Finance at Imperial

MSc Metals & Energy Finance

A Joint programme between the Engineering Faculty (Department of Earth Science and Engineering) and the Imperial College Business School.

Professor Dennis Buchanan, Course Director,
Department of Earth Science & Engineering,
Engineering Faculty
Imperial College London’s mission is to achieve enduring excellence in research and education in science, engineering, medicine and business for the benefit of society.

“"A community of problem-solvers dedicated to finding innovative solutions to the world's biggest challenges"

Professor Alice P. Gast
President of Imperial College London
Imperial College London

STEMB
Science, Technology, Engineering, Medicine and Business. (120 UGT and 132 PGT)

15734 Full-time Students
59% UG and 41% PG
Over 50% international from 136 countries

8200 Staff and Visitors
51% academic and research staff, 49% support staff
42% of academic staff international

14 Nobel Prize winners

Dennis Gabor FRS (1900-1979)
For his invention and development of holography

2016/17 World Rankings
3rd in Europe
8th in World

2nd in Europe
12th in World

Dennis Gabor FRS (1900-1979)
For his invention and development of holography

30 Departments
The results of the UK’s Research Excellence Framework (REF) 2014 were made public in December 2014. Imperial’s research quality is at an all-time high. Details on:

www.imperial.ac.uk/research-and-innovation/about-imperial-research/ref

The Department of Earth Science and Engineering is combined with the Departments of Chemical, Mechanical and Aeronautical Engineering. These disciplines have been rated second only to Cambridge and only missed coming top by the narrowest of margins.

The Business School has been rated fifth after Cambridge, LSE, LBS and Oxford (which is only ahead again by the narrowest of margins).
Finance teaching at Imperial College

MSc in Mathematics and Finance
Faculty of Natural Sciences

MSc in Metals and Energy Finance
Faculty of Engineering

MSc Finance
Business School

Perspective
Mathematics for Developers of Financial Tools

Perspective
Science and Engineering applied to Financial Services and Producers

Perspective
Creative Users of Financial Tools

Maths
Quant
Accounts/Finance
In November 2014 The Institute of Materials, Minerals and Mining (IOM3) recommended that the MSc in Metals & Energy Finance be accredited so that graduates meet a key academic requirement needed to be registered as Chartered Engineers.

The IOM3 act for the UK Engineering Council so that graduates qualify for the CEng (Chartered Engineer) designation.

The UK CEng in turn has reciprocal standing in Europe and as such engineers are entitled to use the EUR ING designation.
Suncor’s Oil Sands mining operation is located near Fort McMurray in northern Alberta. http://www.suncor.com/default.aspx
Gold intergrowth

Autumn Term: MSc Metals and Energy Finance

ESE Autumn (Language) 130 hrs

- Mineral Deposit Studies
- Petroleum Geology
- Petroleum Engin
- CFM/MEPAF/MPMS
- Language
Autumn Term: MSc Metals and Energy Finance

ESE Autumn Term (Maths) 105 hrs

- Mineral Deposit Studies: 35%
- Petroleum Geol: 15%
- Petroleum Eng: 10%
- CFM/MEPAF/MPMS: 20%
- Suppl Maths: 25%
Autumn Term: MSc Metals and Energy Finance

Carlin – epithermal gold
Spring Term: MSc Metals and Energy Finance

Business School Spring Term 50 hrs
Asset Pricing and Derivatives
Language Group 33 hrs

220 hours
Wessex Coast Excursion—Unconventional Petroleum – Oil Shales – Kimmeridge Bay

Former industrial area ("brown field site") on southeast side of Kimmeridge Bay. The bay near the waterfall is a new embayment that may have retreated almost 200m since Clavell’s alum works were present. *Ian West & Tonya West (c) 2006.*
Wesssex Coast Excursion – PumpJack at Kimmeridge Bay
### Course Weighting: MSc Metals and Energy Finance

<table>
<thead>
<tr>
<th>Examinations (43%)</th>
<th>Management &amp; Business Examination Module</th>
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<tbody>
<tr>
<td></td>
<td>Accounting paper (2 hours)</td>
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<tr>
<td></td>
<td>Management of Projects, Markets &amp; Supplies, Strategic Management paper (3 hours)</td>
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<tr>
<td></td>
<td>Petroleum &amp; Mineral Geoscience Examination Module</td>
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<td></td>
<td>Mineral Deposits (2 hours)</td>
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<td></td>
<td>Petroleum Geology and Engineering papers (2 hours)</td>
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<td>Project Evaluation Examination Module</td>
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<td></td>
<td>Metals &amp; Energy Project Appraisal and Finance, Resource Evaluation paper (2 hours)</td>
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<td></td>
<td>Mining Engineering. Extractive Metallurgy paper (2 hours)</td>
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<tr>
<td></td>
<td>Quantitative Finance Examination Module</td>
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<tr>
<td></td>
<td>Asset Pricing and Derivatives paper (3 hours)</td>
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<td></td>
<td>Investment and Portfolio Management 2 paper (3 hours)</td>
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<td></td>
<td>Mathematical Techniques in Finance paper (3 hours)</td>
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<thead>
<tr>
<th>Language and Excursions (26%)</th>
<th>Language Module</th>
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<tr>
<td></td>
<td>Choice of Spanish, French or Italian. Assessment through a Viva voce, coursework and test</td>
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<thead>
<tr>
<th>Dissertation Module (31%)</th>
<th>Excursion to Wessex and South Africa Course Work Module</th>
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<tbody>
<tr>
<td></td>
<td>Field exposure to petroleum systems and active energy and metal operations. Write-up presented in two extended reports</td>
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<td></td>
<td>Independent research undertaken over 10 weeks during the summer</td>
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## Summer Programme

<table>
<thead>
<tr>
<th>Summer Term Week</th>
<th>1</th>
<th>2</th>
<th>3 &amp; 4</th>
<th>5 - 7</th>
<th>8 &amp; 9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Examinations</td>
<td>Examinations and Dissertation Preparation</td>
<td>Excursion</td>
<td>Excursion report</td>
<td>Preparation and presentation of dissertation topics</td>
<td>Board of Examiners meeting. Preliminary results</td>
</tr>
</tbody>
</table>

Summer – Internships and dissertations.

*Deadline for submission of Dissertations – mid September*
South African Excursion May 2017

Palabora Copper Mine

Booysendal Platinum Mine
South African Excursion – Venetia Mine, De Beers

May 2014

May 2017, Shaft Sinking and Group
South African Excursion Mogalakwena Platinum, May 2015 and 2017
South African Excursion May 2017 – Ivanhoe Mines
South African Excursion May 2017 – Landau
South African Excursion May 2017 – Lion Ferrochromium
South African Excursion May 2017

• Week 1
  • Venetia – De Beers (Diamonds)
  • Mogalakwena – Anglo American (Platinum)
  • Ivanhoe Mines – Platreef Resources. (Platinum & Base Metals)
  • Palabora underground block caving (carbonatite Cu)
  • Lion – Glencore Merate (Ferrochromium smelter)
  • Weekend – Kruger Park

• Week 2
  • Stibium – Cons Murch (Au-Sb mine and Au tailings re-processing)
  • Booysendal Platinum – Northam (underground and processing plant)
  • Fairview – Pan African (Gold, Bio-oxidation)
  • Landau Colliery – Anglo American (Coal)
  • DRD – Ergo (Gold, tailing re-processing)
### Selection of 2017 Dissertations in Public Domain

<table>
<thead>
<tr>
<th>Title</th>
<th>Metals</th>
<th>Energy</th>
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<tbody>
<tr>
<td>A Technical and Financial Evaluation of Ixtaca Gold-Silver Project in Mexico</td>
<td>X</td>
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<tr>
<td>A Technical and Financial Appraisal of a Silver Mining Expansion Project in the Central Andes of Peru</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A Technical and Financial Appraisal of a Gold Mine in Mali</td>
<td>X</td>
<td></td>
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<tr>
<td>A Technical and Financial Evaluation of the Liza Prospect, Offshore Guyana</td>
<td></td>
<td>X</td>
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<tr>
<td>Technical and Financial Evaluation of an LNG field in Australia: The Ichthys Project</td>
<td></td>
<td>X</td>
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<tr>
<td>A Financial Evaluation of Different Processing Methods for the Lithium Nevada Project</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A Technical and Economic Evaluation of Energen Corporation and Implications for Permian Tight Oil Investment</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Key Factors Control Commercial Success of Australian Coal Seam Gas-to-LNG Project: Technical and Economic Evaluation of Queensland Curtis LNG Project</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Programme Aims

- produce graduates equipped to pursue careers in the technical and financial appraisal of natural energy and mineral resource projects and develop an understanding of how this knowledge may be applied in practice;
- offer traditional minerals related training directly applicable to a career in the minerals industry for graduates with geology and minerals engineering undergraduate degrees;
- introduce key technical and geological concepts relevant to petroleum projects;
- enhance career opportunities in the financial services and petroleum industries for graduates of all backgrounds;
- provide the basis for an understanding of quantitative finance, accounting and strategic management within the context of technical principles that apply specifically to mineral and energy projects;
- respond to the importance of the City of London as a global centre for mining and energy finance by providing knowledge of corporate finance (acquisitions and mergers), the equity markets, debt finance, metals markets and associated derivative markets;
- provide training in financial modelling, financial engineering and in the techniques of risk modelling;
- enhance entrepreneurial skills;
- provide the skills needed to undertake independent research projects both in industry and in the university environment.
Graduate First Placements as at January 2019 (from 2008) of MSc M&E Finance Graduates

Employment & Recruitment by Sector as at Jan 2019
Analysis of 127 Organisations - First Placements

- International Development & Government
- Financial Services and Commodity Trading
- Mining, Metals, Industrial Minerals & Quarry Industry
- Petroleum Industry
- Energy and Utilities
- Consultants, Advisers & Accountants
- Trading
- University MSc, PhD, Post doc & Faculty
• Altus Capital Ltd – Energy Policy Analyst (London)
• Appian Capital – Investment Associate (London)
• Barclays Capital – Commodities Trading (London)
• BMO Capital Markets – Analyst (London), Equity Research Associate – Metals and Mining. – London.
• BPIFrance – Venture Capital Fund - Paris
• BTG Pactual – Risk Analysis (London)
• Central Bank of Niger – Analyst
• CIM Investment – Analyst (London)
• Citibank – Management Associate (Algeria and London)
• Cutfield Freeman & Co – Associate - (London)
• Commerzbank – Structured Interest Rates (London)
• Credit Agricole – Commodity Structured Finance - London
• Deutsche Bank – Financial Analyst (UAE)
• Elara Capital – Analyst (India)
• Goldman Sachs – Equity Analyst - London
• Grant Thornton – Corporate Finance (UAE)
• GMP Securities Europe LLP – Investment banking and Analyst (London)
Greenstone Capital – Investment Manager (London)
Hayward Securities – Equity Research - Toronto
HSBC – Relationships (China)
JP Morgan – Associate (London)
Knight Vinke Asset Management – Analyst (London)
Macquarie Group – Associate (London)
Morgan Stanley – Investment banker (London)
Nomura - Investment Banking Analyst (London)
Polygon Investment – Analyst (Paris) (Nicosia)
Renaissance Capital – Financial Analyst
Resource Capital Funds – Analyst (Denver)
Rabobank – Sales (London)
Societe General – Interest Rates Structure (London) Global Head Mining Finance (Hong Kong)
Scipion Capital – Investment Analyst - London
Sumitomo Mitsui Banking – Manager, Metals & Mining Project Finance (London)
Tembo Capital – Investment Analyst - London
Tudor, Pickering, Hold & Co – Equity Research (London)
UniTrust Finance & Leasing – Credit Analyst (China)
WestLB – Director and Head of Credit (Sydney)
• Alecto Minerals – Technical Manager (London)
• Allana Potash – Senior Geologist (Umea, Sweden)
• Areva – Mining Engineer (France)
• Anglo America – Market Analyst, iron ore (Luxembourg) Business Development (London)
• Asian Metal – Raw Materials Analyst (London)
• Barrick Gold Corporation – Exploration Geologist (Zambia)
• BHP Billiton – Junior Engineer (Johannesburg)
• Cluff Natural Resources – CFO (London)
• De Beers – Corporate Finance and Strategy Analyst (London)
• Glencore – Junior Engineer (Quebec)
• Mkango Resources – Mining Analyst (London)
• Rio Tinto – New Business Development (London)
• Rotherham Sand and Gravel – Manager (UK)
• Southern Peaks Mining – VP Business Development (Peru)
• X2 Resources – Business Development (London)
Graduate First Placements – Petroleum Industry (Jan 2017)

- Antero Resources – Finance Director (Denver)
- BG Group – Commercial Advisor (Mumbai)
- BP – Finance Analyst (Azerbaijan)
- Exxon Mobil – Product Master Coordinator (Turkey)
- Eni – Engineer, LNG (London)
- Glencore – Analyst (London)
- Shell – Senior Well Engineer (London)
- Sinopec – Research Analyst (China)
- Tullow Oil – Petroleum Engineer (Ghana)
Graduate First Placements - Energy & Utilities (Jan 2017)

- ACWA Power – Acquisition & Project Finance (Dubai)
- Anthony Veder – Assistant
- Calash – Upstream Oil and Gas Analyst (London)
- Clean World Capital – Associated (London)
- Drax – Quantitative Commodity Analyst (UK)
- ENGIE – Origination Desk (Paris).
- ESB International – Mechanical Engineer (London)
- GDF SUEZ Key Account Sales (France) Business Analyst (London) Gas market Analyst (Paris)
Graduate First Placements – Consultants, Advisors and Accountants (Jan 2017)

- Altran Group – Consultant (Paris)
- AWR Lloyd Capital – Investment Analyst Mining (London)
- Bayphase – Senior Consultant (London)
- Booz & Co – Consultant (UAE)
- CGGVeritas – Party Manager (France)
- CRU – Research Analyst Nickel & Ferrochomium (London) 2x Research Analysts (London)
- Equinox Consulting – Consultant (Paris)
- EY – Junior Consultant (Paris) Junior Transaction Advisor (Paris)
- Hannam and Partners – Intern (London) (x3). Oil & Gas M&A partner.
- Independent Project Analysis – Analyst (UK)
- Insight Consulting – Analyst (London) Business Consultant (Surrey)
- Mazars – Transaction Support and Corporate Advisory (London)
- NAPIMS – Petroleum Economist (Nigeria)
- Schlumberger – Field Engineer (Italy) General Completions Engineer (Indonesia) Business Analyst (London) x 2
Graduate First Placements – Consultants, Advisors and Accountants (Jan 2017)

- SML Group – Financial Analyst (London)
- Strand Partners – Intern (London)
- Xodus – Commercial Consultant (London)
Graduate Placements – Other (Jan 2016)

- International Development:
  - Ministry of Mines and Energy - Colombia
  - IBRD – Energy Policy Analyst (Washington) – Consultant (UAE)
  - Bank of England
  - Development Bank of Japan

- Universities
  - Nigeria – Lecturer
  - Imperial College – Postgraduate MSc student
  - Imperial College – PhD
  - Toronto – Postdoctoral Research Fellow
Typical Profile of Students

- BSc Environ Policy. London.
- Ecole National Superieure Des Mines De Nancy.
- BA Economics. Oregon.
- BEng Mining. McGill.
- BSc Engineering. Chalmers.
- Ecole Nationale Superieure de Geologie.
- BSc Elec Eng, Ecole Sup D’Elec
- BSc Physics Imperial College.
- MEng Petroleum. Imperial College.
- BSc Business Science. Cape Town.
- MEng Material Science. Manchester.
- BEng Business Management. Warwick.
- BSc Economics. Bath.
- BSc Information Systems. Birkbeck.
- B Commerce. Concordia.
- BSc Natural Science. Durham.
Contact Details

- Course Director – Professor Dennis Buchanan
  E-mail: msc.mef@imperial.ac.uk
- Joanna Owens - Postgraduate Administrator

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E-mail: j.owens@imperial.ac.uk

2018/2019 Fees: £35,750 (overseas) and £22,000 (Home EU)