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
Our disciplines

• Engineering
• Natural Sciences
• Medicine
• Business School

FT Masters in Finance Survey – 4th in UK

Tomorrow’s breakthrough technologies
Imperial at a glance

The University:

• world class scholarship, education and research in science, technology and medicine
• interdisciplinary collaborations
• communicate and share knowledge
• 13,964 students (30% Postgraduate)
• Students from 126 countries
• 242 taught courses

Established in 1907

Academic faculties:

• Engineering
• Natural Sciences
• Medicine
• Business School
Imperial College London:

World class research and teaching in science, engineering, medicine and management

“It has been a century of great achievement, and my thanks go to all the people, the staff and the students, whose work over the decades has enabled Prince Albert’s vision to flourish” Her Majesty The Queen, 9 July 2007
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](http://www.suncor.com/default.aspx)
Autumn Term: MSc Metals and Energy Finance

Gold intergrowth

![Diagram showing the distribution of ESE Autumn (Language) 130 hrs]

- Mineral Deposit Studies: 25%
- Petroleum Geology: 15%
- Petroleum Engin: 10%
- CFM/MEPAF/MPMS: 15%
- Language: 30%
Autumn Term: MSc Metals and Energy Finance

Gold intergrowth

ESE Autumn Term (Maths) 105 hrs

- Mineral Deposit Studies: 35%
- Petroleum Geol: 15%
- Petroleum Eng: 10%
- CFM/MEPAF/MPMS: 20%
- Suppl Maths: 25%
Business School Autumn Term 120 hrs

- Accounting (Lecture)
- Math Tech in Finance (Lecture)
- Math Tech in Finance (Seminar)
- Investment & Portfolio Management (Lecture)
- Investment & Portfolio Management (Seminar)
Spring Term: MSc Metals and Energy Finance

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

220 hours

- Project Appraisal & Finance: 18%
- Cash Flow Modelling: 16%
- Management of Projects: 14%
- Mining Eng: 12%
- Extractive Metallurgy: 12%
- Excursion (wessex Basin): 10%
- Resource Evaluation: 10%
- Strategic Management: 10%
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.
## Course Weighting: MSc Metals and Energy Finance

<table>
<thead>
<tr>
<th>Examinations (43%)</th>
<th>Language and Excursions (26%)</th>
<th>Dissertation Module (31%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management &amp; Business Examination Module</td>
<td>Language Module</td>
<td>Independent research undertaken over 10 weeks during the summer</td>
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<tr>
<td>Accounting paper (2 hours)</td>
<td>Choice of Spanish, French or Italian. Assessment through a Viva voce, coursework and test</td>
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<tr>
<td>Management of Projects, Markets &amp; Supplies, Strategic Management paper (3 hours)</td>
<td>Excursion to Wessex and South Africa Course Work Module</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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<tr>
<td>Petroleum &amp; Mineral Geoscience Examination Module</td>
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<tr>
<td>Mineral Deposits (2 hours)</td>
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<tr>
<td>Petroleum Geology and Engineering papers (2 hours)</td>
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<tr>
<td>Project Evaluation Examination Module</td>
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<tr>
<td>Metals &amp; Energy Project Appraisal and Finance, Resource Evaluation paper (2 hours)</td>
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<tr>
<td>Mining Engineering. Extractive Metallurgy paper (2 hours)</td>
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<tr>
<td>Quantitative Finance Examination Module</td>
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<tr>
<td>Asset Pricing and Derivatives paper (3 hours).</td>
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<tr>
<td>Investment and Portfolio Management 2 paper (3 hours)</td>
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<tr>
<td>Mathematical Techniques in Finance paper (3 hours)</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 2014

Palabora Copper Mine

Thorncliffe Chromite Mine
South African Excursion May 2014

Venetia Diamond Mine, De beers
South African Excursion May 2015

Mogolakwena Open Pit - Angloplatinum
South African Excursion May 2015

Briefing, Ivanhoe Platreef Project

Western Platinum Processing Plant
Landau coal, AngloCoal
South African Excursion May 2016

Cullinan Diamond Mine and Imperial State Crown
South African Excursion May 2016

**Week 1**
- Lonmin Platinum (Smelter)
- Anglo Plat – Mogalakwena (Open pit platinum)
- Ivanhoe Mines – Platreef Resources. (Platinum Evaluation)
- Northam – Booysendal Platinum (underground and processing plant)
- Glencore – Lion (Ferrochromium smelter)
- Weekend – Kruger Park

**Week 2**
- Stibium – Cons Murch (Au-Sb mine and Au tailings re-processing)
- Rio Tinto – Palabora underground block caving (carbonatite Cu)
- Petra – Cullinan underground block caving.
- ANGLOCOAL – Landau Colliery (Coal)
- DRD – Ergo (Gold, tailing re-processing)
## Selection of 2016 Dissertations in Public Domain

<table>
<thead>
<tr>
<th>Title</th>
<th>Metals</th>
<th>Energy</th>
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</thead>
<tbody>
<tr>
<td>Technical and Financial Evaluation of Rio Tinto Copper Project</td>
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<td>X</td>
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<tr>
<td>A Technical and Financial Valuation of the Gahcho Kuè diamond project in Canada’s Northwest Territories</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A Geostatistical and Financial Analysis of the Platreef Project</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Technical and financial evaluation of the Bunder diamond mine project in the Indian state of Madhya Pradesh</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A Technical and Financial Evaluation of a Copper-Zinc project in Canada, Kutcho Project</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Technical and Financial Evaluation of a LNG project in Equatorial Guinea</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>A Discounted Cash Flow Valuation for the Development of the Vaca Muerta Shale Oil Resources in Argentina</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Technical and Financial Evaluation of the Kraken Project: A Heavy Oil Accumulation in the North Sea</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 – Financial Services (Jan 2017)

- Appian Capital – Investment Associate (London)
- Barclays Capital – Commodities Trading (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)
Graduate First Placements – Financial Services (Jan 2017)

- 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 Group – Sales (London)
- Rabobank Group – 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)
Graduate First Placements – Mining, Metals & Quarry (Jan 2017)

- 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 (Johannnesburg)
- 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)
- 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 & Ferrochromium (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
Profile of 2012/2013 Students

- BSc Environ Policy. London.
- Ecole National Superieure Des Mines De Nancy.
- BA Economics. Oregan.
- BEng Mining. McGill.
- BSc Engineering. Chalmers.
- Ecole Nationale Superieure de Geologie.
- BSc Elec Eng, Ecole Sup D’Elec (x3)
- 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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2017/2018 Fees: £33,000 (overseas) and £20,000 (Home EU)