutions to overcome the limitations of efficient exchange of CAD/CAM data.</li> <li>• Apply design and manufacturing methods to solve engineering problems.</li> <li>• Present solutions to engineering problems in a concise and informative way.</li> <li>• Reflect on areas of personal learning across the module.</li> </ul>												
<b>9. Timetabled Teaching Activities (summary)</b>	<table border="1"> <tbody> <tr> <td>Lectures: 18 x 1hour</td> <td>18 hours</td> </tr> <tr> <td>Visits: 2 x 1 hours</td> <td>2 hours</td> </tr> <tr> <td>Examples class</td> <td>1 hour</td> </tr> <tr> <td>Lab sessions: 4 x 3 hours</td> <td>12 hours</td> </tr> <tr> <td>Lab sessions: 6 x 2 hours</td> <td>12 hours</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>45 hours</b></td> </tr> </tbody> </table>	Lectures: 18 x 1hour	18 hours	Visits: 2 x 1 hours	2 hours	Examples class	1 hour	Lab sessions: 4 x 3 hours	12 hours	Lab sessions: 6 x 2 hours	12 hours	<b>TOTAL</b>	<b>45 hours</b>
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<b>TOTAL</b>	<b>45 hours</b>												
<b>10. Departmental Web-link</b>	<a href="http://warwick.ac.uk/es3a4">warwick.ac.uk/es3a4</a>												
<b>11. Other essential notes</b>	Advice and feedback hours are available for answering questions on the lecture material, theory and lab exercises.												
<b>12. Assessment methods (summary)</b>	<p>Coursework: 100%, consisting of:</p> <ul style="list-style-type: none"> <li>• Practical Group project, including peer assessment: 50%</li> <li>• Individual Practical component: 10%</li> <li>• Individual Essay (2500 words): 30%</li> <li>• Individual Reflective Report: 10%</li> </ul> <p>Students must pass the coursework overall.</p>												

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

<b>Level</b>	<b>JACS3 Code</b>	<b>Teaching Split</b>
		<i>If not provided in 3b above</i>

<b>External Credit Level</b>		<b>Scheme</b>	

<b>Module Context</b>				
<b>13. Please list all departments involved in the teaching of this module. If taught by more than one department, please indicate percentage split.</b>				
WMG				
<b>14. Availability of module</b>				
<b>Degree Code 2016-17 end</b>	<b>Title</b>	<b>Study Year</b>	<b>C/OC/ A/B/C</b>	<b>Credits</b>
H330	Automotive Engineering (BEng)	3	C	15
H339	BEng Automotive Engineering with Intercalated Year	4	C	
H331	Automotive Engineering (MEng) and variants	3	C	
H332	Automotive Engineering (MEng) with an Intercalated Year	3 or 4	C	
H333	Automotive Engineering (MEng) with a year in Research	3 or 4	C	
H106	Engineering (BEng)	3	O	
New	BEng Engineering with Intercalated Year	4	O	
H107	Engineering (MEng) and variants	3	O	
H109	Engineering (MEng) with an Intercalated Year	3 or 4	O	
H110	Engineering (MEng) with a year in Research	3 or 4	O	
HH73	Manufacturing & Mechanical Engineering (BEng)	3	C	
New	BEng Manufacturing and Mechanical Engineering with Intercalated Year	4	C	
HH37	Manufacturing & Mechanical Engineering (MEng) and variants	3	C	
HH38	Manufacturing & Mechanical Engineering (MEng) with an Intercalated Year	3	C	
HH39	Manufacturing & Mechanical Engineering (MEng) with a year in Research	3	C	
<b>Degree Code 2017-18 entry</b>	<b>Title</b>	<b>Study Year</b>	<b>C/OC/ A/B/C</b>	
H113	BEng Engineering	3	A	15
H111	BEng Engineering with Intercalated Year	4	A	15
H114	MEng Engineering	3	A	15
H115	MEng Engineering with Intercalated Year	3 or 4	A	15
H335	BEng Automotive Engineering	3	Core	15

<b>Module Context</b>				
H334	BEng Automotive Engineering with Intercalated Year	4	Core	15
H336	MEng Automotive Engineering	3	Core	15
H337	MEng Automotive Engineering with Intercalated Year	3 or 4	Core	15
HH75	BEng Manufacturing and Mechanical Engineering	3	Core	15
HH74	BEng Manufacturing and Mechanical Engineering with Intercalated Year	4	Core	15
HH76	MEng Manufacturing and Mechanical Engineering	3	Core	15
HH77	MEng Manufacturing and Mechanical Engineering with Intercalated Year	3 or 4	Core	15
HN15	BEng Engineering Business Management	3	B	15
HN13	BEng Engineering Business Management with Intercalated Year	4	B	15
<b>15. Minimum number of registered students required for module to run</b>				
1 (Core)				
<b>16. Pre- and Post-Requisite Modules</b>				
N/A				

<b>Module Content and Teaching</b>	
<b>17. Teaching and Learning Activities</b> ( <i>totals for module – please see guidance</i> )	
<b>Module duration (weeks)</b>	Up to 20 (runs over terms 1 and 2)
<b>Lectures</b>	18 x 1 hour = 18 hours
<b>Seminars</b>	
<b>Tutorials</b>	
<b>Project Supervision</b>	
<b>Demonstration</b>	2 x 1 hour visits
<b>Practical Class/Workshops</b>	1 hour examples class
<b>Supervised time in studio/workshop</b>	4 x 3 hours plus 6 x 2 hours total workshops = 24 hours
<b>Fieldwork</b>	
<b>External visits</b>	
<b>Work based learning</b>	
<b>Placement</b>	

Module Content and Teaching		
<b>Year abroad</b>		
<b>Other activity</b> <i>(please describe): e.g. distance-learning, intensive weekend teaching etc.</i>	<b>Guided independent and group learning: 105 hours</b>	
<b>18. Assessment Method (Standard)</b>		
<b>Type of assessment</b>	<b>Length</b>	<b>% weighting</b>
<b>Written Examinations</b>		
<b>Practical Examinations</b>		
<b>Assessed essays/coursework</b>	<ol style="list-style-type: none"> <li>1. Practical Group project including peer assessment</li> <li>2. Individual Practical component</li> <li>3. Individual Essay (2500 words)</li> <li>4. Individual Reflective Report</li> </ol>	<ol style="list-style-type: none"> <li>1. 50%</li> <li>2. 10%</li> <li>3. 30%</li> <li>4. 10%</li> </ol>
<b>18a. Final chronological assessment</b> <i>(please see guidance)</i>	Group project and individual essay	

<b>19. Methods for providing feedback on assessment.</b>
Written feedback for group project Written feedback for individual essay
<b>20. Outline Syllabus</b>
<p>CAD</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Geometric modelling, curves surfaces and solids</li> <li>• Applications, geometric properties, 3D visualization, Design Analysis, Rapid Prototyping and tooling</li> <li>• Data Exchange: neutral file formats, exchange formats, translators.</li> <li>• PDM and PLM</li> </ul> <p>CAM</p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Machine tools</li> <li>• NC Basics, Tool path generation, Machining strategies.</li> </ul> <p>Simulation</p> <ul style="list-style-type: none"> <li>• Basic theory of simulation, Business applications.</li> </ul>
<b>21. Illustrative Bibliography</b>
<ul style="list-style-type: none"> <li>• Chang, K. e-Design: Computer-Aided Engineering Design Academic Press 2016, ISBN: 0128095695.</li> </ul>

- McMahon, C. CAD/CAM: Principles, Practice and Manufacturing Management (2nd Edition) Addison-Wesley 1998, ISBN: 0201178192
- Lee, K. Principles of CAD/CAM/CAE Systems Addison-Wesley 1999, ISBN: 0201380366
- Zeid, I. Mastering CAD/CAM McGraw Hill 2004, ISBN: 0072868457.

## 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:*

## Resources

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

Will need use of CAD software and NC machines in WMG workshop for laboratory classes. Technicians will also be required for labs on NC machining. Will also need consumables such as metal sheet for NC laboratory exercises. Software upgrades will be required as and when they become available.

## Approval

<b>24. Module leader's signature</b>	Helen Neal
<b>25. Date of approval</b>	
<b>26. Name of Approving Committee (include minute reference if applicable)</b>	School of Engineering and WMG Course and Module Approval Committee
<b>27. Chair of Committee's signature</b>	Professor Gillian Cooke
<b>28. Head of Department(s) signature</b>	Professor David Towers

Examination Information		
<b>A1. Name of examiner (if different from module leader)</b>	(same)	
<b>A2. Indicate all available methods of assessment in the table below</b>		
<b>% Examined</b>	<b>% Assessed by other methods</b>	<b>Length of examination paper</b>
	50% - Practical Group project, including peer assessment 10% - Individual Practical component 30% - Individual Essay (2500 words) 10% - Individual Reflective Report	
<b>A3. Will this module be examined together with any other module (sectioned paper)? If so, please give details below.</b>		
N/A		
<b>A4. How many papers will the module be examined by?</b>	<input type="checkbox"/> 1 paper <input type="checkbox"/> 2 papers	
<b>A5. When would you wish the exam take place (e.g. Jan, April, Summer)?</b>		
<b>A6. Is reading time required?</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>A7. Please specify any special exam timetable arrangements.</b>		
<b>A8. Stationery requirements</b>		
<b>No. of Answer books?</b>		
<b>Graph paper?</b>		
<b>Calculator?</b>		
<b>Any other special stationery requirements (e.g. Data books, tables etc)?</b>		
<b>A9. Type of examination paper</b>		



<b>Examination Information</b>	
<b>Seen?</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Open Book?</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Restricted?</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>If restricted, please provide a list of permitted texts:</b>	N/A

<b>LEARNING OUTCOMES</b>		
<b>(By the end of the module the student should be able to....)</b>	<b>Which teaching and learning methods enable students to achieve this learning outcome? (reference activities in section 17)</b>	<b>Which summative assessment method(s) will measure the achievement of this learning outcome? (reference activities in section 18)</b>
Design engineering components to meet design constraints	Lecture and laboratory classes	Group assessment
Create Engineering Drawings to fully and clearly define manufacturing and assembly requirements of components.	Lecture and laboratory classes	Group assessment
Plan manufacturing operations and create manufacturing instructions for components.	Lecture and laboratory classes	Group assessment
Apply knowledge of CAD/CAM tools and technologies to propose strategies to enhance engineering design and manufacture in familiar products.	Lecture and laboratory classes	Individual essay and group project
Recommend solutions to overcome the limitations of efficient exchange of CAD/CAM data.	Lecture and laboratory classes	Individual essay and group project
Apply design and manufacturing methods to solve engineering problems.	Lecture and laboratory classes	Individual essay and group project
Present solutions to engineering problems in a concise and informative way.	Lecture and laboratory classes	Individual essay and group project
Reflect on areas of personal learning across the module.	Lectures, laboratory classes, demonstrations, workshops	Individual reflective report