

Programme Specification and Curriculum Map for MSc Building Information Modelling Management



1. Programme title	Building Information Modelling Management (BIMM)
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University
4. Programme accredited by	Professional body accreditation – TBC
5. Final qualification	M.Sc. / PGDip. / PGCert.
6. Academic year	2013 – 2014
7. Language of study	English
8. Mode of study	Distance Learning. Full Time 1 year / Part Time 2 years

9. Criteria for admission to the programme

- Degree qualification (minimum 2nd class) in an appropriate construction discipline (e.g. architecture, architectural technology, civil, mechanical, electrical engineering, surveying etc.) + 3 years relevant industrial experience

OR

- A corporate member of a relevant professional body including 3 years of relevant industrial experience

OR

- Relevant industrial experience on a case by case basis
Candidates should also have creative, proactive qualities, ability to engage with technology, exercise leadership as an individual and work efficiently in teams. Applicants should supply evidence of the previous qualities in their personal statement.

Non-English native speakers are required to show high level of competence in the use of English, equivalent to at least 6.5 in the IELTS test (minimum 6 in all bands) or TOEFL 575 (paper based),

87(internetbased) - minimum 20 in listening, 20 in reading, 22 in speaking and 21 in writing.

10. Aims of the programme

The programme aims to:

1. Build an understanding that Building Information Modelling Management (BIMM) is a managed approach to the collection and exploitation of information and 3D models across a construction/infrastructure project from conception to demolition, and extending beyond that to the whole business enterprise.
2. Ensure that the candidates leaving the programme are BIM enabled with a critical awareness of contemporary BIM issues informed by technology, research and management skills in standard and unpredictable scenarios.
3. Provide practitioners in the property, construction and facilities sector, and related stakeholders providing services for it, with a qualification to be employed in a management role in Building Information Modelling (BIM) projects. These include technical BIM management positions, operational/administrative BIM management positions, and strategic BIM management positions.
4. Identify BIM business outcomes through business simulations, procurement strategies and commercial and data transaction learning.
5. Develop critical thinking, leadership, team/personal and decision-making skills, and the ability to reflect upon strategic decisions.
6. Enhance learners' capabilities to negotiate, design and complete BIM projects/inquiries/activities which meet both their own needs and those of their employers/sponsors/organisations. Also develop skills and understanding to work in a collaborative work environment
7. Utilise techniques and strategies from information management, design management, construction management, project management, supply chain management and lifecycle management that best support BIMM processes.

11. Programme outcomes

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of the following:

1. Understand and evaluate the interaction processes involved in designing, constructing and managing a building through use of BIM 3D models and data sets. Recognise the importance of collaborative working between disciplines nationally and internationally and influence/apply techniques and competencies to work collaboratively.
2. Critically analyse and select BIM management techniques to achieve the desired deliverables/handover and performance outcomes, through project, facilities and operations management, taking into account their social and economic global impacts.
3. Comprehend contractual and legal requirements and their implications within the BIM processes, realising legal relationships of all the parties involved and their impact on related insurance issues, to be able to take actions accordingly in their management activities.
4. Define roles and responsibilities of all parties, including external supply chain, involved in a BIM project to collaborate across different disciplines. To develop standards and protocols at institutional, sector and project level for control, feedback and analysis. These standards and protocols include what each contributor / stakeholder aims to achieve through the use of BIM.
5. Identify and assess the risks and risk management techniques/procedures required for the successful implementation of a BIM project and integrate Quality assurance with risk registers.
6. Understand how BIM can contribute to making buildings energy and carbon efficient, sustainable and environmentally friendly and manage the processes required to optimise these outcomes.

Teaching/learning methods

Students gain knowledge and understanding through given face-to-face or online lectures, analysis of existing or new design projects, case studies, researching, reading, listening and working with industrial

practitioners, observing, experimenting, drawing, writing, presenting and discussing

Assessment Methods

Students' knowledge and understanding is assessed by reflective reports on competency checkpoints and issues analysed from previous or current projects they are involved in or given. Also online research and discussion journal feedbacks, project work evaluation, coursework, presentations, publications and critical analysis dissertation of module requirements.

B. Cognitive (thinking) skills

On completion of this programme the successful student will be able to:

1. Critically analyse organisational management processes and apply them to: human resource development, benchmarking in context to BIM on a strategic level, developing commercial, business, financial and marketing opportunities and constraints in adopting BIM processes, implementing Quality Assurance and Control procedures.
2. Identify and apply professional ethics, codes of conduct in different work scenarios and methods to protect the integrity of the models.
3. Select suitable strategies and tools to conduct in-depth research on management issues of projects using BIM processes and application of these issues to various situations.
4. Show evidence of benefits from adoption of BIM through critical and creative analysis of existing projects or case studies, logical reasoning, identifying values, evaluating and managing the transition to a more transparent and collaborative way of working.
5. Devise solutions for complex, unpredictable situations and problem solving e.g. disaster mitigation and recovery, risk prediction. Express good judgement decision-making for specialist and non-specialist stakeholders.
6. Identify, analyse and evaluate Key Performance Indicators (KPI) to help define and reach goals of the BIM process and evaluate its success.

Teaching/learning methods

Students develop cognitive skills through analysis of existing or new design projects, face-to-face or online lectures, case studies, problem solving, analysis of a variety of scenarios and example applications, observing, experimenting, presenting and discussing

Assessment Method

Students' cognitive skills are assessed by reflective reports on competency checkpoints and issues analysed from previous or current projects, project work evaluation, peer and self assessment, e-journal research and discussions, creative writing in problem solving, critical thinking, multitasking, strategic decision-making and dissertation conducted in collaborative groups and individually.

C. Practical skills

On completion of the programme the successful student will be able to:

1. Apply numeracy and quantitative analysis skills to identify and evaluate major costs due to the BIM process integration.
2. Manage the application of various BIM software packages, their integration, the necessary protocols and procedures needed for networks, database systems and information sharing.
3. Demonstrate leadership, management and conflict resolution in collaboration and integration of separate industry and supply chain disciplines during creation of their own models, cost analysis, time phasing and sharing of all project data electronically in a common environment.
4. Show understanding of building information data analysis using COBie or equivalent information set formats and influence modification of a company's integrated management system.
5. Develop standard BIM work policies, procedures and processes, to remove possible barriers and demonstrate/evaluate plans for ethical, professional and social responsibility.

Teaching/learning methods

Students learn practical skills through analysis of existing or new design projects, technical skills enhancement, observing, experimenting, presenting and discussing

Assessment Method

Students' practical skills are assessed by project work evaluation, report and thesis writing to demonstrate appropriate design solutions, planning, prioritising tasks, validating and optimising designs, improving processes simulations and project management

D. Graduate Skills

On completion of this programme the successful student will be able to:

1. Utilise oral and written communication skills to prepare clear, referenced reports, case studies, presentations and conferences objectively in both face-to-face and online scenarios.
2. Employ advanced research skills in the ability to synthesize a research question by identifying a gap in knowledge, analysing required information, presenting an argument and formulating suitable conclusions.
3. Manage self-learning plans, encourage Continuous Professional Development (CPD) and training to incorporate level 3 web-driven BIM and demonstrate virtual management competences.
4. Apply academic research skills in analysis and critique of appropriate literature review of BIM management issues, applying appropriate ethical research methodologies to investigate them and support argument or hypothesis.

Teaching/learning methods

Students acquire graduate skills through the programme by enhancing their research skills, analysis of existing or new design projects, observing, experimenting, presenting and discussing

Assessment method

Students' graduate skills are assessed by project work evaluation, self and peer assessment, and team-based report and individual thesis writing to demonstrate idea synthesis, collaboration and management skills.

12. Programme structure (levels, modules, credits and progression requirements)

12. 1 Overall structure of the programme

The MSc Building Information Modelling Management programme is studied over either 12 months full time or 24 months part time. Study is entirely undertaken at level 7. The programme is made up of 3 consecutive modules comprising a 3-stage structure.

The 1st stage requires the mandatory module PDE4301 to be studied and awards 60 credits and the Certificate award on its successful completion. Its content about Technical BIM Management is taught using online synchronous webinars, discussion journals, case studies, occasional arranged face-to-face meetings, online material etc. The module is divided into 2 parts: i) taught competencies and ii) critical analysis for a simulated case study or for a project from prior experience of the candidate (APEL). Assessment requires preparing a reflective report by the participant showing evidence for performing the checklist of competencies and critical analyses required for this module upon analysing a simulated project or using a project from previous work experience.

After completion of the 1st module, the candidate may wish to exit the programme or continue to study the 2nd module PDE4302, which awards another 60 credits and the Diploma award on its successful completion. Its content is about Operational BIM Management and is taught and assessed in the same manner as above.

After completion of the 2nd module, the candidate may wish to exit the programme or continue to study the 3rd stage - module PDE4303 - which awards another 60 credits and the Masters award on its successful completion and final accumulation of 180 credits. The module involves submission of a thesis providing original contribution to knowledge.

Throughout the stages of the programme there will be 24 weekly online synchronous webinars including Q & A delivered by experts in industry to the cohort about different learning objectives required in 3 stages of the programme.

Before starting the 3rd thesis module and in preparation for it, a “summer school” week of compulsory university full-day workshops must be attended

in June/July, which can be taken in the 1st or 2nd year before or after completion of the 2nd module, but at minimum after the 1st module is completed. During these workshops the cohort will reflect and provide feedback on all prior knowledge acquired within the previous 2 modules and guest lectures, with introduction of business games/scenarios/role-play and case studies. They will also propose their thesis topics, which will be discussed with the tutors and the rest of the cohort to enhance the research arguments to provide novel contribution to knowledge regarding Strategic BIM Management.

The programme starts with a 2-day compulsory induction workshop (over 1 or 2 weeks) to set the theme for the whole programme, objectives, explain learning outcomes as aligned to government policies, provide an overview introduction to Building Information Modelling Management and induction for university online resources. Also by alignment of different backgrounds and experiences of the participants together, analysing how they reason and process information and identifying their individual requirements from the programme, it would be possible to collaborate and merge their experiences.

The programme runs from the Autumn term through to the Spring term (24 weeks contact) during which the 1st only or 1st and 2nd modules may be completed leading to the 3rd thesis module that takes place over the Summer term, and which may only be taken upon completion of the first 2 modules. If only the 1st module is completed in the first year by the end of the Spring term, the candidate will finish the 2nd module in the 2nd year and must wait till summer term of the 2nd year to begin the 3rd thesis module.

Each module has a value of 60 credits. Each 60-credit module represents approximately 540 hours of student learning, endeavour and assessment. The candidate may exit the programme after any module to be awarded with a PGCert after 1st module (60 credits), PGDip after the second module (120 credits) or MSc upon completion of all 3 modules (180 credits). Classification of the MSc award will be based on the distribution of Level 7 grades and the Thesis grade and this will conform to University regulation E4.6.

The programme will not actively recruit for PGCert or PGDip awards but will use these awards to compensate students who will need to exit during the programme based on the number of credits completed at the time.

12.2 Levels and modules		
Level 7		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p>PDE 4301 Technical BIM Management (60 credits)</p> <p>PDE 4302 Operational BIM Management (60 credits)</p> <p>PDE 4303 Strategic BIM Management (60 credits)</p>		<p>For PGCert award, the candidates must successfully pass and complete 60 credits from the module PDE 4301</p> <p>To progress onto the PGDip award, the candidates must successfully complete module PDE 4301</p> <p>To progress onto the MSc award, the candidates must successfully complete modules PDE 4301 and PDE 4302</p>

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)	
Module level	Module code

13. Curriculum map
See Curriculum Map attached

14. Information about assessment regulations
Refer to the University Regulations for generic guidance, and the Programme Handbook, under the Assessment section, for additional information

15. Placement opportunities, requirements and support (if applicable)

There will be no placement requirement for this programme. However the programme will arrange industrial visits and seek relevant industrial partnerships. There will be strong involvement from industrial partners in terms of sponsored projects and specialist lectures. A series of 30 online/face-to-face guest lectures are compulsory for attendance and analysis by the candidates throughout the course of the programme.

16. Future careers (if applicable)

Graduates from the programme will be qualified and expected to take on a managerial role in Business Information Modelling construction and infrastructure projects either on a technical, operational or strategic level within an organisation. Examples are Model managers, BIM coordinators, BIM leads, BIM managers, BIM champions, BIM directors from any stakeholder's side whether the consultant, contractor, client etc. Graduates will have highly specialised technical, analytical and collaborative operational and strategic decision-making skills that are much sought after qualities due to the novelty of the area in concern worldwide. The programme content will be enriched by keeping industrial engagement and collaboration active, and offering sponsored projects. This will help reveal current opportunities and future trends in their relevant employment sector.

17. Particular support for learning (if applicable)

Meeting the learning outcomes of this programme requires active participation in the subject and development of autonomous practice in meeting objectives. Supporting this level of active participation is achieved via regular weekly face-to-face or online tutorial contact with academic staff, productive and informed support from technical staff, the use of online resource based learning materials and discussion tools. The programme cohort will normally have weekly discussion sessions for interaction, collaboration and sharing of experiences to guide development of work through peer support. In the case of sponsored projects, industrial partners will also be part of the panel for offering guidance and support. There will also be weekly seminars/webinars with Q&A delivered by guest lecturer experts in industry in different issues related to the studied modules.

The subject provides extensive studio, laboratory and workshop facilities where students can engage with their coursework assignments in a supported and productive environment.

18. JACS code (or other relevant coding system)

K220

19. Relevant QAA subject benchmark group(s)

Construction, Property and Surveying (2008)

20. Reference points

- QAA Engineering subject benchmark statement (2008)
- QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland
- CIOB Education Framework for Masters Degree Programmes (2010)
- Middlesex University Regulations
- Middlesex university's learning, teaching and assessment policy strategy

21. Other information

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the student programme handbook and the University Regulations.

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Curriculum map for MSc Building Information Modelling Management

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Knowledge and understanding		Practical skills	
A1	Understand and evaluate the interaction processes involved in designing, constructing and managing a building through use of BIM 3D models and data sets. Recognise the importance of collaborative working between disciplines nationally and internationally and influence/apply techniques and competencies to work collaboratively.	C1	Apply numeracy and quantitative analysis skills to identify and evaluate major costs due to the BIM process integration.
A2	Critically analyse and select BIM management techniques to achieve the desired deliverables/handover and performance outcomes, through project, facilities and operations management, taking into account their social and economic global impacts.	C2	Manage the application of various BIM software packages, their integration, the necessary protocols and procedures needed for networks, database systems and information sharing.
A3	Comprehend contractual and legal requirements and their implications within the BIM processes, realising legal relationships of all the parties	C3	Demonstrate leadership, management and conflict resolution in collaboration and integration of separate industry and supply

	involved and their impact on related insurance issues, to be able to take actions accordingly in their management activities.		chain disciplines during creation of their own models, cost analysis, time phasing and sharing of all project data electronically in a common environment.
A4	Define roles and responsibilities of all parties, including external supply chain, involved in a BIM project to collaborate across different disciplines. To develop standards and protocols at institutional, sector and project level for control, feedback and analysis. These standards and protocols include what each contributor / stakeholder aims to achieve through the use of BIM.	C4	Show understanding of building information data analysis using COBie or equivalent information set formats, and influence modification of a company's integrated management system.
A5	Identify and assess the risks and risk management techniques/procedures required for the successful implementation of a BIM project and integrate Quality assurance with risk registers.	C5	Develop standard BIM work policies, procedures and processes, to remove possible barriers and demonstrate/evaluate plans for ethical, professional and social responsibility.
A6	Understand how BIM can contribute to making buildings energy and carbon efficient, sustainable and environmentally friendly and manage the processes required to optimise these outcomes.	C6	
Cognitive skills		Graduate Skills	
B1	Critically analyse organisational management processes and apply them to: human resource development, benchmarking in context to BIM on a strategic level, developing commercial,	D1	Utilise oral and written communication skills to prepare clear, referenced reports, case studies, presentations and conferences objectively in both face-to-

	business, financial and marketing opportunities and constraints in adopting BIM processes, implementing Quality Assurance and Control procedures.		face and online scenarios.
B2	Identify and apply professional ethics, codes of conduct in different work scenarios and methods to protect the integrity of the models.	D2	Employ advanced research skills in the ability to synthesize a research question by identifying a gap in knowledge, analysing required information, presenting an argument and formulating suitable conclusions.
B3	Select suitable strategies and tools to conduct in-depth research on management issues of projects using BIM processes and application of these issues to various situations.	D3	Manage self-learning plans, encourage Continuous Professional Development (CPD) and training to incorporate level 3 web-driven BIM and demonstrate virtual management competences.
B4	Show evidence of benefits from adoption of BIM through critical and creative analysis of existing projects or case studies, logical reasoning, identifying values, evaluating and managing the transition to a more transparent and collaborative way of working.	D4	Apply academic research skills in analysis and critique of appropriate literature review of BIM management issues, applying appropriate ethical research methodologies to investigate them and support argument or hypothesis.
B5	Devise solutions for complex, unpredictable situations and problem solving e.g. disaster mitigation and recovery, risk prediction. Express good judgement decision-making for specialist and non-specialist stakeholders.	D5	
B6	Identify, analyse and evaluate Key Performance	D6	

	Indicators (KPI) to help define and reach goals of the BIM process and evaluate its success.		
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Programme outcomes																				
A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4
Highest level achieved by all graduates																				
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Module Title	Module Code by Level	Programme outcomes																							
		A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4			
Certificate Level Technical BIM Management	PDE 4301	X					X		X		X	X		X	X	X	X		X	X	X	X			
Diploma Level Operational BIM Management	PDE 4302	X	X	X		X			X		X	X		X		X	X	X	X	X	X	X			
Masters Level Strategic BIM Management	PDE 4303			X	X	X		X	X	X	X		X					X	X	X	X	X			