# University of Huddersfield

# Programme Specification

|  |  |  |
| --- | --- | --- |
| 1 | Awarding Institution | University of Huddersfield |
| 2 | **Teaching Institution**  | University of Huddersfield |
| 3 | **School and Department** | Computing and Engineering, Department of Computer Science |
| 4 | **Course Accredited by:** | Not applicable |
| 5 | Mode of Delivery | Full Time (3 years) / Sandwich (4 years) |
| 6 | Final Award | BSc(Hons) Mathematics  |
| 7 | Course Title | Mathematics  |
| 8 | UCAS Code | C372 (Mathematics) |
| 9 | **Subject Benchmark Statement** | QAA MSOR Subject Benchmark Statement 2015 |
| 10 | Date of Programme Approval | August 2018, April 2020 |

**11 Educational aims of the Programme**

This course is designed to blend together core topics in mathematics, statistics and operational research to provide students with a rich and diverse learning experience equipping them with the advanced skills and understanding needed to solve a wide range of complex real-world mathematical problems. Within a supportive teaching environment, the program will develop problem solving skills, individual and team-working skills and stimulate students’ interests in a wide range of modern applications of mathematics, statistics and operational research.

The course will develop highly numerate, professional mathematicians capable of applying both analytical and numerical skills to determine solutions to a diverse range of problems. By applying intellectual rigour and logical reasoning, alongside more generic skills such as team-working, organisation and communication skills, students will develop skills highly sought after by employers in a range of fields. Typical employment routes include the natural and physical sciences, economics, actuarial science, accountancy, informatics, computer science and engineering. Graduates will also find themselves well equipped to progress on to teacher training or further study at Masters or PhD level.

*The main aims of the programme, which are aligned to the QAA Subject Benchmark, are to:*

1. Instil into students an appreciation of the importance of mathematics, statistics and operational research in solving real-world problems and to prepare the student for a career in industry.
2. Develop, through an education in mathematics, statistics and operational research, a range of transferable skills, including scientific computing and IT skills, project management and design skills, problem solving skills and communication skills of value in employment.
3. Develop, in students, an ability to apply their mathematical knowledge and skills to the solution of a wide range of theoretical and practical problems drawn from industry and from research.
4. Provide specialised knowledge in specific areas of mathematics, statistics and operational research that align with current, internationally-leading research within the Department.
5. Through alignment with current, internationally-leading research within the Department, produce students that have a critical awareness of current problems and new insights at the forefront of research. They should be able to evaluate current research and methodologies, develop critiques, show originality in the application of knowledge and, where appropriate, propose new hypotheses.
6. Provide graduates with the knowledge and skills required for further study in mathematics, computing and related areas.

**12** **Intended learning outcomes**

|  |
| --- |
| ***Knowledge and Understanding*** |
| Students will have knowledge and understanding of:1. The key areas in mathematics, indicative areas may include algebra, analysis, geometry, number theory, differential equations, and mechanics.
2. The key areas in statistics indicative areas may include exploratory data analysis, inference, likelihood, linear models, stochastic processes, time series and data analytics.
3. The key areas in operational research in fields indicative areas may include healthcare, transportation, logistics, strategic planning, manufacturing and retail distribution.
4. The role of numerical approximation and numerical computing, its application to a wide range of problems, including stability analysis, convergence and error rates and the effects of finite precision arithmetic on the computing process.
5. A range of modelling techniques, including model validation, model revision, optimisation, and conditions and limitations.
 |

|  ***Professional, Practical and Subject Specific Skills*** |
| --- |
| Students will be able to:1. Analyse a given problem in terms of its abstracted components, including any assumptions and constraints, and represent that problem mathematically using appropriate symbolic notation.
2. Select appropriate solution methods to a range of analytically and numerically formulated problems, analyse the quality of the solutions found and present conclusions.
3. Create, design and execute practical investigations from the problem recognition stage through to the evaluation and appraisal of the results.
4. Interpret essential facts, concepts, principles and theories, develop arguments and make distinctions and design choices based upon this.
5. Describe solutions to qualitative and quantitative problems of a familiar and unfamiliar nature and discriminate between different methodologies and approaches.
6. Interpret experimental results in terms of their statistical significance and underlying theory.
7. Illustrate mathematical and statistical results and conclusions clearly and correctly, in writing and orally, to a variety of audiences and show an ability to both question and exemplify the results and present new hypothesis.
8. Use software for data processing, problem design, retrieving and interpreting scientific information.
9. Critically evaluate novel problems and plan and deploy strategies for their solution using techniques which are at the forefront of the discipline. Apply comprehensive and deep understanding of solution processes and methodologies to unfamiliar situations.
 |

| ***Transferrable/Key Skills*** |
| --- |
| Students will have:1. Interpersonal skills, including the ability to co-operate with others and work as part of a team and develop an awareness of group dynamics.
2. Scientific computational skills, including the use of general and specialist software.
3. Verbal and written communication skills which show the ability to summarise scientific information and statistical data, interpret results, and compose, present and justify arguments.
4. Time management and organisational skills – the ability to initiate, co-ordinate and direct programmes of work and study, including a major research project.
5. Information retrieval skills, including on-line searches and primary literature research skills.
6. Study skills for continuing personal development including the ability to apply the above skills in a wide range of mathematical situations.
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###### 13 Programme structures and requirements, levels, modules, credits and awards:

The course is consistent with the University Credit Accumulation and Transfer Scheme (CATS) where modules are predominantly of 20 credits, delivered and assessed over one year. In the first year, modules are at foundation level (F, level 4 credits) and provide underpinning knowledge, competencies and skills for the later intermediate and honours level modules (I (level 5) and H (level 6) credits, respectively) taken in later years. Students are required to take 120 “F” level credits in the first year, 120 “I” level credits in the second year and 120 “H” level credits in the third year.

**Course Structure**

The course has been designed to meet the QAA Benchmark Statement for Mathematics, Statistics and Operational Research. <http://www.qaa.ac.uk/>

Consolidation and development of the student’s fundamental mathematical skills is initiated in the first year where knowledge of the under-pinning mathematics and statistics is delivered. Subject-specific skills are developed in the context of a broad range of problem solving activities allowing students to develop knowledge of key mathematical concepts and topics both explicitly and by application to the solution of problems. Use of this knowledge is further amplified in the Applied Mathematics module with a focus on application to real world problems. Students are thus able to comprehend problems, abstract the essential elements and formulate solutions both mathematically and symbolically, so facilitating problem analysis and solution.

Throughout the course, students will gain the necessary knowledge and experience to develop logical mathematical arguments with clear appreciation of underlying assumptions and conclusions. Mathematical study will be reinforced throughout by the use of computers and relevant packages appropriate to the level of study. Through individualised and collaborative analysis students will present their mathematical arguments and conclusions using appropriate mathematical notation.

The creative and innovative skills necessary for successful assessment of problems in a given field and the ability to transfer knowledge from one context to another, with logical appraisal and analytical approach are reinforced. Specific application of these skills is introduced in year one in the Introduction to Modelling and Problem Solving module and is further enhanced in Mathematical Programming and in Applied Mathematics. Year 2 modules build further on these problem solving skills in both Advanced Statistical Methods and in Mathematical Methods and Modelling’. The specific application of these skills is developed in the second year Mathematics Group Project. In addition, students will normally further apply their problem solving and analytical skills in the fourth year Individual Project.

Throughout the course, students will gain an appreciation of the social, environmental, ethical, economic and commercial considerations impacting on real world problem solving activities and will be able to place their activities within a broader picture. These aspects are embedded in a variety of modules but are explicitly addressed in the Year 1 Introduction to Modelling and Problem Solving module, the Year 2 Group Project and the Year 4 Individual Project.

A wide range of practical skills are delivered including advanced computer analysis practice and programming skills which form an integral part of the study and application process at all levels. Computer aided solutions are derived in Introduction to Modelling and Problem Solving, Mathematical Programming and Applied Mathematics in Year 1 as well as in the Group Project, Operational Research, and Advanced Statistical Analysis in Year 2. Analytical and transferable problem solving skills are further developed along with computer-based analysis in the final year of the course. Project-based assignments are incorporated in all years of the programme.

During Year 1 students will build an online PDP during the ‘Introduction to Modelling and Problem Solving’ module. This will be enhanced in the second year in the ‘Year 2 Group Project (Mathematics)’ and monitored through the interaction with placement unit and Personal Academic Tutors in Year 2. During the final year, support will be given through final year project supervision sessions to maintain and further enhance the PDPs.

The modules on years 1, 2 and 4 of the course are delivered over a 24-week teaching period followed by a 3-week assessment period. Year 3 of the programme comprises a monitored Professional Placement with a minimum duration of 48 weeks. The professional placement does not contribute to the final degree classification but is recognised in the ‘Sandwich’ award.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code: | Title: | Type | Credits | Semester |
| Year 1 Full Time - Foundation Level |  |  |  |
| CFM2101 | Introduction to Modelling and Problem Solving | Core | 20 | 1 & 2 |
| CFM2102 | Calculus | Core | 20 | 1 |
| CFM2103 | Mathematical Programming | Core | 20 | 2 |
| CFM2104 | Applied Mathematics | Core | 20 | 1 & 2 |
| CFM2105 | Linear Algebra | Core | 20 | 1 & 2 |
| CFM2106 | Probability Theory and Statistical Analysis | Core | 20 | 1 & 2 |
| Year 2 | Full Time - Intermediate Level |  |  |  |
| CIM2201 | Real Analysis | Core | 20 | 1 & 2 |
| CIM2202 | Mathematical Methods and Modelling | Core | 20 | 1 & 2 |
| CIM2203 | Advanced Statistical Methods | Core | 20 | 1 & 2 |
| CIM2204 | Operational Research  | Core | 20 | 1 & 2 |
| CIM2205 | Asymptotic and Perturbation Methods | Core | 20 | 1 & 2 |
| CIM2206 | Group Project  | Core | 20 | 1 & 2 |
| Year 3 Optional - Sandwich Year |
| CSP2010& CSP2020or CSP2025 | Industrial Placement*or*Enterprise in Action |  | NA | 1 & 2 |
| Year 4 Full Time - Honours Level |  |  |  |
| CHM2401 | Applied Data Analysis  | Core | 20 | 1 & 2 |
| CHM2402 | Partial Differential Equations | Core | 20 | 1 & 2 |
| CHM2403 | Big Data Analytics | Core | 20 | 1 & 2 |
| CHM2404 | Numerical Analysis | Core | 20 | 1 & 2 |
| CHM2405 | Individual Project | Core | 40 | 1 & 2 |

**Programme Level and Awards**

BSc (Hons) will be awarded upon successful completion of modules which give the student 360 academic credits at foundation and post-foundation level. These credits must include 120 at honours level, including the credits from the relevant Year 4 Individual Project module.

BSc will be awarded upon successful completion of modules totalling 300 academic credits at foundation and post-foundation level. These credits must include 60 at honours level.

DipHE (Diploma of Higher Education) will be awarded to students gaining 240 credits of which at least 120 must be I and/or H level.

CertHE (Certificate of Higher Education) will be awarded to students gaining 120 foundation level credits

The class of award is determined at the Course Assessment Board. Classification will be determined from an average of the marks obtained from the second year I level modules and final year H level modules. The averages for each stage will be calculated from the best 100 credits, with the proviso that not more than 100 credits can be counted from any one academic year of study.

The class of award is determined at the Course Assessment Board in accordance with the guidelines outlined in the “Regulations for Awards” on the Registry website as follows: <http://www.hud.ac.uk/media/universityofhuddersfield/content2013/services/registry/V1%20Sept%202013.pdf>

The aggregate percentage mark and the relevant classification for BSc will be as follows:

 > 70 First Class

 60 - 69 Upper Second Class

 50 - 59 Lower Second Class

 40 - 49 Third Class

 < 40 Unclassified

Students who enter directly into the third year will be classified based on the average of the marks from the best 100 level credit marks.

The Industrial Placement in Year 3 is assessed and contributes to the award classification in line with the University regulations. The placement is optional but it is recommended.

###### 14 Teaching, Learning and Assessment

A variety of teaching and learning strategies are used appropriate to the nature of the material being delivered. The nominal mean workload on students is 10 hours per credit.

Typically, lectures are used as a mechanism to deliver key facts, concepts, theories and methodologies. These may be backed up by tutorial and/or practical sessions. These sessions allow students to develop their skills, to receive feedback on their progress and to take ownership of their own learning.

In some subject areas, particularly the group-based module, teaching may be studio-based and/or delivered using group seminars.

Use is made of IT resources in teaching across the full range of subjects. This may be in the form of materials made available via the VLE, electronic forums, simulations and examples. Students are introduced to the University and Departmental systems for C&IT through induction and in the Introduction to Modelling and Problem Solving module.

Formative assessment will be provided in a variety of ways. Whenever practical, students will be given individual feedback on their progress prior to formal assessment. This may be in the form of oral feedback on work reviewed in a tutorial, seminar or studio session or written feedback on a piece of work submitted prior to assessment. Formative assessment is a student driven process.

Assessment is used to determine if students have achieved the learning outcomes of individual modules and hence, the learning outcomes of the programme. A number of forms of assessment are used. These may include portfolios of work, essays, reports on group work, audio-visual presentations (both individually and as a member of a group), computer based tests, short tests and formal examinations. In all cases, assessment is governed the University’s Regulations for Awards as reproduced in the [Students’ Handbook of Regulations](http://www2.hud.ac.uk/registry/students_handbook.php).

The assessment to be used in individual modules is indicated in appendix E.

The University complies fully with the Special Educational Needs and Disabilities Act (2001). The wide variety of delivery and assessment methods used makes the course accessible to students with a range of special educational needs and/or disabilities.

###### 15 Support for students and their learning

All students are assigned a Personal Academic Tutor. The role of the personal academic tutor (PAT) in supporting students is seen as of primary importance. Students are encouraged to see their PAT about any problems they have which do or may affect their ability to study and learn. The tutor will keep track of any serious on-going issues, but respects student confidentiality. Students may see other staff about an issue if they feel more comfortable doing so; further information will be supplied in the Course Handbook. Students are encouraged to see academic tutors if they have difficulty understanding material or with coursework. Additional support includes:

**University Level**

A range of central facilities are provided to support students:

* Student Services provide specialist advice in the areas of counselling, disability, pastoral care and chaplaincy, accommodation, finance and careers; it also supports a day-care nursery and job shop for part-time work.
* The Learning Centre (library and computing facilities) provides induction and on-going support for students.
* The International Office provides help and support for overseas students.

**Programme Level**

* All students undertake an induction programme in year 1.
* All students have a Personal Academic Tutor, with whom they can discuss personal and academic difficulties and develop their PDP.
* Year Tutors are available to provide guidance on academic progress.
* Module Tutors are available to help with academic problems specific to the modules they deliver.
* An Academic Skills Tutor is available to provide assistance with generic study, and other, skills.
* A central computer-based attendance monitoring scheme is operated and students with poor attendance are contacted and advised.
* Student Guidance and Support Officers are available to help students who are experiencing difficulties with attendance and/or other aspects of their studies.
* Supporting documentation is provided in the form of student handbooks, module handbooks, programme specifications and module specifications.
* The virtual-learning environment, Brightspace, is used to support all modules and year groups.
* Lecture Capture is available for a large number of taught classes to aid student learning.
* The Placement Unit provide support throughout the application and placement process.

###### 16 Criteria for admission

The recruitment and admissions process endeavours to ensure a good match between the abilities and aptitudes of the applicants and the demands of the programme. The aim is to facilitate widening participation whilst ensuring that students can reasonably expect to succeed on their chosen course. Indicative admissions requirements will be: A-level BBB including Mathematics. BTEC DDD in Engineering or DDD in Science/Technology plus Mathematics A-level. Since these may be subject to change, definitive admissions requirements, including UCAS points equivalence, will be as given on the University web site (http://www.hud.ac.uk/courses).

###### 17 Methods for evaluating and improving the quality and standards of teaching and learning

**Quality and Standards**

* The University’s Teaching and Learning Committee has ultimate responsibility for quality and standards of teaching and learning in the University.
* The School Board, via the School Teaching and Learning Committee has responsibility for implementing University policy through School-defined procedures.
* Periodic School and subject reviews take place on a rolling quinquennial programme and focus inter alia on the arrangements for quality management and enhancement, teaching, learning and assessment, C&IT strategies, the articulation and assurances of standards, external examiner reports and evaluation and links with professional bodies, employers and other external organisations.

**Monitoring, Development and Evaluation**

The Course Committee is responsible for the monitoring and development of the course or programme, taking account of feedback from staff, students and external examiners. Feedback is sought as follows:

* From students through annual course and module evaluation questionnaires, termly Student Panel meetings, input from student members of the Course Committee and the National Student Survey.
* From external examiners through annual reports, course assessment board minutes, assessment moderation reports and informal communication during the year.
* From Professional Standards and Review Bodies through quinquennial reaccreditation visits.

Annual evaluation of the programme is the responsibility of the School Board. The Course Committee prepares an annual evaluation report comprising reporting and evaluation, informed by feedback from staff, students and external examiners and by statistical data.

**Validation of Courses, Modules and Changes**

Course validation takes place under the University's [Quality Assurance Procedures for Taught Programmes](http://www2.hud.ac.uk/registry/quality_assurance_regulations.php). Amendments to programme and module documents are validated by the School Accreditation and Validation Panel.

**Teaching and Learning**

The School Teaching and Learning Committee is tasked with implementing the University's teaching and learning strategy and with fostering innovation in teaching and learning and the dissemination of good practice.

**Staff Development Priorities Include**

Staff Annual Appraisal and institutional staff development courses

Fellowship of the Higher Education Academy

Updating professional developments

Regular course meetings and annual review and planning for subsequent academic year

Engagement in subject specific research conferences, including pedagogical research.

###### 18 Regulation of assessment

Assessment regulations are as detailed in the University of Huddersfield [Regulations for Awards](http://www.hud.ac.uk/registry/regulationsandpolicies/awards/), relevant sections of which are repeated in the [Students’ Handbook of Regulations](http://www.hud.ac.uk/registry/regulationsandpolicies/studentregs/).

Details of the assessment schedule and outcomes assessed for each module are provided in the module specification documents.

***Role of External Examiners***

External Examiners are appointed by the University Teaching and Learning Committee.

External Examiners are appointed from the academic community with responsibility for all modules on the course. The role of the External Examiner is that of moderator. In order to do this they:

- approve examination papers

- review coursework and examination scripts

- Contribute to discussion of borderline candidates for award

- attend the Course Assessment Board.

###### 19 Indicators of quality and standards

Reports of validation panels

Annual course reviews

Annual evaluation report

External examiners’ reports

Qualifications and experience of staff

Report on University Review

The program will be offered for accreditation by the Institution of Mathematics and its Applications (IMA). Accreditation will normally constitute quintennial external audit/review.

In the periods between professional institution accreditation visits, quality will be monitored and maintained via the external examining system. The teaching quality of staff responsible for delivering course modules will be assured by a mandatory FHEA requirement. An additional quality indicator will be the significant involvement in the delivery of the programme of staff contributing to Research Excellence Framework submissions.

**Please note: This specification provides a concise summary of the main features of the Programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the study module guide(s) and course handbook. The accuracy of the information contained in this document is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.**

**Key sources of information about the course can be found in:**

Student Handbook (Issued yearly)

University of Huddersfield Student Handbook of Regulations (issued yearly)

University of Huddersfield Prospectus (issued yearly)

[www.hud.ac.uk](http://www.hud.ac.uk) - University website

http://compeng.hud.ac.uk/internal-student/ - the School of Computing and Engineering intranet contains Year Handbooks and Module Specifications.

Appendix 1. Staffing and management

**Management of Programmes**

The management structure for the BSc (Hons) Mathematics course operates within the Department of Computer Science within the School of Computing and Engineering.

**Course Committee**

The Course will be under the overall management of the Course Committee which meets at least once per term and is responsible for any decisions concerning the suitability of modules for inclusion on the Course. The chair of that Committee is normally the Subject Area Leader (SAL). The SAL will implement policies and decisions of that committee and be responsible for overseeing the day to day running of the course in collaboration with the Course Leader. Feedback from student representatives is a standing item on the agenda.

**Course Leaders** are responsible to the Course Committee for the proper management and monitoring of each year of the Course. They will be responsible for advising students of their choice of modules and for support, guidance and counseling when appropriate. The Individual Project tutor is responsible for the co-ordination and administration of the final year project. They will be responsible for allocating project supervisors to each student and will co-ordinate and oversee the assessment of the project.

**Module Leaders** will arrange and co-ordinate the teaching programme for the module(s) for which they are responsible, and maintain appropriate records. Module leaders meet on a regular basis with the teaching team involved in the delivery of the module and with the Course Leader. The Module Leader also seeks feedback from student representatives regarding the module. Module Leaders prepare annual reports for the modules for which they are responsible and which subsequently feeds into the Annual Evaluation process.

**Personal Academic Tutors (PATs)** are allocated to all first year students by the Course Leader and are retained in Years 1, 2 and 3. In the final year it is the project supervisor.

**Admissions Officer** is responsible, through the Course Leader, to the Course Committee for the proper processing of all applications for admission to the Course.

Appendix 2. Mapping of learning outcomes on to modules

|  |  |  |
| --- | --- | --- |
| Year 1 Full Time - Foundation Level |  |  |
| CFM2101 | Introduction to Modelling and Problem Solving | Core | 20 Credits |
| CFM2102 | Calculus | Core | 20 Credits |
| CFM2103 | Mathematical Programming | Core | 20 Credits |
| CFM2104 | Applied Mathematics | Core | 20 Credits |
| CFM2105 | Linear Algebra | Core | 20 Credits |
| CFM2106 | Probability Theory and Statistical Analysis | Core | 20 Credits |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Learning Outcome | CFM2101 | CFM2102 | CFM2103 | CFM2104 | CFM2105 | CFM2106 |
| 1 |  | √ | √ | √ | √ | √ |
| 2 | √ |  |  |  | √ | √ |
| 3 | √ |  |  |  |  | √ |
| 4 |  |  | √ |  | √ |  |
| 5 | √ |  | √ | √ | √ |  |
| 6 | √ | √ | √ | √ | √ |  |
| 7 |  | √ | √ | √ | √ | √ |
| 8 | √ |  | √ |  | √ | √ |
| 9 | √ | √ | √ |  | √ | √ |
| 10 | √ | √ |  | √ | √ |  |
| 11 | √ |  |  |  |  | √ |
| 12 | √ |  |  |  |  | √ |
| 13 | √ |  | √ |  | √ |  |
| 14 | √ | √ |  |  |  |  |
| 15 | √ |  |  |  |  | √ |
| 16 |  |  | √ |  | √ | √ |
| 17 | √ | √ |  |  |  |  |
| 18 | √ |  | √ |  |  |  |
| 19 | √ |  | √ |  |  | √ |
| 20 | √ |  |  |  |  | √ |

|  |  |  |
| --- | --- | --- |
| Year 2 Full Time - Intermediate Level |  |  |
| CIM2201 | Real Analysis | Core | 20 Credits |
| CIM2202 | Mathematical Methods and Modelling | Core | 20 Credits |
| CIM2203 | Advanced Statistical Methods | Core | 20 Credits |
| CIM2204 | Operational Research  | Core | 20 Credits |
| CIM2205 | Asymptotic and Perturbation Methods | Core | 20 Credits |
| CIM2206 | Group Project  | Core | 20 Credits |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Learning Outcome | CIM2201 | CIM2202 | CIM2203 | CIM2204 | CIM2205 | CIM2206 |
| 1 | √ | √ |  |  | √ |  |
| 2 |  | √ | √ |  |  | √ |
| 3 |  |  |  | √ |  | √ |
| 4 |  |  | √ |  |  | √ |
| 5 |  |  | √ | √ | √ | √ |
| 6 | √ | √ |  | √ | √ | √ |
| 7 | √ | √ |  |  | √ |  |
| 8 |  |  | √ |  |  | √ |
| 9 |  |  | √ |  |  | √ |
| 10 |  |  |  |  |  | √ |
| 11 |  | √ | √ |  | √ |  |
| 12 |  |  | √ |  |  | √ |
| 13 |  |  | √ |  |  | √ |
| 14 |  |  |  |  | √ | √ |
| 15 |  |  |  |  | √ | √ |
| 16 |  |  | √ |  |  |  |
| 17 | √ |  | √ |  |  | √ |
| 18 |  |  | √ |  |  | √ |
| 19 |  |  |  | √ |  | √ |
| 20 |  | √ |  |  |  | √ |

|  |  |  |
| --- | --- | --- |
| Year 4 Full Time - Honours Level |  |  |
| CHM2401 | Applied Data Analysis | Core | 20 Credits |
| CHM2402 | Partial Differential Equations | Core | 20 Credits |
| CHM2403 | Big Data Analytics | Core | 20 Credits |
| CHM2404 | Numerical Analysis | Core | 20 Credits |
| CHM2405 | Individual Project | Core | 40 Credits |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Learning Outcome | CHM2401 | CHM2402 | CHM2403 | CHM2404 | CHM2405 |
| 1 |  | √ |  | √ |  |
| 2 | √ |  | √ |  |  |
| 3 | √ |  | √ |  | √ |
| 4 | √ |  | √ | √ |  |
| 5 | √ | √ | √ |  |  |
| 6 |  | √ |  | √ |  |
| 7 |  | √ |  | √ |  |
| 8 | √ |  | √ |  | √ |
| 9 |  | √ |  |  | √ |
| 10 | √ |  | √ |  | √ |
| 11 | √ |  | √ |  | √ |
| 12 | √ |  | √ | √ |  |
| 13 | √ |  | √ | √ | √ |
| 14 | √ |  | √ | √ | √ |
| 15 |  | √ |  | √ |  |
| 16 | √ |  | √ | √ |  |
| 17 | √ |  | √ |  | √ |
| 18 | √ |  | √ |  | √ |
| 19 | √ |  | √ |  | √ |
| 20 |  |  |  | √ | √ |

Appendix 3. Assessment strategies for modules

**YEAR ONE – FOUNDATION LEVEL MODULES**

|  |  |  |
| --- | --- | --- |
| **Module** **Code** | **Module Title** | **Assessment Weighting** |
| **Exam** | **CW** |
| CFM2101 | Introduction to Modelling and Problem Solving |  | 100 |
| CFM2102 | Calculus |  | 100 |
| CFM2103 | Mathematical Programming |  | 100 |
| CFM2104 | Applied Mathematics | 50 | 50 |
| CFM2105 | Linear Algebra | 50 | 50 |
| CFM2106 | Probability Theory and Statistical Analysis | 50 | 50 |

**YEAR TWO – INTERMEDIATE LEVEL MODULES**

|  |  |  |
| --- | --- | --- |
| **Module****Code** | **Module Title** | **Assessment Weighting** |
| **Exam** | **CW** |
| CIM2201 | Real Analysis | 50 | 50 |
| CIM2202 | Mathematical Methods and Modelling | 50 | 50 |
| CIM2203 | Advanced Statistical Methods | 50 | 50 |
| CIM2204 | Operational Research  | 50 | 50 |
| CIM2205 | Asymptotic and Perturbation Methods | 50 | 50 |
| CIM2206 | Group Project  |  | 100 |

**YEAR 4 – HONOURS LEVEL MODULES**

|  |  |  |
| --- | --- | --- |
| **Module****Code** | **Module Title** | **Assessment Weighting** |
| **Exam** | **CW** |
| CHM2401 | Applied Data Analysis  | 50 | 50 |
| CHM2402 | Partial Differential Equations | 50 | 50 |
| CHM2403 | Big Data Analytics |  | 100 |
| CHM2404 | Numerical Analysis | 50 | 50 |
| CHM2405 | Individual Project |  | 100 |

# OUTLINE ASSESSMENT SCHEDULE (SAMPLE) BSc(hons) Mathematics Year 1

**These are sample dates and would need to be adjusted to fit with other classes for shared modules within the undergraduate framework.**

|  |  |  |
| --- | --- | --- |
| **Week** | **Module(s)** | **Summative Assessment** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **5** |  |  |
| **6** |  |  |
| **7** |  |  |
| **8** | CFM2103 | Mathematical Programming Component 1: Portfolio 30% |
| **9** |  |  |
| **10** |  |  |
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| **13** |  |  |
| **14** |  |  |
| **15** |  |  |
| **16** | CFM2103 | Mathematical Programming Component 2: Portfolio 30% |
| **17** | CFM2201 | Linear Algebra Component 1:Coursework 50% |
| **18** |  |  |
| **19** |  |  |
| **20** |  |  |
| **21** |  |  |
| **22** |  |  |
| **23** |  |  |
| **24** | CFM2103 | Mathematical Programming Component 3: Portfolio 30% |

Additionally, CFM2101, CFM2104, CFM2105 and CFM2106 have a summer examination, each contributing 50% towards the relevant module mark, which will take place in weeks 37 to 39 (inclusive).

# OUTLINE ASSESSMENT SCHEDULE (SAMPLE) BSc(hons) Mathematics Year 2

**These are sample dates and would need to be adjusted to fit with other classes for shared modules within the undergraduate framework.**

|  |  |  |
| --- | --- | --- |
| **Week** | **Module(s)** | **Summative Assessment** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **5** |  |  |
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| **20** |  |  |
| **21** |  |  |
| **22** |  |  |
| **23** |  |  |
| **24** |  |  |

# OUTLINE ASSESSMENT SCHEDULE (SAMPLE) BSc(hons) Mathematics Year 4

**These are sample dates and would need to be adjusted to fit with other classes for shared modules within the undergraduate framework.**

|  |  |  |
| --- | --- | --- |
| **Week** | **Module(s)** | **Summative Assessment** |
| **1** |  |  |
| **2** |  |  |
| **3** | CHM2405 | Year 4 Individual Project-Coursework Component 1 |
| **4** |  |  |
| **5** |  |  |
| **6** |  |  |
| **7** |  |  |
| **8** |  |  |
| **9** | CHM2403 | Big Data Analytics-Coursework Component 1 |
| **10** |  |  |
| **11** |  |  |
| **12** | CHM2404 | Numerical Analysis – Coursework Component |
|  |  |  |
| **13** |  |  |
| **14** | CHM2403 | Big Data Analytics-Coursework Component 2 |
| **15** | CHM2405 | Year 4 Individual Project-Coursework Component 2 |
| **16** |  |  |
| **17** |  |  |
| **18** | CHM2403 | Applied Data Analysis – Summative Case Study Coursework. |
| **19** |  |  |
| **20** |  |  |
| **21** | CHM2403 | Big Data Analytics-Coursework Component 3 |
| **22** |  |  |
| **23** |  |  |
| **24** | CHM2405 | Year 4 Individual Project-Coursework Component 3 |