# Part IIB syllabuses; links to online resources

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Note that all modules are assessed by 100% Coursework, or 100% Examination, or 75% Examination and 25% Coursework. In all cases, the definitive form of assessment is given in the Faculty Board's Modules & Sets document. The Faculty Board will publish an outline of the coursework requirements for Part IIB 100% coursework modules (being updated, link to follow) but you should see the module syllabus pages for further details.

Engineering Areas

Course material on Moodle

## Group A: Energy, Fluid Mechanics and Turbomachinery

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4A2 | Computational fluid dynamics | M(1) | Coursework | 3A1, 3A3 | | Moodle | Dr J. Taylor |
| 4A3 | Turbomachinery I | M(4) | Exam and coursework | 3A1, 3A3 | | Moodle | Prof R.J. Miller |
| 4A4 | Aircraft stability and control | M(6) | Coursework | | | Moodle | Dr M Vera-Morales |
| 4A7 | Aircraft aerodynamics and design | M(8) | Coursework | 3A1, 3A3 | | Moodle | Dr J. Jarrett |
| 4A9 | Molecular thermodynamics | M(7) | Exam | | 3A1, 3A5 | Moodle | Dr A. J. White |
| 4A12 | Turbulence and vortex dynamics | L(3) | Exam | 3A1 | 3A3 | Moodle | Dr J Li |
| 4A13 | Combustion and engines | L(5) | Exam | | 3A5, 3A6 | Moodle | Prof N Swaminathan |
| 4A15 | Acoustics | L(11) | Exam | | | Moodle | Dr A Agarwal |

## Group B: Electrical Engineering

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4B2 | Power microelectronics | M(6) | Exam | | 3B3, 3B5 | Moodle | Prof F. Udrea |
| 4B5 | Quantum and Nano-technologies | M(11) | Exam | 3B5 | | Moodle | Dr L. Sapienza |
| 4B11 | Photonic systems | M(5) | Exam | | 3B6 | Moodle | Prof T. Wilkinson |
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| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4B19 | Renewable electrical power | M(2) | Exam | 3B4, 3B5 | 3B3, 3B6 | Moodle | Prof H Joyce |
| 4B23 | Optical Fibre Communication | L(2) | Exam and coursework | | 3F4, 3B6 | Moodle | Prof S J Savory |
| 4B24 | Radio frequency systems | L(4) | Exam and coursework | 3B1 | | Moodle | Dr M J Crisp |
| 4B28 | Very large scale integration (VLSI) | M(7) | Exam and coursework | 3B2 | 3B5 | Moodle | Dr M Tang |
| 4B29 | Wireless Communication | L(8) | Exam and coursework | | 3B2, 3F4 | Moodle | Prof O. Akan |

## Group C: Mechanics, Materials and Design

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4C2 | Designing with composites | M(3) | Exam and Coursework | | | Moodle | Prof A Markaki |
| 4C3 | Advanced Functional Materials and Devices | M(8) | Exam | | 3B5 | Moodle | Prof J H Durrell |
| 4C4 | Design methods | M(2) | Exam | | | Moodle | Prof J. Cullen |
| 4C5 | Design case studies | L(4) | Coursework | | | Moodle | Prof N. Crilly |
| 4C6 | Advanced linear vibrations | M(4) | Exam and Coursework | 3C6 | | Moodle | Dr J Talbot |
| 4C8 | Vehicle Dynamics | L(8) | Exam and Coursework | | 3C5, 3C6 | Moodle | Dr X Na |
| 4C11 | Data-driven and learning based methods in mechanics and materials | L(2) | Coursework | | 3C7, 3D7 | Moodle | Dr B Liu |

## Group D: Civil Engineering

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4D2 | Advanced structural design | L(3) | Coursework | 3D3, 3D4 | | Moodle | Prof SD Guest |
| 4D3 | Environmental Engineering | L(9) | Exam | 3D5 | | Moodle | Prof A Al-Tabbaa |

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|---|---|---|---|---|---|---|---|---|
| 4D5 | Deep Foundations and Underground Construction | M(8) | Exam | 3D2 | | | | Moodle |
| 4D7 | Concrete and Prestressed concrete | M(4) | Exam and Coursework | 2P8, 3D3 | | | | Moodle |
| 4D9 | Offshore Geotechnical Engineering | L(5) | Exam | 3D2 | | | | Moodle |
| 4D10 | Structural steelwork | M(3) | Exam and Coursework | 3D4 | | 3D3 | | Moodle |
| 4D13 | Architectural engineering | M(12) | Coursework | | | 3D3, 3D4, 3D8 | | Moodle |
| 4D15 | Water management under climate change | L(12) | Coursework | | | | | Moodle |
| 4D17 | Plate and shell structures | L(6) | Exam | | | | | Moodle |

## Group E: Management and Manufacturing

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4E1 | Innovation and strategic management of intellectual property | M(9) | Coursework | | | Moodle | Dr F Tietze |
| 4E4 | Management of technology | M(9) | Exam | | | Moodle | Dr L. Mortara |
| 4E6 | Accounting and finance | M(2) | Exam | | | Moodle | Dr L Mischchenko |
| 4E11 | Strategic management | L(12) | Coursework | | | Moodle | Dr C Coleridge |
| 4E14 | Organisational Behaviour | L(12) | Coursework | | | Moodle | Dr C Ererdi |
| 4E15 | Environmental Sustainability and Business | M(9) | Exam | | | Moodle | Prof L Reisch |
| 4E16 | Operations Management | L(6) | Coursework | | | Moodle | Dr N Oraiopoulos |
| 4E17 | Managing Engineering risks in real life | L(12) | Exam | | | Moodle | Prof T Minshall |

## Group F: Information Engineering

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4F1 | Control system design | M(5) | Exam and Coursework | | 3F1, 3F2 | Moodle | TBC |
| 4F2 | Robust and nonlinear control | L(7) | Coursework | 3F2 | | Moodle | TBC |
| 4F3 | An optimisation based approach to control | L(11) | Exam | | 3F1, 3F2 | Moodle | Prof I Lestas |
| 4F5 | Advanced information theory and coding | L(6) | Exam | 3F7 | 3F1, 3F4 | Moodle | Prof A Guillen i Fabregas |
| 4F8 | Image processing and image coding | L(2) | Exam | 3F1 | 3F3, 3F7 | Moodle | Prof J Lasenby |
| 4F10 | Deep learning and structured data | M(6) | Exam | | 3F1, 3F3, 3F8 | Moodle | Prof M Gales |
| 4F12 | Computer vision | M(2) | Exam | | | Moodle | Prof R. Cipolla |
| 4F13 | Probablilistic Machine Learning | M(1) | Coursework | | 3F3 | Machine learning lecture notes<br><br>Moodle | Dr H Ge |
| 4F14 | Computer Systems | L(5) | Exam and Coursework | Part I Digital circuits and computing | | Moodle | Prof A H Gee |

## Group G: Bioengineering

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4G1 | Mathematical biology of the cell | M(7) | Coursework | | | Moodle | Dr T. Savin |
| 4G2 | Bioelectronics | L(9) | Coursework | | | Moodle | Prof G. Malliaras |
| 4G8 | Engineering Living Systems | L(4) | Exam | | | Moodle | Dr S Bakshi |
| 4G9 | Biomedical Innovation | L(11) | Coursework | | | Moodle | Dr T. Bashford |
| 4G10 | Brain Machine Interfaces | M(3) | Coursework | | 3M1, 3G3, 3F2, 3F8 | Moodle | Dr Y Ahmadian |

## Group I: Imported Modules

Note that these modules are all imported from other courses, and hence might be timetabled at unusual times and in unusual places, and have a different course structure to other IIB modules. Also, many of them have a cap on numbers. However, they do provide a tremendous opportunity to learn about a wider range of technology than the Engineering Tripos would otherwise provide.

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4I8 | Medical physics | L(8) | Exam | | 3G4 | Moodle | Prof G Treece |
| 4I10 | Nuclear reactor engineering | M(12) | Exam | 4M16 | | Moodle | Dr E Shwage |
| 4I11 | Advanced fission and fusion systems | L(12) | Coursework | 4I10 | | Moodle | Dr E Shwage |

## Group M: Multidisciplinary Modules

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4M1 | French | L(10) | Coursework | | | Moodle | Prof D Tual |
| 4M2 | German | L(10) | Coursework | | | Moodle | Mr J-M Bogdanovic |
| 4M3 | Spanish | M(10) | Coursework | | | Moodle | Mr S. Bianchi |
| 4M12 | Partial differential equations and variational methods | L(1) | Exam | | | Moodle | Prof J. Biggins |
| 4M16 | Nuclear power engineering | L(1) | Exam | | | Moodle | Dr P Cosgrove |
| 4M17 | Practical optimization | M(11) | Coursework | 3M1 | | Moodle | Prof G Parks |
| 4M19 | Advanced building physics | M(1) | Coursework | 3D8 | | Moodle | Prof G.R. Hunt |
| 4M21 | Software engineering and design | L(1) | Exam | | | Moodle | Dr E Punskaya |
| 4M22 | Climate change mitigation | M(11) | Coursework | | | Moodle | Prof J.M. Allwood |

| Module | | Term (set) | Form of assessment | Prerequisites | | On-line resources | Leader |
|---|---|---|---|---|---|---|---|
| Code | Title (linked to syllabus) | | | Assumed | Useful | | |
| 4M23 | Electricity and environment | L(6) | Coursework | | | Moodle | Prof M Pollitt |
| 4M24 | Computational statistics and machine learning | M(8) | Exam and coursework | 3F3, 3F8, 3M1 | | Moodle | Prof M Girola |
| 4M26 | Algorithms and data structures | L(3) | Exam | | | Moodle | Dr A Tewari |
| 4M29 | Designed to Lead | M(10) | Coursework | | | Moodle | Ms K Lanucha |

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