\Year 2

Computing:

Algorithm Design and Analysis

Models of Computation

Compilers

Symbolic Reasoning

Computational Techniques

Networks and Communications

Mathematics (for JMC):

Multivariable Calculus

Real Analysis

Linear Algebra

Differential Equations

Complex Analysis

Numerical Analysis

Network Science

Lebesgue Measure

Statistical Modelling

Partial Differential Equations in Action

----- BELOW IS FOR OLDER COURSES -----

kn

••••••••••Honest opinions and experiences from people on the other side to help you choose your course. Please take all opinions with a pinch of salt or ignore them. Whatever.

[Year 2](#_Toc129760614)

[CO202 Algorithms II (JMC Option)](#_Toc129760615)

[CO526 Databases (JMC Option)](#_Toc129760616)

[CO233 Computational Techniques (Computing Option)](#_Toc129760617)

[CO231 Introduction to AI (Computing/JMC Option)](#_Toc129760618)

[**Mathematics**](#_Toc129760619)

[Autumn](#_Toc129760620)

[M2AA2 Multivariable Calculus](#_Toc129760621)

[M2PM1 Real Analysis](#_Toc129760622)

[Spring](#_Toc129760623)

[M2S2 Stats Modelling 1](#_Toc129760624)

[M2PM3 Complex Analysis](#_Toc129760625)

[M2AM Non-Linear Waves / PDEs in Action](#_Toc129760626)

[Numerical Analysis](#_Toc129760627)

# Year 2

## CO202 Algorithms II (JMC Option)

~~Pretty chill, literally Leetcode.~~  Not applicable anymore; this is now a required course for Computing students (however remains optional for JMC students). Also the 2018-19 exam was not chill (I swear to god Madhi fooled us all) ... the courseworks are easy however, and the course is copied from Introduction to Algorithms by Cormen et al (known popularly as CLRS). Requires a fair amount of theoretical knowledge but pseudocode answers can literally be bullet points/paragraphs if you don’t like writing actual code 😛

Was in Mahdi’s first year. Very useful course IMO, goes into some popular algorithmic approaches to questions and different types of algorithms - builds well off Graphs and Algorithms from First Year. Having been in the 18/19 year, I’d say Mahdi has an emphasis on the more mathematical side of algorithms i.e. the actual problem solving side of things. His tutorials show this. I’d say the exam is in between the difficulty of papers before 2018 and his tutorial sheets - personally found it very hard but more because of time constraints - make sure you can rattle off the algorithms (like Floyd-Warshall or Ford-Fulkerson) very quickly.

-Avish (18/19)

If he starts talking about LOTR, you can take a nap for the rest of the lecture - Andy

## CO526 Databases (JMC Option)

Covers all of CO130 Databases, however goes more in depth on relational algebra and also covers concurrency control and recovery. Courseworks are quite easy, however I’d say there is a fair amount of content to revise for the exam. Bear in mind, in the exam you pick 3 questions out of 4 (so you can skip an entire chapter or two in your revision). Note if you don’t take this in 2nd year, you can take it in 3rd year.

Lectures consist of going through the content, mentimeter questions (useful ones! I’d make a note of answers during lectures so you don’t have to rewatch panopto), and doing worksheets. Lecturer (Peter McBrien) is decent. Stay up to date with worksheets and you should be fine. Peter goes through them in class but doesn’t publish the answers properly until the end of term. Courseworks are very doable (I wouldn’t say easy but spend a couple evenings on them and you should be fine N.B. the courseworks tend to pile up alongside WACC around mid Feb - early March, start all CWs ASAP). Unlike the person above, I woulfaldn’t say there’s a great deal of content, it’s more logical so once you know definitions, syntax and equivalences, practice questions.

-Avish (18/19)

I really enjoyed this course. Found myself stressing out for the exam because I thought there was hella content, but I found the content quite interesting and useful. McBrien provides lots of tutorials and worksheets which is very useful for revision.

## CO233 Computational Techniques (Computing Option)

Definitely take this module if you’re serious about machine learning or computational science. Also, bear in mind that you should definitely tackle problems for **every** examinable topic covered there, **even if neither tutorials nor past papers mention it**. In our year, some of us were surprised by one specific topic coming up in the exam (35% of 50% of all marks) since it wasn’t touched at all in tutorials/coursework and it didn’t appear in any of the recent past papers. - Maks (19/20)

So the courseworks are quite difficult, and require a lot of thinking. Definitely take it if you're good at matrices/vectors. Lots of past papers as the content hasn't changed for the last 10 years. Lots of available online resources to help where the lecturers may not be clear.

Quite a useful module as it’s basically just linear algebra with a few extra bits. The lecturers can make it kind of boring and easy to get lost but the papers tend to focus on just applying mathematical methods with the odd proof here and there. Overall the course isn’t too bad but is quite daunting at first. - Sam

I lectures themselves lost me for the most part but the content is relatively straightforward when you can sit down and go through it at your own pace with a Khan Academy video and some of the many other resources available online. Weekly courseworks were good at making sure I kept on-top of the course content. There are a tonne of questions to use for practice and the exams have been straightforward for every year so far. DO NOT take if you struggled with the linear algebra section of maths methods as this is more of that. - Joe (18/19)

Very difficult yet useful course. I would advise trying to stay on top of lectures and coursework as it does get very content heavy and confusing near the end. Good collection of past papers so you can practice plenty. Weekly meetings are also very useful and highly recommended.

## CO231 Introduction to AI (Computing/JMC Option)

I think this module is called Symbolic Reasoning now. I very much enjoyed it, and Ally and Dalal both give amazing lectures. The teaching quality was way better than Comp Tech (lol). Dalal’s part on ASP was quite definition-heavy, but overall the lectures and exam were pretty chill. It is a good prerequisite for software verification or the symbolic side of AI (which is quite popular at Imperial). -- Hengzhi (22/23)

I recommend it if you’re not keen to do more of what was done during Math Methods in first year. If you enjoy the coursework “Introduction to Prolog” at the beginning of the second year and want to do more prolog then I recommend AI. That being said, the lecturers aren’t great and the entire course is copied from a book. The lectures are also **not on Panopto** which could be annoying for some people. Overall, it’s a safe choice if you don’t want to do Comp tech.

Be warned, this course is NOT about Machine Learning.

People advised against this course saying the exam went poorly in 2018, but I found the course really interesting and the exam in 2019 was fair and quite doable based on the teaching and tutorials.

The lecturers don’t use Panopto, but the lecture notes are quite extensive and parts of the course follow some of the recommended reading very closely, so you can use that for revision. I’d still recommend attending all the lectures, the lecturers seem really passionate about what they teach and the lectures are sometimes interleaved with tutorials.

There are some proof systems/algorithms that you’ll need to apply by hand in the exam. There are many tutorial questions for these, so make sure you can do these pretty much automatically, cause you’ll need to focus on writing quickly, not thinking for that part of the exam.

Overall also a good choice for JMC, if you don’t want to do Compilers (you have to do WACC anyway).

Personally my favourite course, the lecturers are really passionate about what they teach. Really helpful in tutorials too, I'd ditch lectures and go to tutorials as a lot of tutorial stuff usually comes up in the exam. Francesca redid her part, imo slides aren’t the best but she explains the content well in lectures. The first coursework is all prolog but in tutorials you can go ask lecturers for help. The second coursework was a bit longer but followed exam patterns so was very useful. I don’t like maths so personally eally enjoyed it – Kriti (19/20)

# **Mathematics**

# Autumn

## M2AA2 Multivariable Calculus

Lecturer is pretty decent, explains everything well. Notes are really good (he gives them unfilled out each week, but go to MathSoc website for the entire set). Everything meta about the module is excellent.

The maths itself though, can be really difficult and confusing. Requires a lot of time to understand. Has many parts which can be extremely fiddly and irritating. Understanding at a level above will help a lot (i.e. intuition & visualization), go to Khan Academy for some **👌** explanations of this. Although once you do understand this stuff, this module becomes super interesting and cool.

Ontop of this, the exam is actually killer, I’ve heard it’s known as the worst exam you will take through the entire degree. Has many questions basically no one gets. Scaling should save you tho so don’t worry about the exam too much tbh, it will be fair. And it’s been the same for like 50 years so you can churn up as many past papers as you like.

Definitely take if you have any interest in applied whatsoever (it’s essential). And supports a lot of computing topics well if you have more interest in that side.

*Clovis PJ - Took exam in 2019*

## M2PM1 Real Analysis

Awesome course, even if you didn’t like analysis in M1J1/2 this is worth a shot. Extremely rigorous - take this if the hand-waving in M2AA2 annoys you, this is the pure option whereas M2AA2 is more applied. Not really required for any future modules but useful for complex analysis/topology. Really hard at first but everything clicks at around halfway through, once you get epsilon-delta proofs down (it’s only a matter of time/practice). Nicaise is awesome, really engaging and approachable, he knows it’s hard so makes it as intuitive as possible. This is THE course to learn how to properly write proofs. Exam is basically guaranteed >70% if you understand the content, memorisation/formulae not required.

Topics: sequences and convergence, functions and continuity/limits, differentiation and integration in R^n. Basically M2AA2 (can you tell I don’t like it?) wouldn’t exist without this course propping it up! Also take if you want to be able to make physicists cry, they just assume everything continuous is differentiable but [WE KNOW BETTER](https://en.wikipedia.org/wiki/Weierstrass_function).

*Omar Tahir - 18/19*

# Spring

## M2S2 Stats Modelling 1

Lectures are a bit alternative in style. You are expected to go through notes beforehand, then complete quizzes (which count towards the coursework grade). Then lectures themselves just go through it at a high level or do questions. Depends on how you learn, if this style fits you.

The notes are really good, they have all the details and are very clear. And the coursework supports the content well. Problem sheets are okay. They can be kinda tricky and irrelevant, but do provide a lot deeper understanding and intuition. So do use them if you want to get good at stats, but not so much for the exam.

Exam is decent, not especially easy or hard, about right. Plenty of past papers.

The course is really useful, by far the most useful out of the three this term, and definitely take if you want to do stats in the future.

*Clovis PJ - Took exam in 2019*

Do not take this module if Ricardo Passeggeri (teaching from 2021) is still the lecturer. He has an obscure tendency to make up terms such as Second Order Assumptions (the correct term is Homoscedasticity), Normal Theory Assumptions, and other stuff that no one else uses. On top of that, he is generally ambiguous, makes typos in exams, makes typos in his announcement of typos in exams, etc.

*Freddy J 2021/22*

## M2PM3 Complex Analysis

Really interesting course, bad lecturer but AMAZING notes. Ari just copies from his printed slides (!) onto the visualiser, but his LaTeX notes that he uploads at the end of every week are just **👌**. First ¾ is super cool, last ¼ is literally just 47348 ways to integrate complex-valued functions. Doesn’t need real analysis at all. Real focuses on nitty-gritty rigour and pathological cases, whereas in complex you only deal with nice functions and how to integrate them. Kinda similar to the first third of M2AA2 but a bit more pure. Exam is tough, do lots of practice.

Topics: Holomorphic (i.e. analytic) functions, Laurent series, Mobius transformations, complex integration.

*Omar Tahir - 18/19*

## M2AM Non-Linear Waves / PDEs in Action

The content for this module is super interesting and follows on from MVC really well (so that’s basically a requirement). Its just lots more applied content (although perhaps less applicable than MVC outside maths itself). And if you’ve made it through MVC, this won’t be any harder, or conceptually that different.

However, everything meta about this module is pretty terrible, to be honest. The lecturer (if its still Carillo) knows his stuff, but is really all over the place. There’s no single source of truth for the content. Mix of old notes, typed, and new ones, handwritten. Assumes symbols and perquisites no one has seen. Problem sheets are a bit of a mess and aren’t helpful at all. Tbf problem classes are abandoned, so you can make use of the PhDs as much as you like. Most people give up on this course after a few weeks, as did I, so no idea about the exam.

Overall, I advise not to take. If you really like applied, just max out on it in third year. MVC will have set you up basically all you need. Unless things have changed for you guys **🤞.**

*Clovis PJ - exam would have been in 2019*

First year after curriculum change (2020/21): There’s a lot of useful content here, you get to practice content from 1st year calculus & MVC. However, bear in mind that the lecture notes are 160+ pages, there’s a lot of method memorisation required, and problem sheets provide 1 example per method. Past papers usually irrelevant but can get bits and pieces to practice on. Thibault did really well with preparing the online content, but still a lot of things to cover... Would still take it due to its useful nature (good to know how to solve basic PDEs) but would never count on getting a good grade on it.

\*2nd Year JMC who hasn’t decided yet here, any advice would be massively appreciated! \*

2020/2021 student: course content was enjoyable, however coursework and exam not so. The question sheets were fine, but when we came to the coursework and exam, they were at a much harder level than the question sheets he gave out, some taking a very long while to recognise as even being taught.

## Numerical Analysis

Useless. Avoid at all costs. The lecturer does not teach you well, his own PhD student needs to responds on Piazza in a format of “I asked Prof Schmidt and he says as follows: ...”. Interesting content, but simply taught in an incomprehensible way. Exams not based on problem sheets. Content from past papers examinable even if not taught (e.g., least squares for functions). Pass boundary of 25% last year says it all.

You just had to memorise all the methods with no grounding for them. The coursework was the only fun part of this course. Nothing else felt like it belonged there.

Sheehan Olver rebranded the course in 2021 and it’s a pretty good course now. He hosts all notes on GitHub; *please* learn to clone the repo (there are students who download the repo every time he updates the notes). Exam was chill and was very similar to problem sheets.

(<https://github.com/Imperial-MATH50003/MATH50003NumericalAnalysis>)

*Freddy J 21/22*