

## DEPARTMENT OF EARTH SCIENCE AND ENGINEERING

### MODULE AND PROGRESSION FOR 2023/2024

This document details the modules that students on different degree schemes in the Department of Earth Science & Engineering may take in 2023-2024.

Abbreviations used throughout:

EPS: Earth and Planetary Science

ES: Earth Science

G&G: Geology and Geophysics

DUGS: Director of Undergraduate Studies

#### YEAR 1

MODULE	ECTS	TERM
<i>All students:</i>		
Dynamic Earth and Planets	7.5	1 & 2
Stratigraphy & Geomaterials	7.5	1
Chemistry for Geoscientists OR Low Temperature Geochemistry <sup>*1</sup>	5	1
Mathematics for Geoscientists OR Maths Methods 1 <sup>*1</sup>	5	1
Deforming the Earth	5	2
Programming for Geoscientists	5	1
Physical and Surface Processes	7.5	2
Volcanism and Internal Processes	5	2
Geology in the Field	7.5	3
<i>Geology, PG:</i>		
Life over Deep Time	5	2
<i>Geophysics:</i>		
Maths Methods 2	5	2
<i>EPS:</i>		
Life over Deep Time OR Maths Methods 2 <sup>*2</sup>	5	2

<sup>\*1</sup> This choice depends on the A-levels of A-level equivalents that the student has studied prior to entry to Imperial College. Students with A-level Chemistry take Low Temperature Geochemistry; those without take Chemistry for Geoscientists. Students with A-level Maths take Maths Methods 1; those without take Mathematics for Geoscientists. In cases that are not clear-cut, the choice of module is taken in consultation with the DUGS.

<sup>\*2</sup> This choice determines the EPS stream that the student will be following; selection is made late in term 1 following briefings.

**All students may also take a Horizons module, but this is not for credit. Horizons modules take place on Tuesdays, 4-6pm. There are no associated timetable clashes with ESE modules.**

Note that other timetabled teaching (e.g. tutorials, workshops, briefings) occurs throughout the year, but is not associated with a formal module.

## YEAR 2

MODULE	ECTS	TERM
<b>All students:</b>		
High Temperature Geochemistry	5	1
Pure and Applied Geophysics	7.5	1 & 2
Solar System Geoscience	5	1
Maps and Structures	5	1
Remote Sensing Earth & Planets	5	2
<b>Geology/Geological EPS:</b>		
Igneous & Metamorphic Petrology [ <i>requires Palaeontology &amp; Opt. Min</i> ]	7.5	2
Sediments and Stratigraphy	7.5	1 & 2
Palaeontology and Optical Mineralogy	7.5	1 & 2
Rocks and Structures in the field ( <i>Pyrenees + Scotland fieldtrips</i> ) <sup>*1</sup>	10	3
<b>Geophysics/Geophysical EPS:</b>		
Mechanics and Waves [ <i>requires Maths Methods 2</i> ]	7.5	1 & 2
Maths for Scientists and Engineers [ <i>requires Maths Methods 2</i> ]	7.5	1 & 2
Seismology & Numerical Methods [ <i>requires Maths Methods 2</i> ]	7.5	2
Field Geophysics ( <i>Cyprus fieldtrip and data processing</i> )	10	3
<b>Earth Science:</b> <sup>*2</sup>		
Environmental Geochemistry and Climate Report	10	2 & 3

<sup>\*1</sup> EPS students are allowed to take Environmental Geochemistry and Climate Report instead of either Rocks & Structures in the Field or Field Geophysics. This is not normally recommended however, and numbers on Environmental Geochemistry and Climate Report may be limited. Please discuss with the DUGS if you wish to take this route.

<sup>\*2</sup> Earth Science students take Environmental Geochemistry and Climate Report instead of the field modules. Beyond that, they may take any combination of modules from the geology/ geophysics sections, as timetabling and pre-requisites allow, in discussion with the DUGS.

All students may also take a Horizons module, not for credit. Horizons modules take place on Mondays, 4-6pm. There are no associated timetable clashes with ESE modules.

Geology/Geological EPS may also take Maths Methods 2 (MM2) in term 2. This will not normally formally increase elective choice in years 3 and 4, but will better prepare you for more mathematical modules in those years. Taking MM2 is 'not for credit' – students attend lectures and practicals and optionally submit coursework, but do not take the exam. MM2 does not clash with any second year modules, but DOES clash with year 2 Horizons – students should not take a Horizons module if they wish to take MM2.

Note that other timetabled teaching (e.g. tutorials, workshops, preparation sessions for independent projects) occurs throughout the year, but is not associated with a formal module.

## YEAR 3

These are colour coded to give an indication of which degree streams normally take them, but most modules are open to most students. Fully red/green modules have pre-requisites that normally limit them to one degree stream, but these can be set aside in special cases, with the approval of the DUGS. Pale red/green modules are frequently taken by the other degree schemes.

Geological	Weakly Geol.	Both	Weakly Geophys.	Geophysical	EPS only				
<b>MODULE</b>						<b>ECTS</b>	<b>TERM</b>		
Independent Project (Mapping, Geophys, Earth Sci., Landing Site)						15	1		
I-Explore module						5	2 <sup>*1</sup>		
<b>THREE of the following first term modules:</b> <sup>*2</sup>									
Near Surface Seismic Imaging						5	1		
Continental Tectonics						5	1		
Advanced Remote Sensing						5	1		
Climate						5	1		
Mining Geology & Engineering						5	1		
<b>FOUR of the following second term elective modules:</b> <sup>*3</sup>									
Palaeobiology [ <i>requires Palaeontology &amp; Optical Mineralogy</i> ]						5	2	Level <sup>*4</sup>	Clash
Arc Magmatic Processes and Products [ <i>requires Ig. &amp; Met. Geology</i> ]						5	2	7	A
Planetary Surfaces [ <i>requires Sediments &amp; Stratigraphy</i> ]						5	2	7	B
Mining Environmental Management						5	2	6	C
Environmental Seminars <sup>*5</sup>						5	2	6	D
Sea Levels [ <i>requires Climate</i> ]						5	2	6	
Tectonics of the Oceans						5	2	7	
Geological and Coastal Engineering						5	2	7	
Geological Reactive Transport [ <i>requires Maths Methods 1</i> ]						5	2	6	
Data Science & Machine Learning for Geoscientists						5	2	6	
Geodynamics [ <i>requires Geophys. Maths, Mechanics and Waves</i> ]						5	2	6	A
Gravity, Magnetism & Orbital Dynamics [ <i>requires Geophys. Maths</i> ]						5	2	6	D
Planetary Physics [ <i>requires Geophys. Maths, Seismology &amp; N. Meth.</i> ]						5	2	7	B
Geophys. Fluid Dynamics of the Oceans [ <i>Requires Geophys. Maths</i> ]						5	2	6	C
<b>ONE of the following</b> <sup>*6</sup>									
Integrated Advanced Field Geology (Sardinia Fieldtrip)						5	3		
Comparative Planetary Science (Part Fieldtrip)						5	3		
Practical Seismic Data Processing [ <i>Requires Maths Methods 2 and Near Surface Seismic Imaging</i> ]						5	3		

Modules with the same letter code in the 'Clash' column are timetable clashes – students cannot take both (e.g. Palaeobiology and Geodynamics are both clash code 'A' – they are timetabled against each other, and both cannot be taken).

<sup>\*1</sup> Some I-Explore modules take place over both terms 1 and 2, though most are term 2 only. Students are very strongly encouraged to take their I-Explore in term 2.

<sup>\*2</sup> Climate is compulsory for Earth Science students. Advanced Remote Sensing is compulsory for EPS students. Near Surface Seismic Imaging is very strongly recommended for geophysics and geophysical-stream EPS students. Students on these degree schemes who do not take it will not be able to take Practical Seismic Data Processing or the year 4 Geophysical Analysis Project in term 3 (of years 3 and 4 respectively); they will need instead to take an extra term 2 elective in year 3, and either another extra term 2 elective in year 4, or the Apennines field course. Please discuss with the DUGS if you are considering these routes. There are no other restrictions in selection.

<sup>\*3</sup> If you are not taking a module in term 3 (some ES, Geophys, EPS – see <sup>\*7</sup> below) you take FIVE of these modules.

<sup>\*4</sup> Level 7 modules have a 50% pass-mark. College regulations require students on an MSci degree to take at least 60 ECTS of level 7 modules by the end of year 4. In practice, this means that you need at least 25 ECTS of level 7 second

term elective modules over years 3 and 4. Students on MSci degrees are very strongly advised to take at least two level 7 modules in their third year, otherwise they may find their choice restricted in year 4 because of this regulation.

<sup>\*5</sup> Environmental Seminars clashes with the main I-Explore slot – you may not take this module *unless* your I-Explore module does not clash. Environmental Seminars is normally numbers-limited (to 23 students).

<sup>\*6</sup> Geology students must take the Sardinia fieldtrip. Geophysics students are very strongly recommended to take Practical Seismic Data Processing, but may opt to take a fifth second-term elective instead after consultation with the DUGS. EPS students may take (a) Integrated Advanced Field Geology, (b) Comparative Planetary Science, (c) Practical Seismic Data Processing, or (d) a fifth second-term elective instead after consultation with the DUGS. Earth Science students may take (a) Integrated Advanced Field Geology, (b) Practical Seismic Data Processing, or (c) a fifth second-term elective instead after consultation with the DUGS.

Students re-entering year 3 after an interruption of studies will take a modified programme, agreed with the DUGS.

## YEAR 4

These are colour coded to give an indication of which degree streams normally take them, but most modules are open to most students. Fully red/green modules have pre-requisites that normally limit them to one degree stream, but these can be set aside in special cases, with the approval of the DUGS. Pale red/green modules are frequently taken by the other degree schemes.

Geological	Weakly Geol.	Both	Weakly Geophy.	Geophysical		
<b>MODULE</b>			<b>ECTS</b>	<b>TERM</b>		
MSci Project			30	1		
<i>FIVE of the following second term elective modules:</i> <sup>*1</sup>				Level <sup>*2</sup> Clash		
Palaeobiology [ <i>requires Palaeontology &amp; Optical Mineralogy</i> ]			5	2	7	A
Arc Magmatic Processes and Products [ <i>requires Ig. &amp; Met. Geology</i> ]			5	2	7	B
Planetary Surfaces [ <i>requires Sediments &amp; Stratigraphy</i> ]			5	2	6	C
Mining Environmental Management			5	2	6	D
Environmental Seminars <sup>*3</sup>			5	2	6	
Sea Levels [ <i>requires Climate</i> ]			5	2	7	
Tectonics of the Oceans			5	2	6	
Geological and Coastal Engineering			5	2	6	
Geological Reactive Transport [ <i>requires Maths Methods 1</i> ]			5	2	7	
Data Science & Machine Learning for Geoscientists			5	2	6	
Geodynamics [ <i>requires Geophys. Maths, Mechanics and Waves</i> ]			5	2	7	A
Gravity, Magnetism & Orbital Dynamics [ <i>requires Geophys. Maths</i> ]			5	2	6	D
Planetary Physics [ <i>requires Geophys. Maths, Seismology &amp; N. Meth.</i> ]			5	2	7	B
Geophys. Fluid Dynamics of the Oceans [ <i>Requires Geophys. Maths</i> ]			5	2	6	C
<i>ONE of the following two modules:</i> <sup>*4</sup>						
Field Geology of an Active Mountain Belt (Apennines Field Trip)			5	3		
Geophysical Analysis Group Project [ <i>Requires Seismic Processing</i> ]			5	3		

Modules with the same letter code in the 'Clash' column are timetable clashes – students cannot take both (e.g. Palaeobiology and Geodynamics are both clash code 'A' – they are timetabled against each other, and both cannot be taken).

<sup>\*1</sup> Students take six of these modules if they are not taking a 3<sup>rd</sup> term module (see <sup>\*5</sup> below)

<sup>\*2</sup> Level 7 modules have a 50% pass-mark. College regulations require students on an MSci degree to take at least 60 ECTS of level 7 modules by the end of year 4. In practice, this means that you need at least 25 ECTS of level 7 second term elective modules over years 3 and 4. It is your responsibility to ensure that this stricture has been met. Students re-entering year 4 after a year abroad should discuss this rule with the DUGS.

<sup>\*3</sup> Environmental Seminars is normally numbers-limited (to 23 students). This module runs in the 4-6 Thursday PM Horizons slot – students cannot Environmental Seminars if they have a timetable clash with this.

<sup>\*4</sup> Geology students are required to take the Apennines trip; other students will take either the Geophysical Analysis Group Project or the fieldtrip, or optionally (but not recommended) an extra term 2 elective, after consultation with the DUGS.

## PROGRESSION AND CALCULATION OF DEGREE RESULTS 2022-2023

Note – students whose entry year to Imperial is 2019 or later are governed by academic regulations laid down at college levels. See <https://www.imperial.ac.uk/about/governance/academic-governance/regulations/> for the latest version of these, and details of procedures relating to resit examinations (SQTs).

To progress to the next year, students must pass 60 ECTS of modules in that year (although see compensation rules below for exceptions). The pass mark for level 4-6 modules is 40%, and the pass mark for level 7 is 50%.

The overall year mark for each year (except year 3 for year abroad students) is calculated as the mean of all module marks, weighted by their ECTS value. The overall year mark is rounded to one decimal place.

To progress to the 3<sup>rd</sup> year of an MSci degree, or to transfer onto an MSci from a BSc degree, students must achieve a cumulative overall year mark of 60% or higher at the end of year 2 (under MSci weightings)

To progress to the 2<sup>nd</sup> year of a ‘Year Abroad’ degree, students must achieve an overall year mark of 70% or higher in year 1. Performance must also be highly satisfactory in the January examinations of year 2 in order to stay on the year abroad scheme.

To be awarded an MSci degree, students must achieve an overall year mark of 50% or higher in year 4.

The aggregate mark for the entire degree is calculated as the weighted mean of the overall year marks. Weightings are given in the table below:

	Year 1	Year 2	Year 3	Year 4
MSci students (entry year before 2019) *	1/9	2/9	3/9	3/9
BSc students (entry year 2019 or later)	7.5%	35%	57.5%	-
MSci students (entry year 2019 or later)	7.5%	20%	36.25%	36.25%

\* These weights are given as fractions to avoid recurring decimals

Final degree classification uses the following rules, supplemented by the ‘uplift criteria’ rules in Appendix A.

Third Class – a student must achieve an aggregate mark of 39.5% or higher

Lower Second Class – a student must achieve an aggregate mark of 49.5% or higher

Upper Second Class – a student must achieve an aggregate mark of 59.5% or higher

First Class- a student must achieve an aggregate mark of 69.5% or higher

### Compensation

In addition to the progression rules detailed above, the Examination Board may choose to apply *compensation*. Compensation is a mechanism by which a module can be passed and credit can be awarded by the Examination Board where the student has achieved a marginal failure. Where a student has achieved an aggregate module result of 30-39%, (40-49% for a level 7 module) the Examination Board can, at its discretion, award a compensated pass. A compensated pass cannot be offered for a core module. Compensated passes can be awarded for up to a maximum of 15 ECTS credits per credit level, and for year of study. Where a student has been awarded a compensated pass they cannot re-attempt that module. For the purposes of this compensation rule, but not for any other purposes, the following level 4 and 5 (year 1 and 2) modules are considered NOT to be core modules:

- Programming for Geoscientists (all degree schemes)
- Pure and Applied Geophysics (for all degree programmes except geophysics)
- Maps and Structures (for Geophysics and Earth Science degree programmes)
- Remote Sensing Earth and Planets (for all degree programmes except Earth & Planetary Science)

### Mitigating circumstances

Students with recorded mitigating circumstances are treated as special cases by the Board of Examiners, which may choose to modify normal progression and award rules.

## **Appendix A**

Undergraduate degree “borderline uplift algorithm” for students entry year 2019 or later.

This algorithmic approach is to be applied to all graduating students who do not have mitigating circumstances pertaining to their marks, and whose Overall Programme Weighted Average falls within 1.5% of the boundary mark as defined by the single set of academic regulations. These boundary marks are >69.49% for 1<sup>st</sup> class, >59.49% for upper 2<sup>nd</sup> class, >49.49% for lower 2<sup>nd</sup> class, and >39.49% for third class.

### **A) MSci degrees:**

Six indicators are established:

1. Overall year weighted average (OYWA) year 1 at next classification\*
2. OYWA year 2 at next classification
3. OYWA year 3 at next classification
4. OYWA year 4 at next classification
5. Year 4 median of module marks at next classification
6. Median of all module marks in the entire degree at next classification

If a student satisfies four or more of the six indicators and their Overall Programme Weighted Average lies within the borderline zone, they are promoted to the next classification

### **B) BSc degrees:**

Five indicators are established:

1. Overall year weighted average (OYWA) year 1 at next classification
2. OYWA year 2 at next classification
3. OYWA year 3 at next classification
4. Year 3 median of module marks at next classification
5. Median of all module marks in the entire degree at next classification

If a student satisfies three or more of the five indicators and their Overall Programme Weighted Average lies within the borderline zone, they are promoted to the next classification

### **Clarifications:**

1. For the purposes of the calculation of these indicators only, “at next classification” means >69.99% for 1<sup>st</sup> class, >59.99% for upper 2<sup>nd</sup> class, >49.99% for lower 2<sup>nd</sup> class, and >39.99% for third class.
2. Where MSci students undertook a ‘year abroad’ in their third year, the year abroad is excluded from the median mark calculation in indicator 6.