QUANTITATIVE CLIMATE FINANCE

OVERVIEW

At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. The agreement is due to enter into force in 2020. The European Union has already outlined in its roadmap 2050 the European Union five headline targets for climate action, one of which relates to climate and energy. This target includes renewable energy (RE) generation and the reduction of greenhouse gas emissions as important points. To achieve these targets and switch to a low carbon economy a huge financial effort from the Global and European societies is required. Up to now mainly governments have sponsored projects (climate funds, green loans, and subsidies). In order to achieve the ambitious aims private financing for e.g. renewable energy and clean development mechanism (CDM) projects is needed. Thus the EU 2050 document states “Additional public private financing mechanisms are key in order to overcome initial financing risks and cash flow barriers. Public finance through innovative financing instruments, such as revolving funds, preferential interest rates, guarantee schemes, risk-sharing facilities and blending mechanisms can mobilise and steer the required private finance and limited public finance can leverage a multitude of private sector investments.” Regulatory uncertainty, the variation in energy prices, the financial crisis and the different preferences for renewable energy policies over investors harm the appetite for investing in renewable energy. The course will outline basic concepts of climate economics and discuss regulatory measures. In addition, we will investigate the evaluation of renewable energy projects and the role of the capital markets in financing such products.

THE COURSE

The course on Quantitative Climate Finance is designed to provide insight to the researchers an effective lead to global warming and climate change. The course structure facilitates the scholars in the area to acquire conceptual(regulatory and voluntary markets on carbon trading) and practical (developing quantitative modelling, stochastic valuation methods for financial contracts related to climate, and climate regulation) insights on climate finance. With adequate emphasis on interactive climate change modes of learning, the course envisages motivating those with a research aptitude to engage in the study of Quantitative Climate Finance. The course is being taught by faculty with vast experience both in the research domain and in extension activities on energy trading and financial services, stochastic valuation methods on Clean Development Mechanisms, Joint Implementation and Emission Trading Scheme, carbon credit and emission allowances. With the experience on quantitative climate finance the faculty are capable of addressing the needs of both the Indian and the international students. The students of different countries study together and the course module creates enough opportunities for them to learn through mutual interaction.
OBJECTIVES
The primary objectives are:

- An introduction to climate with a focus on quantitative modelling
- A discussion of stochastic valuation methods for financial contracts related to climate
- Building confidence and capability of course participants to analyse environment-friendly investments
- An introduction of valuation methods for companies exposed to climate regulation
- Raise the ability to question models critically, interpret model results and extend them.
- To evaluate the effectiveness of regulatory markets - Clean Development Mechanisms, Joint Implementation and Emission Trading Scheme
- To test the strengths of Certified Emission Reductions (CERs) and carbon credit market.

COURSE STRUCTURE:
The proposed course will be conducted at University of Mysore, Mysore. The course will be conducted between 28th November to 3rd December 2016. The course will have a weightage of 1 credit, taught over a period of 6 working days with 24 hours of exposure (10 Lecture hours, 6 Tutorial hours, 2 Hours of Case Study, 2 hours Field Study and 4 hours of examination - Student Presentation, report writing and feedback) and is linked to credit transfer facility agreed upon by participating universities. The course is taught through the LTP method. There is a combination of Lecture, Tutorial (interaction and student presentations) and Practical (field study) approaches in the delivery of course module. Both the faculty members will make themselves available to students for off classroom interactions during the whole week. The enrolled students will be provided support to make adequate preparations before commencement of the course.

CONTENT AND DELIVERY PATTERN:

28th November 2016
Lecture 1: 09:30 to 10:30 AM
Climate Economics: Emission Scenarios, Abatement Costs, Policy Instruments for Emission Reduction - Professor Dr. Rüdiger Kiesel
Lecture 2: 10:45 to 11:45AM
The European Union –Emission Trading System: Structural Models, Valuation of Certificates - Professor Dr. Rüdiger Kiesel
Tutorial 1: 02:00 to 04:00 PM
Studying the Valuation of Emission Certificates with Examples, Pricing of Option in Practice - Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

29th November 2016
Lecture 3: 09:30 to 10:30 AM
The EU-ETS: Reduced-Form Models, Option on Certificates - Professor Dr. Rüdiger Kiesel
Lecture 4: 10:45 to 11:45 AM
Further Policy Instruments: Clean Development Mechanism (CDM) and Voluntary Carbon Standard (VCS) - Dr. T.S.Devaraja
Tutorial 2: 02:00 to 04:00 PM
Detailed Analysis of an Example CDM Project- Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

30th November 2016
Lecture 5: 09:30 to 10:30 AM
Optimal Climate Policy: Discounting, Uncertainty and Irreversibility - Professor Dr. Rüdiger Kiesel
Lecture 6: 10:45 to 11:45PM
Capital Markets and Climate-friendly Investments: Instruments, Institutional Investors - Professor Dr. Rüdiger Kiesel
Case Study: 02:00 to 04:00 PM
Practical Analysis of Investment Decisions, Performance Measures for Investments - Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

1st December 2016
Lecture 7: 09:30 to 10:30 AM
Green Financial Indizes: Construction and Performance - - Professor Dr. Rüdiger Kiesel
Lecture 8: 10:45 to 11:45 AM
Green Bonds: Market, Types and Valuation - - Professor Dr. Rüdiger Kiesel
Tutorial 3: 02:00 to 04:00 PM
Practical Construction of a Green Financial Index, Valuation of a Green Bond. - Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

2nd December 2016
Lecture 9: 09:30 to 10:30AM
Carbon Risk and Company Valuation: Valuation Methods, Stranded Assets - Professor Dr. Rüdiger Kiesel
Lecture 10: 10:45 to 11:45 AM
Climate Risk to the Financial System: Systemic Risk, Impact of Regulation - - Professor Dr. Rüdiger Kiesel
Field Survey: 02:00 to 04:00 PM
Practical Valuation of Energy Companies - Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

3rd December 2016
Student’s examination – Students presentation, report writing and feedback
: 09:30 to 10:30AM, 10:45 to 11:45 AM and 02:00 to 04:00 PM -Professor Dr. Rüdiger Kiesel and Dr.T.S.Devaraja

WHO CAN ATTEND:
This is an interdisciplinary course designed keeping in mind the level of learning ability of students pursuing their final year of undergraduate program and/or post graduate program in any Arts, Commerce, Management, Science and Engineering discipline of study. The course very much fits in for the needs of Consultants, entrepreneurs, Doctoral Students, Development Practitioners, Professionals and Policy Makers as well. Therefore, students who are at the final year of any undergraduate/ or post graduate program or any one else with a qualification of a degree from any recognized university are eligible to apply.

INTAKE AND SELECTION CRITERIA:
The course will have a maximum intake of 50. Selection of candidates will be done as per the common selection norms devised and accepted by University of Mysore.

FEE STRUCTURE:

<table>
<thead>
<tr>
<th>Student Category</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Students currently pursuing studies at University of Mysore</td>
<td>INR 750</td>
</tr>
<tr>
<td>Students currently pursuing studies in any other university in India</td>
<td>INR 1,000</td>
</tr>
<tr>
<td>Other domestic participants</td>
<td>INR 2,500</td>
</tr>
<tr>
<td>International participants</td>
<td>USD 100</td>
</tr>
</tbody>
</table>

The above fee include all instructional material, computer use for tutorials and assignments, internet facility during class hours. The participant will be provided with accommodation depending on the availability on payment basis.
### TEACHING FACULTY:

**FOREIGN EXPERT:**

| Professor Dr. Rüdiger Kiesel | Rüdiger Kiesel heads the chair for “Energy Trading and Financial Services” at the University Duisburg-Essen, Essen, Germany. Previously he has been Director of the Institute for Mathematical Finance at the University of Ulm. He also held positions as Lecturer and Reader for actuarial science and financial mathematics at Birkbeck College, University of London and London School of Economics. He was a Visiting Professor at the Center for Mathematics for Applications, Oslo University. His main research areas are risk management for power utility companies, design and analysis of Emission Trading Schemes, valuation and hedging of derivatives (interest-rate, credit- and energy-related), methods of risk transfer and structuring of risk (securitization). He is Co-author of the Springer Finance monograph Risk-Neutral Valuation (now in its second edition) and has written more than fifty published research papers. He is a frequent speaker at international conferences and organized several conferences and practitioner seminars. Professor Kiesel also consults financial institutions, utilities and regulators on (credit- and energy-) risk management, derivative pricing models and asset allocation. He received several grants from German Government and Research Institutions such as BMWi Grant „Stochastische Methoden zur Bewirtschaftung und Bewertung von zentralen und dezentralen Speichern im Kontext des zukünftigen deutschen Energiesystems“ BMBF Grant "Economics of Climate Change", Project: Analytics and Empirics of Emission Trading. DFG Schwerpunktprogramm 1324 "Mathematische Methoden zur Extraktion quantifizierbarer Information aus komplexen Systemen" Projects: Valuation of Swing Options, Analysis of Emission Trading Schemes. DAAD – UGC -PPP India, University of Mysore; Project: Marketing of Carbon Credit in the framework of UNFCCC. |
| Mail: | ruediger.kiesel@uni-due.de |
| Web: | [http://www.lef.wiwi.uni-due.de/en/](http://www.lef.wiwi.uni-due.de/en/) |

### HOST FACULTY:

| Dr. T. S. Devaraja | Dr.T.S. Devaraja, Associate Professor of Commerce and Director of Post Graduate Centre, University of Mysore, Hassan, Karnataka. He received his M.Com and Ph.D., degree in Commerce from the University of Mysore. He is the Post Doctoral Fellow from the Corvinus University of Budapest, Hungary. He is the fellow of UGC- DAAD-PPP and he is the lead collaborator for two international projects in the area of global warming and carbon credits marketing. And visiting Research Fellow, University of Presov, Faculty of Management, Presov, SLOVAKIA, (2009-2010). His focused area is International Business and Management and Carbon Credit Marketing. |
| Dr. T. S. Devaraja | [Dr.T.S. Devaraja](mailto:tds@mes.ac.in) |
He has completed five Major Research Projects and one more is in the pipeline. He has published 50 research papers in the peer reviewed National and International Journals and written eight working papers. He has written a five books in the area of commerce and management leading to current area of research. He is also the awardee of “Dr. Ambedkar Fellowship National Award”, “Seva Chakra Puraskar National Award” “Rashtriya Vidya Saraswati Puraskar Award”, for his contribution in Social Science Research. He is an editorial board member for 21 international and national peer reviewed journals. And advisory board member for 32 international level conferences. He has presented number of research papers in National and international Conferences and chaired four sessions in the international level seminars held at Bangkok and Cairo, Egypt. He has produced four Ph.D. and 10 M.Phil and currently seven Ph.D., scholars are working. He is associated with many Professional Research Organizations of international level in different capacities.

**CONTACT:**

**COURSE COORDINATOR**

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