| SPECIFIC SELECTION CRITERIA FOR SECOND AND FIRST YEAR UNDERGRADUATE PRACTICALS | | | |
|---|---|---|---|
| **Term** | **Second year practicals** | **Term** | **First year practicals** |
| TT 22 | 2P9 XRD Detective (**SCS**, RSW) | TT 22 | 1P9 Energy Levels & Band Gaps (**AARW,** HB) |
| TT 22 | 2P10 SEM & Fracture (**TJM**, tbc) | TT 22 | 1P10 Fabrication & Testing (**JTC**, TJM) |
| TT 22 | 2P11 TEM (**J Haley,** PDN) | MT 22 | 1P1b Intro to Optical Microscopy, (**KAQOR**, SLP) |
| TT 22 | 2P12 Semiconductor Devices (**RSB**, tbc) | MT 22 | 1P2 Intro to LabVIEW (**AARW,** RSB) |
| MT 22 | 2P1 Materials Selection (**DEJA,** SCS) | MT 22 | 1P3 Young's Modulus (**TJM,** PDN) |
| MT 22 | 2P2 Steels (**C Salter**, MPM) | MT 22 | 1P4 Metallography (**B Jenkins,** AJW) |
| MT 22 | 2P3 Extrusion (**M Danaie,** MLG) | HT 23 | 1P5 Polymers (**NG**, HEA) |
| MT 22 | 2P4 Casting (**KAQOR**, MLG) | HT 23 | 1P6 Thermal Analysis (**E Liotti**, KAQOR) |
| HT 23 | 2P5 Diffusion (**TJM,** CRMG) | HT 23 | 1P7 Bubble Raft (**SCB**, MRC) |
| HT 23 | 2P6 Dislocations & Deformation (**MRC**, JTC) | HT 23 | 1P8 Electrode Potentials (**S Narayanan,** MP) |
| HT 23 | 2P7 Corrosion (**J Haley**, tbc) | | |
| HT 23 | 2P8 Mechanical Properties of Polymers (**HEA**, AARW) | | |

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| **TT** | 2P9: XRD Detective (**SCS**, RSW)<br>• Experience with XRD | 1P9: Energy Levels & Band Gaps (**AARW,** HB)<br>• Physics background with understanding of atomic spectra<br>• Experience of basic optics<br>• Knowledge of LED |
| | 2P10: SEM & Fracture (**TJM**, tbc)<br>• Experience of SEM imaging<br>• Knowledge of fracture mechanics and mechanisms<br>• Experience of working with liquid nitrogen | 1P10: Fabrication & Tensile Testing (**JTC**, TJM)<br>• Experience of workshop practice<br>• Knowledge of the mechanical properties of materials<br>• Experience of mechanical testing |
| | 2P11: TEM (**J Haley,** PDN)<br>• Experience with TEM | |
| | 2P12: Semiconductor Devices (**RSB**, tbc)<br>• Physics background with understanding of basic semiconductor devices<br>• Experience with basic electronic circuits<br>• Experience with data acquisition and LabVIEW | |

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| **MT** | **YEAR 2 (Mon, Tue, Wed)** | **YEAR 1 (Thur, Fri)** |
| | 2P1: Materials Selection (**DEJA,** SCS)<br>• Polishing metals<br>• Etching<br>• Optical microscopy<br>• SEM | 1P1b: Intro to Optical Microscopy (**KAQOR**, SLP)<br>• Experience of Microscopy<br>• Experience of preparing samples |
| | 2P2: Steels (**C Salter**, MPM)<br>• Experience of tensile testing<br>• Experience of polishing metal samples<br>• Experience of etching<br>• Experience of optical microscopy | 1P2: Intro to LabVIEW (**AARW,** RSB)<br>• A working knowledge of a programming language, ideally LabVIEW<br>• Experience with computer data logging |
| | 2P3: Extrusion (M Danaie, MLG)<br>• Experience of mechanical testing<br>• Experience of casting molten metal | 1P3: Young's Modulus (**TJM,** PDN)<br>• Experience with strain gauges<br>• Knowledge of stress/strain analysis including Mohr's circle |
| | 2P4: Casting (**KAQOR**, MLG)<br>• Experience of casting molten metal<br>• Experience of polishing metal samples<br>• Experience of etching<br>• Experience of optical microscopy<br>• Experience with LabVIEW | 1P4: Metallography (**B Jenkins,** AJW)<br>• Experience of polishing metal samples<br>• Experience of etching<br>• Experience of optical microscopy |

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|---|---|---|
| **HT** | 2P5: Diffusion (**TJM,** CRMG)<br>• Experience or knowledge of heat treatment of steels<br>• Experience of polishing metal samples<br>• Experience of etching<br>• Experience of optical microscopy and image analysis | 1P5: Polymers (**NG**, HEA)<br>• Knowledge of polymer behaviour<br>• Experience of working with liquid nitrogen |
| | 2P6: Dislocations & Plasticity (**MRC**, JTC)<br>• Knowledge of mechanical properties of metals<br>• Experience of working with liquid nitrogen<br>• Experience of polishing metal samples and etching<br>• Experience of etching<br>• Experience of optical microscopy | 1P6: Thermal Analysis (**E Liotti**, KAQOR)<br>• Experience of working with furnaces and molten metal<br>• Experience with computer data logging<br>• Knowledge of phase diagrams and solidification theory |
| | 2P7: Corrosion (**J Haley**, tbc)<br>• Knowledge of electrochemistry & corrosion<br>• Experience using potensiostat<br>• Experience with computer controlled equipment and data logging | 1P7: Bubble Raft (**SCB**, MRC)<br>• Materials Science/Physics<br>• Dislocation theory<br>• (Digital) photography |
| | 2P8: Mechanical Properties of Polymers (**HEA**, AARW)<br>• Knowledge of polymer behaviour<br>• Knowledge of polymer testing | 1P8: Electrode Potentials (**S Narayanan,** MP)<br>• Knowledge of electrochemistry and thermodynamics<br>• Experience of titration experiments |