University of Delhi
Delhi School of Economics
Department of Economics

Handbook of Information 2020
Master of Arts (Economics)
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Reckoning from the appointment of V. K. R. V. Rao as Professor in 1942, the Department of Economics of the Delhi School of Economics (henceforth, the Department) is one of the oldest departments of the University of Delhi. The Delhi School of Economics was set up in 1949 as an institution for advanced studies and research in economics, on the initiative of the Founder-Director Professor Rao, with Prime Minister Jawaharlal Nehru as its President. Since then, the Department has been at the forefront of postgraduate teaching and research in economics. At present, it is one of the three constituent departments of the Delhi School of Economics, the other two being Geography and Sociology.

The Department supports postgraduate programmes (M. A., M. Phil., and Ph. D.) in Economics, which draw a huge number of applicants from all over the country and many from abroad. These programmes have a strong theoretical and quantitative focus with an emphasis on empirical applications. Their hallmark is the dynamic curriculum offered, which is continuously reviewed and updated in line with the latest developments in the discipline.

The Department is proud of its many past faculty members who have made significant contributions to the Economics discipline. Among them is the Nobel laureate Amartya Sen and many Fellows of the Econometric Society, a much coveted honour in the field of Economics.

The Department is also proud of its numerous alumni who have gone on to distinguished academic careers, including many Fellows of the Econometric Society. Department alumni can be found in most major Economics, Business, and Public Policy departments worldwide, very often as members of the faculty, and even more commonly, as doctoral students.

Apart from purely academic distinctions, members of the Department have contributed to the task of institution-building in various capacities. The founder, Professor Rao, went on to become the Vice Chancellor of Delhi University, served as the Education minister in the central government, and also founded other important academic institutions. Another former member of the Department, Professor Manmohan Singh, served as Governor of the Reserve Bank of India, union Finance Minister, and later Prime Minister of India. Numerous other members of the Department served the nation as high-level economic officials or advisers to the government and international bodies, as members of the Planning Commission, and as regulators or members of important government Commissions and committees. Others have served as public intellectuals and as public-spirited activists.

While the Department’s alumni have traditionally found jobs and attained considerable eminence in academia, the civil services, NGOs, international organisations and the media, the number of alumni in finance, consultancy and other areas of the private sector has grown.
1. DEPARTMENT OF ECONOMICS

manifold in the past two decades.

In 1965, the Department was the first economics department in the country to be recognised by the University Grants Commission as a Centre for Advanced Studies, a distinction that it continues to hold to the present day. The present Department is building on this evolving tradition and continues to perform the functions of academic research, teaching and public service. Current faculty have published their research in leading Indian and international professional journals, and have won prestigious international and Indian awards and fellowships. Their specialisations span a wide range of areas in economics. For many years, the Department has been ranked the highest amongst university economics departments in India by RePEc (Research Papers in Economics), a global electronic archive of working papers and publications in Economics and Finance (http://ideas.repec.org/top/top.india.html). Apart from pursuing their individual research programmes, several members of the faculty also serve on committees of various government departments and public sector organisations, and on the governing bodies or academic councils of important academic institutions.

1.1 Looking outward

The Department maintains a lively interaction with the economics profession at large. Over the years, it has hosted a long list of distinguished scholars as visitors and speakers, including Nobel laureates Kenneth Arrow, Abhijit Banerjee, Angus Deaton, Esther Duflo, Milton Friedman, Oliver Hart, John Hicks, Lawrence Klein, Eric Maskin, John Nash, Thomas Sargent, Amartya Sen, Joseph Stiglitz, Jan Tinbergen, and James Tobin. Other distinguished visitors and speakers over the years have included Bela Balassa, Robert Baldwin, Pranab Bardhan, William Baumol, Jagdish Bhagwati, Partha Dasgupta, Avinash Dixit, Maurice Dobb, Jacques Dreze, Zvi Griliches, Harry Johnson, Ronald Jones, Nicholas Kaldor, Michal Kalecki, Anne Krueger, Ian Little, Edmond Malinvaud, I. G. Patel, Debraj Ray, Joan Robinson, Hugo Sonnenschein, T. N. Srinivasan, Nicholas Stern, Lance Taylor, and Hal Varian. Key policy-makers in the government, RBI, and regulatory bodies are also regularly invited to give talks at the Department.

Conferences, workshops and seminars are important fora for the Department’s research engagement with the economics profession at large. Members of the Department actively engage in such interactions, and also organise such events, the largest being two regional meetings of the Econometric Society. The Department hosts an active weekly seminar series that attracts speakers from around the world.

Another regular event is the annual Winter School, which brings in distinguished scholars from India and abroad to give a set of expository lectures on frontier areas of research, and to interact with young research scholars in a workshop-style setting. This is one of the regional Summer/Winter Schools sponsored by the Econometric Society. Past invited lecturers include Dilip Abreu, Manuel Arellano, Abhijit Banerjee, Kaushik Basu, Ken Binmore, V. V. Chari, Andrew Chesher, Janet Currie, Avinash Dixit, Esther Duflo, Mukesh Esarwan, Andrew Foster, Maitreesh Ghatak, Edward Glaeser, Gita Gopinath, Sanjeev Goyal, Atsushi Kajii, Nobuhiro Kiyotaki, John Leahy, Glenn Loury, George Mailath, Charles Manski, John Moore, Stephen Morris, Herve Moulin, Prasanta Pattanaik, Jean-Marc Robin, John Roemer, Ariel Rubinstein, Ran Spiegler, Scott Taylor, William Thomson, Christopher Udry, Jorgen Weibull, and Timothy van Zandt.
1.2 Journal and working papers

The Department houses a highly-regarded biannual journal, the *Indian Economic Review*, now published by Springer, which publishes peer-reviewed scholarly articles in diverse areas of economics; visit [https://www.springer.com/journal/41775](https://www.springer.com/journal/41775) for details. Over the years, it has featured the work of leading economists including several Nobel laureates. Past issues of the journal are available at [https://www.jstor.org](https://www.jstor.org).

The Department also has a Working Paper series that publishes the research of its faculty members and visitors ([http://cdedse.org/working-papers-2019/](http://cdedse.org/working-papers-2019/)).

1.3 Academic infrastructure

Teaching and research in the Department are supported by excellent infrastructure, computing facilities, and a well-stocked library. The main lecture theatre as well as all classrooms are air-conditioned and equipped with audio-visual facilities. The lecture theatre is interconnected with two other classrooms *via* an enhanced two-way interactive audio-visual system. The Ratan Tata Library houses one of the best collections in economics and related social disciplines (see Section 4.1 for details). Online resources, such as JSTOR and ScienceDirect, are accessible *via* the Delhi University Library System (DULS) from terminals in the library as well as in the Department’s computer labs.

The Department has separate computer labs for M. A. and M. Phil./Ph. D. students. The labs have about 36 latest quad-core i7 based desktops. Here, students receive training in data analysis and economic modelling, using econometric packages such as STATA, Mathematica, Scientific Workplace, E-views, Shazam, Microfit, Gauss, RATS (Real Analysis of Time Series), NLOGIT, Rstudio, etc. Students have access to high-speed internet through these desktops to aid their research. The computer lab also provides printing facilities through a network printer. Computer labs provide access to various offline and online databases such as NSSO (National Sample Survey Organisation), NFHS (National Family Health Survey), Census data, ASI (Annual Survey of Industries), NAS (National Accounts Statistics), CMIE Prowess database on companies, EPW Research Foundation Indian Time Series, Indiastat, etc. Laptops are made available to students for presentations. Course-wise folders, containing course material, are also accessible from each desktop through a network drive. The entire building is Wi-Fi enabled so that students can use their own laptops to access the internet.

The Department’s website ([http://www.econdse.org](http://www.econdse.org)) provides information about faculty, the Department’s academic programmes, notices for upcoming seminars, conferences, Working Papers, Public Lectures, and links to other useful academic websites. It is an important forum for interaction between the Department and the students.

1.4 Contact information

The Department office may be contacted (Monday to Friday) between 9:00 AM and 5:30 PM.

- **Telephone** [011] 27666395, [011] 27008130
- **Fax** [011] 27667159
• Email dept@econdse.org
• Web http://www.econdse.org
• Postal address
  Department of Economics, Delhi School of Economics, University of Delhi, Delhi 110007
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Admission

This chapter brings together information that is scattered in various locations on the Delhi University website. In case of conflict, the University website is the final authoritative source.

2.1 Eligibility for admission

All admissions are done via the Direct/Merit mode or the Admission test mode. The eligibility conditions for Indian students (unreserved category) via these modes are

- Direct/Merit mode: At least 60% marks in the aggregate or equivalent CGPA for the B. A. (Hons.) Economics degree of the University of Delhi.
- Admission test mode: At least 60% marks in the aggregate or First Division or equivalent CGPA for any graduate/post-graduate degree in any subject from the University of Delhi or any Indian University recognised by the University of Delhi.

Relaxations of these conditions for categories other than the Unreserved category are as per the rules stated in the Information Bulletin of Delhi University.

Foreign applicants are advised either to take the Department’s Admission test or to submit their GRE scores along with recommendation letters from two academic referees, in order for the Department to evaluate their suitability for the M. A. programme. Those who choose to take the Admission test must apply on the prescribed online form by the due date. Those who do not wish to take the Admission test should familiarise themselves with the material covered in the textbooks recommended for the Admission test, so as to ensure that they have the aptitude and training for the M. A. courses offered by the Department. No matter which option they choose, all foreign nationals must route their applications through

- Foreign Students’ Registry Office
  Room No. 11, First Floor
  Conference Centre
  University of Delhi
  Delhi 110007

- Telephone [011] 27666756

- Email [fsr_du@yahoo.com](mailto:fsr_du@yahoo.com) [fsr@du.ac.in](mailto:fsr@du.ac.in)
2.2 Admission test

For information about the date, time, and venues of the Admission test, instructions regarding the test, declaration of results, and other questions, please visit https://pgadmission.du.ac.in/index.php/site/login

The test will consist of multiple-choice questions only, with negative marking for wrong answers. Calculators will not be allowed. Candidates are expected to be familiar with the material contained in the current syllabus of the B. A. (Hons) Economics programme of the University of Delhi. The examination will test a candidate’s ability to understand and apply concepts in four basic areas in Economics: (a) microeconomic theory, (b) macroeconomic theory, (c) mathematical techniques used by economists, and (d) probability, statistics, and elementary econometrics. General questions testing the reasoning and quantitative abilities of the students may also be asked. Some Admission tests for earlier years are available at http://www.econdse.org under ‘Admissions’. However, the format and weightage of the different sections of the test may change from year to year. No queries on the test paper will be entertained.

Some indicative, but not exhaustive, references that may be used to prepare for the test are:


2.3 Registration for admission

Registration for admission to the M. A. Economics programme is carried out online by the University according to the rules and procedures described in the University’s Bulletin of Information, which should be read carefully before filling the online application form. Details are available at https://pgadmission.du.ac.in/index.php/site/login

Applicants are responsible for regularly checking the portal for any updates. Further information on Delhi University is available at

- Web http://fsr.du.ac.in/
2.4 Admission procedure

Separate merit lists will be put up for the reserved and general categories to be admitted through the Admission test and through Direct Admissions. The admission procedure will be as per the Bulletin of Information at

https://pgadmission.du.ac.in/index.php/site/login

Admission of students to the programme will be provisional and will be confirmed by the Admission Committee of the University only after verification of the original certificates.

After being selected for the M. A. Economics programme, students may enrol themselves either in the Department of Economics at the Delhi School of Economics, or in any of the colleges of the University of Delhi that are willing to register them. No specific quotas are assigned in colleges for students of M. A. Economics.

All lectures and tutorials are held in the Department of Economics, Delhi School of Economics, irrespective of where the student is enrolled.
Fees and scholarships

This chapter brings together information that is scattered in various locations on the Delhi University website. In case of conflict, the University website is the final authoritative source.

3.1 Fees

Students registered directly in the Delhi School of Economics are required to pay the following annual fees/charges (subject to revision):

<table>
<thead>
<tr>
<th>Fee/Charge</th>
<th>Amount (in ₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition fee (₹ 18 per month from May to April)</td>
<td>216</td>
</tr>
<tr>
<td>Admission fee</td>
<td>240</td>
</tr>
<tr>
<td>University enrolment fee</td>
<td>150</td>
</tr>
<tr>
<td>University development fee</td>
<td>600</td>
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<tr>
<td>University annual charges</td>
<td>8</td>
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<tr>
<td>Library fee</td>
<td>6</td>
</tr>
<tr>
<td>Identity card</td>
<td>10</td>
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<tr>
<td>Athletics fee</td>
<td>50</td>
</tr>
<tr>
<td>W. U. S. Health Centre fee</td>
<td>120</td>
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<tr>
<td>Student Union fee</td>
<td>125</td>
</tr>
<tr>
<td>Library deposit (refundable)</td>
<td>1000</td>
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<tr>
<td>Cultural fee</td>
<td>10</td>
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<tr>
<td>DSE Amenities fund</td>
<td>100</td>
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<tr>
<td>Library development fee</td>
<td>200</td>
</tr>
<tr>
<td>Computer fee</td>
<td>3000</td>
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<tr>
<td>DSE development fee</td>
<td>500</td>
</tr>
<tr>
<td>DSE Library services fee</td>
<td>1000</td>
</tr>
<tr>
<td>N. S. S. fund</td>
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<tr>
<td>Prevention of sexual harassment fund</td>
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</table>

For students registered in colleges, the following annual fees will be collected in the colleges (apart from the relevant college’s fees and charges):

To alleviate the financial hardship of needy students, the Computer fees may be fully or partially waived, as per the assessment of a departmental committee. Needy students should
3. FEES AND SCHOLARSHIPS

<table>
<thead>
<tr>
<th>Fee/Charge</th>
<th>Amount (in ₹)</th>
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<td>Computer fee</td>
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<tr>
<td>DSE development fee</td>
<td>500</td>
</tr>
<tr>
<td>DSE Library services fee</td>
<td>1000</td>
</tr>
</tbody>
</table>

submit an application for the full/partial waiver of the Computer fee. This application must be accompanied by a statement of circumstances and a certificate of proof of the annual family income.

Tuition fees from May to August and annual charges are payable on the day of admission. Other dues are payable in advance on or before the 10th of the month for which they are due.

Fees may be revised from time to time as per the University’s decision.

3.2 Scholarships

The students joining the M. A. Economics programme can compete for a number of scholarships awarded every year. All scholarships that are awarded in the First year of the programme are allocated on the basis of rank-order of marks in the Admission test. Those that are awarded for a two year term may be renewed in the Second year conditional on satisfactory academic performance in the First year.

<table>
<thead>
<tr>
<th>Name of scholarship</th>
<th>Year awarded</th>
<th>Duration</th>
<th>Monthly amount (in ₹)</th>
<th>Number of awards</th>
</tr>
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<tr>
<td>Dr. Manmohan Singh fellowship</td>
<td>First</td>
<td>Two years</td>
<td>10,000 (plus 7500 annual book grant)</td>
<td>1</td>
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<tr>
<td>Exim Bank scholarship</td>
<td>Second</td>
<td>One year</td>
<td>5000</td>
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<tr>
<td>Prof. S. D. Tendulkar scholarship</td>
<td>First</td>
<td>One year</td>
<td>2000</td>
<td>1</td>
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<tr>
<td>Prof. S. D. Tendulkar scholarship</td>
<td>Second</td>
<td>One year</td>
<td>2000</td>
<td>1</td>
</tr>
<tr>
<td>A. N. Ram scholarship</td>
<td>First</td>
<td>Two years</td>
<td>1200</td>
<td>1</td>
</tr>
<tr>
<td>Arjun and Jayashree Sengupta scholarship</td>
<td>First</td>
<td>Two years</td>
<td>1000</td>
<td>1</td>
</tr>
<tr>
<td>Smt. Shanti Sharma scholarship</td>
<td>First</td>
<td>Two years</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>Merit scholarship</td>
<td>First</td>
<td>One year</td>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>Merit scholarship</td>
<td>Second</td>
<td>One year</td>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>National (CAS) scholarship</td>
<td>First</td>
<td>Two years</td>
<td>250</td>
<td>8</td>
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<tr>
<td>Prof. Balvir and Ranjana Singh scholarship</td>
<td>First</td>
<td>Two years</td>
<td>230</td>
<td>1</td>
</tr>
<tr>
<td>Prof. Balvir and Ranjana Singh scholarship</td>
<td>Second</td>
<td>One year</td>
<td>TBA</td>
<td>1</td>
</tr>
<tr>
<td>Prof. K. A. Naqvi scholarship</td>
<td>First</td>
<td>Two years</td>
<td>TBA</td>
<td>1</td>
</tr>
<tr>
<td>Prof. K. A. Naqvi scholarship</td>
<td>Second</td>
<td>Ten months</td>
<td>TBA</td>
<td>1</td>
</tr>
<tr>
<td>Alka Garg scholarship</td>
<td>First</td>
<td>Two years</td>
<td>TBA</td>
<td>1</td>
</tr>
<tr>
<td>Pradeep Gupta scholarship</td>
<td>First</td>
<td>Two years</td>
<td>TBA</td>
<td>1</td>
</tr>
<tr>
<td>Datia Darbar endowment</td>
<td>First</td>
<td>Two years</td>
<td>TBA</td>
<td>1</td>
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</tbody>
</table>
3.2. SCHOLARSHIPS

Some scholarships are subject to special restrictions that are detailed below.

1. The A. N. Ram scholarship is awarded once in two years, only to needy students whose parents do not pay income tax.

2. The Arjun and Jayashree Sengupta scholarship is restricted to women students.

3. Four of the eight National Scholarships are reserved for students who have graduated from universities other than the University of Delhi.

4. TBA means that the amount paid by the scholarship varies according to the availability of funds.

5. The Alka Garg scholarship is awarded once in two years and is restricted to women students.

6. The Pradeep Gupta scholarship is awarded in alternate years only.

7. The Datia Darbar endowment scholarship is awarded only to students from rural areas and only once in two years.
4

Infrastructure

This chapter brings together information that is scattered in various locations on the Delhi University website. In case of conflict, the University website is the final authoritative source.

4.1 Ratan Tata library

The Ratan Tata library of the Delhi School of Economics is one of the best-equipped libraries in Economics and allied fields.

The total collection comprises almost 200000 books and 133000 bound periodicals. Collection of Theses and Dissertations has grown to more than 1600 records. The library subscribes to 232 current titles of journals. The library is a repository of United Nations publications. It also has a fairly large and well-organised collection of State and Central Government publications.

Bibliographical records of the complete book collection are accessible through OPAC, including Web-OPAC via the Delhi University Library System portal.

A folder containing the list of new books added to the collection every month is placed in the main Reading Hall on the ground floor.

An e-Library provides facilities for accessing the internet, e-resources, and OPAC, including WEB-OPAC, using 64 terminals and 2 servers.

For the differently-abled, two computer terminals with appropriate software packages (Screen reader and NVDA) have been kept in the Main Reading Hall on the ground floor for accessing the internet, OPAC (online catalogue), and Electronic R.

4.2 Student hostels

The merit list announced for admission to M. A. Economics will be the sole basis for admission to hostels. For information about Delhi University hostels, please consult


Enquiries should be directed to the relevant hostel’s office. Application for accommodation must be made in the prescribed forms obtainable directly from these hostels. The application must be routed through the Head, Department of Economics. However, an advance copy may be sent directly to the Hostel concerned.
Note that the Ambedkar-Ganguly Students’ House for Women is a hostel exclusively for women students of the Delhi School of Economics. In addition, women students may also apply to the Meghdoot and the Post-graduate Hostel for Women.

For men students, several hostels of the University are situated on the University Campus. These are V. K. R. V. Rao Hostel, Gwyer Hall, Jubilee Hall, Mansarover Hostel, Post-graduate Men’s Hostel, and the International Students House.

Accommodation in the above-mentioned hostels is available for a limited number of students who are admitted directly to the Delhi School of Economics as students of the M. A., M. Phil. and Ph. D. programmes.

Foreign students should contact

- **Foreign Students’ Registry Office**
  Room No. 11, First Floor
  Conference Centre
  University of Delhi
  Delhi 110007

- **Telephone** [011] 27666756

- **Email** fsr_du@yahoo.com, fsr@du.ac.in

- **Web** [http://fsr.du.ac.in/](http://fsr.du.ac.in/)

for their hostel accommodation.

### 4.3 Medical facilities

Facilities of the World University Service (WUS) Health Centre of the University of Delhi will be available to students. For more information, please consult [http://healthcentre.du.ac.in/](http://healthcentre.du.ac.in/)
M. A. programme

This chapter brings together information that is scattered in various locations on the Delhi University website. In case of conflict, the University website is the final authoritative source.

5.1 Definitions

(a) ‘Core course’ means a course that a student admitted to the M. A. Economics programme must pass in order to receive the degree and which cannot be substituted by any other course.

(b) ‘Elective course’ means an optional course that is to be selected by a student out of a menu of such courses offered by the Economics department.

(c) ‘Open Elective’ means an elective course that is available for students of all programmes, including students of the Economics department. Students of other departments may opt for these courses, subject to fulfilment of eligibility criteria as laid down by the Economics department.

(d) ‘Credit’ means the value assigned to a course indicating the level and quantity of instruction as measured by instructor-student interaction.

(e) ‘SGPA’ means Semester Grade Point Average calculated for individual semester.

(f) ‘CGPA’ is the Cumulative Grade Points Average calculated for all courses completed by the students at any point of time. CGPA is calculated each year for both the semesters clubbed together.

(g) ‘Grand CGPA’ is calculated in the last year of the course by clubbing together the CGPA of two years, i.e., four semesters. Grand CGPA is given in Transcript form. A formula for conversation of Grand CGPA into percentage marks is given in the Transcript.

5.2 Structure

Delhi University’s academic year is divided into two semesters: the summer semester from July to December and the winter semester from January to May.
The M. A. Economics programme is spread over two academic years and divided into Part I (the first year) and Part II (the second year). Part I comprises Semesters I and II. Part II comprises Semesters III and IV. Teaching related in Semesters I and III (resp., II and IV) takes place in the summer (resp., winter) semester.

The programme requires students to take a combination of Core courses (see Chapter 6 for details), Elective courses (see Chapter 7 for details), and Open Elective courses (possibly from other departments). A student is required to complete a minimum of 80 credits for the completion of the programme and the award of the M. A. Economics degree.

Depending on the nature of the course, instruction consists of lectures combined with computer labs, tutorials, and preceptorials. The labs provide students the opportunity for hands-on learning of programming, statistical, and econometric techniques. Tutorials are small-group interactions in a classroom setting that complement the lectures and support problem-solving related to the lectures. Preceptorials are small-group or individual interactions meant for intensive problem-solving (possibly beyond the lecture material), supervision of guided reading and research, and discussions ranging beyond the lecture material.

The semester-wise distribution of courses and credits is as follows:

### Core courses and credits

<table>
<thead>
<tr>
<th>Semester</th>
<th>Core Courses</th>
<th>Credits per course</th>
<th>Total credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>EC001, EC002, EC003</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>II</td>
<td>EC004, EC005, EC006</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>III</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>IV</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Elective courses and credits

<table>
<thead>
<tr>
<th>Semester</th>
<th>Elective Courses</th>
<th>Credits per course</th>
<th>Total credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>II</td>
<td>One elective course</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>III</td>
<td>Four elective courses; one may be an Open Elective</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>IV</td>
<td>Four elective courses; one may be an Open Elective</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

### 5.3 Teaching

The faculty of the Department is responsible for organising lecture and tutorial work for the M. A. programme. There shall be 90 instructional days, excluding examinations, in a semester. English is the medium of instruction throughout the programme.

### 5.4 Selection of elective courses

A student’s choice of elective courses in each semester will be limited to those announced by the Department at the beginning of that semester. Each student is required to finalise his/her choice of elective courses within two weeks of the start of each semester.
5.5 Examinations

Assessment of a student’s performance in a course shall be based on marks for internal evaluation and the written final examination for the course. Unless otherwise specified, the division of marks will be 30 marks for internal evaluation and 70 marks for the final examination. English is the medium of examination for all courses.

The final examination for each course will be held only at the end of the semester in which the course is taught. Students may seek revaluation of their final examination scripts and may re-appear for the final examination as per the applicable Delhi University rules.

Internal evaluation may be based on a combination of midterm examinations, term-papers, lab assignments, class attendance, and class participation. The weights assigned to these components will be specified by the instructor at the beginning of the course. In all the courses, the internal evaluation requirements begin from the first day of classes, and these requirements must be met as scheduled by the instructor. Once awarded, internal evaluation marks cannot be changed, even if the student re-appears for the final examination of that course.

5.6 Promotion

(a) In order to pass a course, the student must secure 40% or more in the final examination for the course and 40% or more in the total of the final examination and internal evaluation for the course.

(b) If a student is not eligible for appearing in Semester I examinations for any reason, then he/she will not be eligible for admission to Semester II and will have to apply for readmission to Semester I. Otherwise, a student will be automatically promoted from Semester I to Semester II and from Semester III to Semester IV.

(c) A student shall be promoted from Part I of the programme to Part II if he/she passes at least half of the courses of Semesters I and II taken together. However, he/she will have to pass the remaining course(s) while studying in Part II of the programme.

(d) If a student is not promoted from Part I of the programme to Part II, then he/she shall have the option to retain the marks in the courses in which he/she has passed as per clause (a) above, while he/she attempts to meet the requirements to be promoted to Part II.

(e) If a student who is promoted to Part II fails to complete all degree requirements while in Part II, he/she will have the remaining part of his/her span period (see Section 5.9) to complete the necessary requirements.
5.7 Reappearance

A student may reappear for the final examination of a course within his/her span period (see Section 5.9), either because he/she failed that course earlier or because he/she wishes to improve upon an earlier performance.

(a) A student reappearing in the final examination for a Semester I (resp., II, III, IV) course may do so only in the corresponding Semester I (resp., II, III, IV) examinations held in the immediately subsequent academic year. Semester I and III (resp., II and IV) examinations are normally held in November-December (resp., April-May).

(b) In order to reappear in the final examination for a course, a student must surrender, in writing, his/her previous performance in the final examination of that course.

(c) An applicant for reappearance in the examination for any course should be aware that the surrender of the previous performance as per clause (b) will make him/her ineligible to join any higher course of study until the University examination results declare him/her as having passed the relevant course. This is so even if he/she had previously passed that course.

(d) No candidate who has once chosen to reappear in certain courses of a semester will be allowed to reappear in the remaining courses of that semester at a later examination.

(e) In the case of reappearance in a course examination, the result will be prepared on the basis of the candidate’s latest performance in the examination.

(f) If a candidate opts to reappear in the examination for any course but fails to take that examination, then the marks previously secured by the candidate in that course shall be taken into account while determining his/her result of the examination held currently.

(g) Reappearance in practical examinations, dissertation, project and field work shall not be allowed.

(h) A student who reappears in a course final examination shall carry forward the internal evaluation marks originally awarded.

5.8 Marks, grades, and degree

Conversion of marks in courses into grade points, SGPA, CGPA, grand CGPA, class, and award of degree will be done by Delhi University as per its rules.

5.9 Span period

No student shall be admitted as a candidate for any M. A. Economics examination after the lapse of four years from the date of admission to Part I of the M. A. Economics programme.
6

Core courses

6.1 Microeconomic Theory: EC001

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 6 hours.
- **Credits**: 6.
- **Course Objectives**
  The purpose of this course is to give students a rigorous introduction to modern microeconomic theory.
- **Course Learning Outcomes**
  Three main learning outcomes are envisaged. First, the student should develop a sound understanding of the core concepts that economists use to understand the world of business, trade and public policy. By the end of the course, thinking like an economist should become second nature. Second, the course will familiarize students with the mathematical techniques that economists routinely use in their analysis. Modern economics makes heavy use of mathematics and statistics that advanced students must master. Finally, we will try to illustrate the usefulness of the abstract ideas and concepts introduced in the course with the aid of suitable applications to real world problems.
- **Content: Unit-wise**
  1. Prices, Markets and Efficiency - Voluntary exchange, Pareto efficiency, quasilinear utility, cost functions, demand and supply, market equilibrium, comparative statics, taxes and subsidies, public goods, externalities.
  2. Choice theory and Consumer Demand - The axiomatic approach, utility representation, demand and expenditure functions, duality, Slutsky decomposition, testable implications.
  3. Production, Costs and the Firm - Production possibility sets, cost minimization and profit maximization, input demand and output supply, non-profit motives.

6. General Equilibrium Analysis: Barter; Core of Exchange economy; Market exchange; General equilibrium models of exchange and production; Existence of competitive equilibria; Competitive equilibrium as Core allocation Uniqueness and Stability of Competitive equilibrium; Comparative statics.
   Welfare Properties of Competitive Equilibria - First and Second Fundamental Theorems of Welfare Economics; Efficiency and fairness of Market wage; Factor Price Equalization Theorem.

7. Welfare Economics: Welfare Criteria - Fairness; Pareto optimality; Kaldor efficiency; Scitovsky Criterion; Samuelson Criterion; Cost Benefit Analysis.
   Social Choice; Social Welfare Function; Arrow’s Impossibility Theorem and the related results.

8. Market Failures: Market failure; Sources of market failure and their implications Externalities; Public Good.

- **Suggested Readings**


6.2 **Mathematics for Economics: EC002**

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 6 hours.
• Credits: 6.

• Course Objectives
The objective is to rigorously introduce and teach several areas of mathematics that are widely-used in Microeconomics, Macroeconomics and Econometrics.

• Course Learning Outcomes
The approach of the course will be analytical, so that we expect as a learning outcome that students can go beyond cookbook procedures when modelling and analyzing economic problems. A second learning outcome will be the acquisition of some mathematical sophistication, in understanding and writing proofs. These will be complemented by a basic learning outcome, which is to understand the main optimization and other tools used in a variety of economic applications.

• Content: Unit-wise

1. Preliminaries: Sets, relations, functions.
2. Linear Algebra:
   - Vector spaces, subspaces.
   - Convex sets, concave and quasiconcave functions, their characterisations.
   - Linear independence. Linear mappings and matrix representation. Range, null space, rank-nullity theorem.
   - Projection mappings and inverse mappings. Solutions of linear equations.
   - Spectrum of matrix, diagonalisation, similarity of matrices.
3. Basic Real Analysis:
   - In normed spaces, notions of open, closed and compact sets, continuous functions, their optima and their existence.
   - Notions of differentiability of mappings between Euclidean spaces, chain rule, higher order derivatives.
   - Implicit and inverse function theorem, comparative statics.
4. Optimization:
   - Characterisations of differentiable concave and quasiconcave functions. Characterisation of interior optima.
   - Lagrange characterisation of optima subject to equality constraints.
   - Karush-John-Kuhn-Tucker characterisation of optima subject to inequality constraints.
5. Differential Equations: First-order and systems of first-order differential equations (linear and nonlinear); some stability theory.

• Suggested Readings

6. CORE COURSES


6.3 Introductory Econometrics: EC003

• Marks: Assignments - 30, Exam - 70
• Duration (per week): 6 hours.
• Credits: 6.
• Course Objectives
The first half of the course covers basic concepts in probability and mathematical statistics that are needed for the study of econometrics. The second half introduces basic econometric techniques commonly used in the empirical analysis of economic relationships and other social sciences.

• Course Learning Outcomes
Students would acquire theoretical knowledge of statistics and basic econometric techniques used in the empirical analysis of economic relationships. They will undergo hands-on training in the use of software to select random samples, compute numerical counterparts of theoretical results and estimate empirical models.

• Content: Unit-wise
1. Probability, Random Variables, Distributions:
   Sample spaces, Counting methods, Conditional Probability, Bayes’ Theorem.
   Discrete, continuous and mixed random variables, marginal and conditional distributions, multivariate distributions, distributions of functions of random variables. Expectations, conditional expectations and other moments.


3. Sampling Distributions, Asymptotic Distribution Theory:
   Large Sample Results: Laws of large numbers and central limit theorems.
   Sampling Distributions of Estimators: The Chi-square, t and F distributions.


5. Linear Regression:
   Simple Linear Regression - Ordinary Least Squares (OLS) Estimation; Desirable properties of least squares estimators; Goodness-of-Fit; Normality assumption for the errors; Maximum likelihood estimation.
6.4. MACROECONOMIC THEORY: EC004

Multiple Linear Regression: Ordinary Least Squares (OLS) Estimation; Underlying assumptions; Goodness-of-Fit.
Dummy variables in regression models: Qualitative regressors; qualitative and quantitative regressors; interaction terms.
Multicollinearity, Heteroscedasticity, Autocorrelation: Nature; implications; detection; remedies

6. Dynamic Models:
   ARIMA models: AR, MA, and ARMA processes
   Distributed lag models

7. Model specification: Model selection criteria

8. Panel data regression: Fixed effects LSDV model; Fixed effects within-group model; Random effects model.

• Suggested Readings


6.4 Macroeconomic Theory: EC004

• Marks: Assignments - 30, Exam - 70

• Duration (per week): 6 hours.

• Credits: 6.

• Course Objectives

The objective of the course is to familiarise the students with (a) the concepts and issues in modern macroeconomics, as is applied in theory and practice across the world; (b) the major mathematical tools used in modern macro analyses.

The course has two modules of 4 units each. The first module begins with a brief discussion of the short run (static) aggregative macro frameworks and explore the implications of different policy changes for the macroeconomy. It then focuses on long run output dynamics, i.e., issues related to economic growth. The second module focuses on medium run dynamics as captured by business cycles, paying special attention to the Real Business Cycles theory and the New Keynesian framework.
• **Course Learning Outcomes**
  
  Two central questions that motivate Macroeconomics are: (i) What causes aggregate output and employment levels in an economy to fluctuate/change over time? (ii) how effective are government policies in stabilizing the economy and/or generating steady growth? This course will provide the students with a deeper understanding of both these issues in the context of the real economy and will enable them to evaluate various macroeconomic policies and their implications on the basis of coherent theoretical frameworks.

• **Content: Unit-wise**

  1. Aggregative Macro Models: The classical system; the Keynesian system; Role of expectations in the aggregative framework; various theories of expectation formation; solving aggregative macro models with different assumptions about expectation formation and their policy implications.
  
  2. Mathematical Preliminaries:
     Methods of solving Ordinary Difference Equations; Systems of first-order difference equations; Steady states, Stability, Phase Diagrams, Linearization.
     Infinite Horizon Optimization in Discrete Time: Stationary Dynamic Programming with Discounting; Euler Equations and Transversality Condition; Solution techniques.
  
  3. Microfounded Macro Models:
     Lucas Critique and the need for microfoundations; the Dynamic General Equilibrium (DGE) approach to macro analysis: optimization problem of a representative household; optimization problem of a representative firm.
  
  4. Growth and Overlapping Generations models:
     Neoclassical Growth Models - The Solow model; The Ramsey-Cass-Koopmans model; The Samuelson-Diamond Overlapping Generations model.
     Endogenous Growth Models - the Basic AK-Model; Models with Externalities.
  
  5. Basic Factors of Business Cycles: Evidence and Issues
  
  
  7. Real Business Cycle Theory - basic structure with and without labour; Money in utility; Effectiveness of Monetary Policy.
  

• **Suggested Readings**


6.5 Introduction to Game Theory: EC005

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 6 hours.
- **Credits**: 6.

**Course Objectives**

Game theory, which systematically studies strategic interactions, is an important tool for economists. The main goal of this course is to introduce the basic concepts of Game theory and to illustrate its importance in explaining various kinds of economic and social phenomena.

**Course Learning Outcomes**

To learn static and dynamic game models with complete and incomplete information. Learn and apply the main equilibrium concepts of noncooperative game theory, as well as learn procedures of iterated dominance. Learn some major applications such as Auctions, Bargaining, Repeated Games, Signaling and Screening.

**Content: Unit-wise**

1. Games with perfect information
   - (a) Strategic form games: Dominated strategy, Nash and mixed strategy Nash equilibrium, Iterated elimination
   - (b) Extensive form games: Action and strategy, Nash Equilibrium, Subgame perfect Nash equilibrium, One-deviation property and backward induction
   - (c) Repeated games: Finitely and infinitely repeated game,
   - (d) Bargaining: Alternating offers bargaining: Finite and infinite horizon

2. Games with Imperfect Information
   - (a) Imperfect information and Subgame perfection: Information Set, Mixed and behavioural strategies
   - (b) Static games of incomplete information: Bayesian Nash equilibrium, Harsanyi transformation, Auction
6. CORE COURSES

(c) Dynamic games of incomplete information: Perfect Bayesian Equilibrium, Signaling games, Reputation games, Intuitive Criterion
(d) Information Economics: Adverse selection, Monopolistic Screening, Moral hazard

• Suggested Readings


6.6 Economic Development and Policy in India: EC006

• Marks: Assignments - 30, Exam - 70

• Duration (per week): 6 hours.

• Credits: 6.

• Course Objectives

The aim of this course to familiarise students with recent research on issues concerning economic development and policy in India, with an emphasis on contemporary debates, and to train them in the conduct of policy analysis using the tools of economics. In particular, the course will help students to understand the application of economic theory, and the statistical and econometric techniques that they are taught in other courses. The approach is modular, and will vary with time, depending on the nature of current policy discourse and the expertise of the instructor.

• Course Learning Outcomes Students will have the tools to understand current policy debates and contribute to policy making in an informed way. They will also learn how to conduct independent research in these areas.

• Content: Unit-wise

1. Poverty and inequality
2. Food and nutrition
3. Economic reforms and industrial performance
4. Agriculture
Suggested Readings


6. CORE COURSES
Elective Courses

7.1 Microeconomics

7.1.1 Mathematical Economics: EC101

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course is designed for students who plan to do further graduate level work in economic theory, especially those with a keen interest in creating, as opposed to consuming, pure theory.

**Course Learning Outcomes** The course aims for students to learn the following: (1) a rigorous exposure to a selection of basic mathematical tools that are used by economic theorists, and (2) applications of these methods to some areas of economic theory including duality theory, game theory, the Arrow-Debreu model and comparative statics.

**Content: Unit-wise**

1. Set theory and preliminaries
2. Topological Spaces:
   - Metric spaces, topological spaces and continuous functions; various useful constructions, e.g., projective and inductive topologies
   - Countability and separability properties
   - Compactness, completeness, connectedness, etc.
   - Topologies on function spaces; linear spaces, weak topologies; topologies on space of probability measures
   - Convex analysis; separation theorems
   - Set-valued mappings, fixed point theorems
3. Arrow-Debreu model: existence and optimality
4. Debreu-Scarf theorem
5. Duality theory
6. Nash’s existence theorem
7. Lattices, supermodularity and comparative statics

• **Suggested Readings**


### 7.1.2 Contract Theory: EC102

• **Marks**: Assignments - 30, Exam - 70

• **Duration (per week)**: 5 hours.

• **Credits**: 5.

• **Course Objectives**

Contracts are the bedrock for functioning of the market as well as non-market economic systems. Unsurprisingly, the study of contracts and the associated incentive structures has been a major preoccupation of thinking and research in Economics. Most of the real world contractual settings are characterized by conflict of interests as well as asymmetry of information among the individuals involved. Accordingly, this course examines the incentives and outcomes for various contractual settings, covering contracts used by the market as well as non-market economic systems.

• **Course Learning Outcomes**

The learning outcomes of the course are as follows: First, students successfully completing this course will enhance their skill to develop formal analytical framework to examine the contractual settings and the economic systems covered in the course. Second, they will learn about incentive structures for the individuals and firms involved. Finally, they will learn to draw policy conclusions about optimal contracts for various settings covered in the course.

• **Content: Unit-wise**

1. Decision Making Under Uncertainty:
   
   The Expected Utility Theorem; Money Lotteries; Measure of Risk aversion; Comparing Risk aversion; Comparison of risky alternatives, Insurance.
2. Hidden Information and Adverse Selection:
The first-best versus the second-best in presence of informational asymmetry; Single-crossing condition and monotonicity of choice; The Revelation Principle; The Rent Extraction versus Allocative Efficiency Tradeoff; Screening and its applications - Credit Rationing, Regulation, Insurance; Signalling and its applications.

3. Hidden Action and Moral Hazard:
The basic principal-agent problem; Rent Extraction-Efficiency Tradeoffs, The first-order approach; Linear and Non-linear Contracts; Insurance Contracts; Value of information; Adverse selection with Moral hazard; Multi-task moral hazard; Relational Contracts.

4. Competition and Moral hazard in Teams:
Competition among agents; Symmetric and Asymmetric Competitions; Relative performance evaluation; Multi-agent moral hazard; Moral hazard in teams; Firm as a team.

5. Incomplete Contracts:
Basic framework; Verifiability; Hold-up problem and its consequences; Market and Non-market Organizations; Markets and contracts; Foundations of Incomplete Contracts; Procurement Contracts for Public Goods; Short-term versus Long-term Procurement Contracts; Public versus Private ownership; Public Private Partnerships.

• Suggested Readings
The detailed reading list will contain those below along with several papers for each section.


7.1.3 Game Theory: EC103

• Marks: Assignments - 30, Exam - 70

• Duration (per week): 5 hours.

• Credits: 5.
• **Course Objectives**

The primary objective of this course is to make the student familiar with some of the core ideas, methods and results of noncooperative game theory; a secondary objective is to show the theory in use in substantive economic applications.

• **Course Learning Outcomes**

The student will learn the rigorous language of game theory, and the important theorems that underpin noncooperative game theory. By the end of the course, the student is expected to be able to develop the facility of using some of these tools to model and analyze situations of conflict and cooperation.

• **Content: Unit-wise**

1. Formal representation of a non-cooperative game in extensive form. Important notions: information; pure, mixed, and behaviour strategies; Kuhn’s theorem; equivalence notions.


3. Special classes of games: perfect information games and constant-sum games.


5. Economic applications: oligopoly theory, some dynamic games applications.


7. Economic applications, including auction theory and regulation theory.

• **Suggested Readings**


**7.1.4 Game Theory II: EC104**

• **Marks**: Assignments - 30, Exam - 70

• **Duration (per week)**: 5 hours.

• **Credits**: 5.
7.1. MICROECONOMICS

- **Course Objectives**
  The objective is to discuss selected topics in game theory in some depth. These can vary across different years, depending upon the instructor’s choice. They may include, but are not restricted to, the topics listed below.

- **Course Learning Outcomes**
  It is evident that there is overlap between the listed topics. So, for instance, if mechanism design is taught, its unifying framework can be used to study auctions, matching and so forth as well. The student is expected to learn individual topics in some depth, as well as learn some of their interconnections, as in the illustration above.

- **Content: Unit-wise**
  5. Repeated Games and Applications.
  7. Evolutionary Game Theory.
  8. Epistemic Game Theory.

- **Suggested Readings**
  Relevant papers will be an important part of the references in any given year. In addition, the following books and materials are good sources.

Battigalli, P. (2018): *Analysis of Strategic Thinking-Part I*, didattica.unibocconi.edu


7. ELECTIVE COURSES

7.1.5 Social Choice Theory: EC105

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

Social choice theory studies group decisions that are achieved by aggregating individual preferences. Aggregations may be guided by notions of justice, fairness and efficiency, which are also subjects of political philosophy, making this topic inherently interdisciplinary. The subject has evolved in economics by the systematic modelling of individual preferences and axiomatic structures, and more recently by using Game theory to provide a framework for considering strategic interactions and information revelation in this context. The goal of this course is to introduce students to basics of social choice theory and mechanism design.

**Course Learning Outcomes**

The student will learn a set of formal tools with which to analyze economic and social outcomes, as well as ongoing work on mechanism design or design of institutions to implement social choice functions.

**Content: Unit-wise**

1. Preference aggregation:
   - Arrow’s impossibility theorem; Welfare functional; Utilitarianism; Liberal paradox.
2. Fairness:
   - Rawlsian justice; Capability; Equality of opportunity; Envy freeness.
3. Axiomatic bargaining, Axiomatic cost/surplus allocations, Matching.
4. Measures:
   - Inequality; Poverty; Mobility; Vulnerability.
5. Mechanism design:
   - Strategy proof mechanism, Nash and Bayes-Nash implementation, Auction, Regulation.

**Suggested Readings**


7.1. MICROECONOMICS

7.1.6 Topics in Economic Theory: EC106

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

The objective is to discuss topics of significance in economic theory at some length. The topics will vary over different years and depend on the instructor’s choice, who may choose them from any of a variety of fields, ranging from Micro to Macro.

**Course Learning Outcomes**

As a salient illustration, dynamic economics plays a significant role across a wide spectrum of Micro- and Macro- theory. A possible outline for such a course is given below. By the end of the course, students would learn the economics and mathematics of recursive models, modeling individual intertemporal choice, as well as repeated games with exponential discounting, and some of their many economic applications. They would also learn the problems and pitfalls when one models hyperbolic discounting.

**Content : Unit-wise**

2. Repeated games with perfect and imperfect monitoring. Applications to repeated moral hazard (and adverse selection): e.g., collusive repeated oligopoly, relational labour contracts.

**Suggested Readings**

Besides papers, the following readings are suggested.


7.1.7 International Trade Theory: EC107

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course is designed to familiarise students with discussions in the area of international trade and trade policy, reviewing traditional theories of international trade and recent developments in the economic literature based on the New trade theory and on the analysis of FDI and global production chains.

**Course Learning Outcomes**

The student will be able to analyze historical as well as contemporary issues in trade theory and policy using a variety of lenses provided in the course: classical theories of comparative advantage, imperfect competition, political economy of trade agreements and protectionism. The analytical tools relating to the issues of migration, trade and capital formation will be updated.

**Content : Unit-wise**

1. Classical trade theories on comparative advantage (Ricardo and Heckscher-Ohlin frameworks), gains from trade, international equilibrium with continuum
2. Specific factor models, empirical approaches, HOV and paradox
3. Trade in intermediate inputs and wages: outsourcing, trade in tasks and submodularity
4. Imperfect Competition:
   - Imperfect competition, homogeneity: Krugman, Brander-Spencer models
   - Monopolistic competition, heterogeneity
   - Generalised oligopoly framework, heterogeneity
5. FDI and global production, FDI vs. exports
6. Political economy of trade agreements and upcoming issues of protections
7. Trade and growth; immiserizing growth; endogenous growth with homogeneity and heterogeneity
8. Migration, international trade and capital formation

**Suggested Readings**


## 7.2 Macroeconomics

### 7.2.1 Dynamic Macroeconomics: EC201

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

Dynamic models and approaches to policy making are integral to modern macroeconomics. This course emphasizes the use of recursive methods to analyze macroeconomic models. Applications involve building on the models introduced in compulsory macro, such as deterministic and stochastic growth and OLG models, as well as search models and dynamic public finance.

**Course Learning Outcomes**

This course will enable students to understand and apply dynamic programming methods to analyze macroeconomic problems and policy.

**Content**: Unit-wise
7. ELECTIVE COURSES

1. Competitive Equilibria in Dynamic Economies:
   Stochastic difference equations; Markov processes; Dynamic Programming, Complete Markets; sequential trading and Arrow securities; Recursive competitive equilibrium; examples of incomplete markets.

2. Optimal Fiscal Policy

3. Optimal Taxation with and without commitment

4. Search, Matching and Unemployment
   McCall’s model of intertemporal job search, A lake model, A model of career choice, Jovanovic’s matching model

5. The savings problem and Bewley models

• Suggested Readings


7.2.2 Computational Macroeconomics: EC202

• Marks: Assignments - 50, Exam - 50

• Duration (per week): 5 hours.

• Credits: 5.

• Course Objectives
   The objective is to teach the analytical and numerical tools for solving dynamic macroeconomics models. This includes relevant software (Matlab, Dynare).

• Course Learning Outcomes
   The student will understand recursive methods to express dynamic macro models, as well as gain facility in solving them numerically using Dynare (a software package written on Matlab). In particular, they will learn the formulation and solution of DSGE models, and their Bayesian estimation.

• Content: Unit-wise

   1. Introduction of coding the dynamical Systems: Deterministic and stochastic difference equations, Markov Process, Ergodic Theory, basic programming with Dynare.


4. Application of standard New Keynesian in open economy with informal sector

5. Estimating non-linear models with states and with filtering states

6. Dynamic programming and projection methods

7. Heterogeneous models and estimations
   Aiyari model and Krusell-Smith models and their extensions.

- Suggested Readings


  Miao, Jianjun (2013), Economics Dynamics: A Discrete Time, Boston University.

7.2.3 International Macroeconomics: EC203

- Marks: Assignments - 30, Exam - 70

- Duration (per week): 5 hours.

- Credits: 5.

- Course Objectives The course is aimed at providing students with a comprehensive knowledge of modern macroeconomic theory in a way that develops intuition and technical ability to apply macroeconomic theory in practice in an open economy environment. This is the study of how trade between countries in goods, services, and assets changes over time, both over the business cycle and the long run. The course offers important concepts, empirical facts, and puzzles in international macro and builds models to make sense of them (or not, in some cases!) Students will be equipped with the key tools needed to formulate and solve problems analytically and provided with an appreciation of how these tools can be used to understand real world events and policy.

- Course Learning Outcomes

  On successful completion of this course, students will be able to:

  (a) Recognise key concepts, theories and models of macroeconomics in open economy environment

  (b) Apply macroeconomic tools to the analysis of a variety of real world events, empirical trends and policy.

  (c) Communicate concepts, graphically, mathematically and in writing, to a professional standard.
(d) Evaluate real world events and illustrate their arguments in terms of relevant macroeconomic models.

- **Content: Unit-wise**

  1. Preliminaries and basic models:
     Business-Cycle Facts Around the World, Global imbalances and balances of payment accounting; An Open Endowment Economy; An Open Economy with Capital; The Open Economy Real-Business-Cycle Model.
  2. Standard New Keynesian model with open economy
  3. Business Cycles, Trade, Exchange Rates and Unemployment:
  4. Policy:
     Exchange Rate Policy And Capital Controls; Financial Frictions And Aggregate Instability.
  5. Sovereign debt, default and crises:
     Sovereign Default; Government debt in international macroeconomics; sovereign debt crises; International capital flow puzzles.
  6. Modeling joint dynamics of the current account and the real exchange rate under currency paradigms

- **Suggested Readings**


**7.2.4 Monetary Theory and Policy: EC204**

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

- **Course Objectives**

  This course aims to acquaint the students with the role played by monetary policy and the impact of introducing money in standard economic theory models. The course covers money-in-the-utility function model and the New Keynesian model of monetary
7.2. MACROECONOMICS

policy. The course also includes a discussion on the role played by monetary policy in the open economy context. The course also delves on discretionary policy vs rules and monetary policy strategies.

- Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Understand monetary models
2. Analyse transmission mechanism of monetary policy
3. Comprehend and analyse the impact of monetary policy on the economy
4. Compare impact of monetary rules vs discretionary policy
5. Understand monetary policy strategies

- Content: Unit-wise

1. Money-in-the-Utility Function
   MIU model; steady state equilibrium; Nonsuperneutrality; Dynamics.
2. New Keynesian Models of Monetary Policy
   Basic New Keynesian model; Monetary policy analysis in the New Keynesian model
3. Monetary Policy in an Open Economy
   Two-country model; Policy coordination; Small open economy models
4. Discretionary Policy and Rules
   Policy Objectives; Targeting rules; Taylor Principle; Inflation Targeting framework;
   Commitment vs. Discretion
5. Monetary Policy Operating Procedures
   Instruments and goals; Effects of operating procedures; policy measures; Role and
   strategies of Central Bank communication in Monetary Policy; Forward guidance;
   Unconventional monetary policy

- Suggested Readings


7. ELECTIVE COURSES

7.2.5 Macroeconomics of Development: EC205

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
- **Course Objectives**
  The course is motivated by two fundamental queries: (i) What explains the vast divergence in growth patterns across the world? (ii) What is an appropriate government policy (if any) in a low income-low growth country which can usher in a “high growth” regime? Modern growth theory has moved beyond the neoclassical framework to provide answers to these set of questions. This course takes a closer look at these alternative theories.
- **Course Learning Outcomes**
  This course will enable students to understand, evaluate and compare various policies that promote growth. It will also help them understand the deeper institutional and cultural characteristics that might be the root cause of underdevelopment in many poor countries.
- **Content: Unit-wise**
  1. Proximate Causes of Growth:
     (a) Human Capital: The Ben Porath model of human capital accumulation; The Nelson-Phelps model of skill-technology complementarity.
     (b) Technology: Distance to the frontier and technology diffusion; Directed technological change; Appropriate versus inappropriate technologies.
  2. Deeper Causes of Growth:
     (a) Imperfect Markets: Credit Market Imperfection and Indivisibility of investment; Risk, diversification and financial institutions.
     (b) Political Economy: Inequality, Taxation and Growth; Democracy versus Oligarchy.
     (c) History versus Expectations: Underdevelopment as coordination failure; Multiple equilibria in technology adoption.
     (d) Culture: Culture, risk and entrepreneurship; Culture, patience and occupational choice.
- **Suggested Readings**
  This course is primarily based on journal articles too numerous to list here. A broad overview of the topics can be found in the following text books:


  A few representative articles are listed:


7.3 Economic History/History of Economic Thought

7.3.1 Contemporary Issues in Historical Perspective: EC301

Marks: Assignments - 30, Exam - 70

Duration (per week): 5 hours.

Credits : 5.

• Course Objectives: This course aims to connect contemporary issues in economics with their historical counterparts to better understand the evolution of ideas and the empirical patterns that accompany them. Many of the questions that are the centre of charged and polarized discussions today have interesting histories whose reading can provide sharpness and context to current debates. Each year, a few of these issues will be selected. The readings given below are therefore indicative. They are an example of what will be used for two broad topics: Environmental Change and Group Inequality.

• Course Learning Outcomes: The class will be a mixture of lectures and seminar-type discussions based on assigned material that is read before coming to class. Students will learn how to combine historical argument with the tools of modern microeconomic analysis.
7. ELECTIVE COURSES

• Content: Unit-wise

1. Historical facts about our changing environment:
   Trends in population, GDP, energy use and pollution. Milestones in environmental regulation since the early twentieth century.

2. The commons problem:
   Community institutions and collective action.

3. Environmental regulation:
   Types of international agreements that have emerged to avoid environmental degradation. Game-theoretic analysis of the stability of such agreements. Price versus quantity regulation.

4. Discrimination:

5. Social policy to address group inequalities:
   Affirmative action in historical and cross-national perspective.

• Suggested Readings


7.3.2 Topics in Economic and Social History: EC302

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course critically examines the mainstream characterisation of global migration flows. After discussing the impulses that led to the massive movement of people across continents in the 19th century, the course focuses attention on plantations, a sector that was one of the largest employers of migrant labour.

**Course Learning Outcomes** The student will understand the diverse recruitment strategies used on the plantations in this period, and also, in depth, the causes and consequences of the variety of labour contracts (including indenture) under which workers were employed. Additionally, they will develop an understanding of gender dimensions of migration and work are discussed in a separate sub-section.

**Content : Unit-wise**

1. Global migration flows in the 19th century
2. Plantations in the colonies: indentured labour
3. Other types of labour contracts
4. Women workers in the 19th century
5. Role of plantations in the colonial economy

**Suggested Readings**


7.3.3 History of Economic Analysis: EC303

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Objectives**: This course traces the development of the ideas that have led to the methods of economic analysis that are considered best practice in the discipline. It will also expose students to non-mainstream paradigms that have emerged in the discipline.

**Course Learning Outcomes**: Students will follow the evolution of the techniques they are taught in many of their compulsory courses. This will help them critically evaluate economic techniques and link them to the challenges of economic environment that led to their emergence.

**Content: Unit-wise**

1. Classical political economy:
   The development and growth of nations and the distribution of income across the owners of labour, capital and land.

2. Neoclassical microeconomics:
   Demand theory, welfare economics and general equilibrium analysis.

3. Information economics and game theory:
   The effects of missing information and strategic behaviour on the functioning of markets.

4. Macroeconomics and financial markets:
   Origins of macroeconomics in the Great Depression and its subsequent development.

5. The development of empirical methods:
   Statistical thinking and causal inference in economics.

6. Endogenous preferences and behavioral economics:
   The move beyond traditional notions of preferences and maximizing behavior.

**Selected Readings**


J. R. Hicks (1946). *Value and Capital*.

J. M. Keynes (1936). *The general theory of employment, interest and money*.


### 7.4 Econometric Methods and Applications

#### 7.4.1 Econometric Methods: EC401

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course provides the theoretical underpinnings for conducting applied econometric studies. It provides the conceptual framework on which such analyses are based, supplemented by illustrative empirical applications. Students will need to have passed course 003 in order to be eligible to take this course.

**Course Learning Outcomes**

The ability to conduct empirical analyses and data analytics are increasingly valued in the job market. This course will enable students to understand why and how questions are to be framed and answered. It will also equip them to learn more advanced topics on their own.

**Content**: Unit-wise
1. Ordinary Least Squares, Hypothesis Tests and Model Selection.
3. Endogeneity and Instrumental Variable Estimation.
5. Simulation Based Inference.
7. Special topic (will vary each year)

- **Suggested Readings**


  Supplementary material for empirical applications will also be provided.

### 7.4.2 Impact Evaluation Methods: EC402

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

- **Course Objectives**

  The objective of this course is to introduce students to techniques used to evaluate the impact of programmes and policies on design outcomes. It will underline the need for context-specificity, but in each case, the focus will be on uncovering causal impact. It will review various techniques used to achieve identification, and discuss their limitations. It will use examples from India and overseas to anchor discussion of each of these methods.

- **Course Learning Outcomes**

  Impact assessment tools are being increasingly used in public, private and NGO sectors to evaluate which interventions and programmes work, and how cost-effective they are. This course will therefore be of benefit to students in a wide range of careers.

- **Content: Unit-wise**

  1. Randomized Control Trials
  2. Control Function Approaches
  3. Matching Methods
  4. Regression Discontinuity
  5. Mixed Methods

- **Suggested Readings**

7.4. ECONOMETRIC METHODS AND APPLICATIONS


7.4.3 Time Series Analysis: EC403

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
- **Course Objectives**
  This course familiarizes students with advanced modelling techniques using time series data. The course primarily focuses on acquainting students with technical skills along with implementation of time series models using software. Students can apply time series econometrics to a wide variety of macro and financial data problems.

- **Course Learning Outcomes**
  On successful completion of this course, students will be able to: (a) Relate to the key concepts in time series econometrics. (b) Apply time series methods to analyse various situations using time series econometrics software. (c) Evaluate real world problems by formulating and utilizing the appropriate time series models.

- **Content: Unit-wise**
  1. Unit Roots, Cointegration and ARDL:
     Deterministic and stochastic trend, trend stationary and difference stationary process; Random walk model; Testing for unit roots, structural change, multiple unit roots, seasonal unit roots; Cointegration, error correction: Testing for cointegration; ARDL Bounds Testing Approach.
  2. Box-Jenkins Methodology:
     Stationarity, invertibility; Autoregressive models, moving average models, mixed autoregressive and moving average models; Identification, estimation, diagnostic checking; Forecast function.
  3. ARCH/GARCH:
     ARCH Processes; GARCH Processes; ARCH-M and GARCH-M Models.
  4. VAR Models:
     Estimation and identification; Impulse response function; Variance decomposition.
  5. Panel Data Methods:
     Panel Data Unit Root Tests; Panel Data Cointegration Test; Panel Estimation (FMOLS and DOLS).
• Suggested Readings


7.4.4 Forecasting Methods and Applications: EC404

• Marks: Assignments - 50, Exam - 50

• Duration (per week): 5 hours

• Credits : 5

• Course Objectives

This course covers various quantitative and judgmental techniques used in economic and business forecasting. The course also examines techniques for the evaluation of performance of forecasting methods and combination of forecasts. Practical applications of forecasting using forecasting/econometric software packages are undertaken.

• Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Understand qualitative and quantitative methods for forecasting in business and economics
2. Apply time series econometric forecasting methods to practical forecasting settings
3. Use standard econometric/forecasting software for forecasting
4. Work on real world forecasting applications

• Content : Unit-wise

1. Overview of Forecasting and Forecast Evaluation
   Applications of forecasting; Forecasting methods and forecast horizons; Nowcasting and backcasting; Measures and tests of accuracy; Choosing between forecasting methods; Unbiasedness and Rationality
2. Combination of Forecasts
   Forecast Encompassing; Optimal combining weights

3. Univariate Models: Smoothing Techniques and Box-Jenkins Methodology
   Averaging methods; Exponential smoothing methods; Decomposition methods;
   Unit roots; Autoregressive models, moving average models, mixed autoregressive
   and moving average models; Identification, estimation, diagnostic checking; Forecast
   function

   models
   Multivariate regression model; Implications of violation of OLS assumptions for
   forecasting; Observational Equivalence, reduced form representation; Estimation,
   forecasting and simulation with simultaneous equation model; VAR models; Cointegration

5. Judgmental Forecasting
   Jury of executive opinion; Delphi approach; Sales force composite methods; Anticipatory
   surveys and market research-based assessments

• Suggested Readings


University Press.


https://www.sas.upenn.edu/ fdiebold/Teaching221/Forecasting.pdf


Inc.


Press.

Pindyck, R.S. and Rubinfeld, D.L. (1997): Econometric Models and Economic Forecasts,
7. ELECTIVE COURSES

7.4.5 Applied Production Analysis: EC405

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours.

- **Credits**: 5.

- **Course Objectives**
  
  This is an applied course intended to equip students with relevant skills and competences to analyse production technologies and producer behaviour with appropriate applied methods/tools.

- **Course Learning Outcomes**
  
  The student will develop a thorough understanding of production theories, estimation techniques for efficiency and productivity measurement.

- **Content : Unit-wise**
  
  1. Primal approaches in production economics: theory and econometric estimation
  2. Dual approaches in production economics: cost minimization and cost function, profit maximization and profit function: theory and econometric estimation
  3. Multi-output technologies and their estimation: input, output and directional distance functions
  4. Functional forms used in applied production analysis: Cobb-Douglas, translog, quadratic etc. Unit V: Efficiency and Productivity Analysis: concepts and measurements (stochastic frontier analysis (SFA), DEA etc.)

- **Suggested Readings**


  Moreover, readings in the form of journal articles and working papers
7.4.6 Applied Consumption Analysis: EC406

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**
The objective of this course is to familiarize students with analyzing issues related to consumer demand using appropriate econometric tools.

**Course Learning Outcomes**
The student will learn how to analyze demographically-extended demand systems, as well as dynamic demand systems, using maximum likelihood, and nonparametric estimation techniques.

**Content: Unit-wise**
4. Dynamic Demand Systems: Habit formation models, Modelling changes in taste.

**Suggested Readings**


7.4.7 Semi- and Nonparametric Estimation: EC407

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
• Course Objectives
This course is aimed at giving a brief introduction to the statistical theory of nonparametric density and regression function estimation. The focus is on kernel-based nonparametric estimation and inference. This includes nonparametric kernel density estimation, tests associated with densities, nonparametric kernel regression, tests for correct specification of functional forms, nonparametric sieve estimation, and semi-parametric estimation of single-equation models (including partially linear models, single-index models, additive models, etc.). Several statistical and econometric applications with cross-sectional data will be discussed. A brief discussion of nonparametric and semi-parametric estimation of panel data models will be touched upon.

• Course Learning Outcomes
Students will acquire some understanding and skills in nonparametric estimation, an area that is increasingly important in today’s data-rich contexts.

• Content : Unit-wise
1. Parametric vs. nonparametric statistical models. The histogram and the kernel density estimator.
5. Some direct statistical applications of kernel density estimation.
8. Some direct applications of nonparametric regression.
10. Application: estimating regression discontinuity models.

• Suggested Readings


### 7.4.8 Topics in Econometrics: EC408

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
- **Course Objectives**
  
  This course is meant to acquaint students with some advanced techniques in econometric estimation.

- **Course Learning Outcomes**
  
  Students would become conversant with technical derivations and practical applications in the areas of microeconomics and macroeconomics.

- **Content: Unit-wise**
  
  1. Linear regression models:
     
     Instruments, 2SLS estimator, Generalized Instrumental Variables estimator; Simultaneous equations.

  2. Generalised Method of Moments estimator:
     
     Efficient GMM estimation; Over-identifying restrictions.

  3. Panel Data Models:
     
     Fixed effects models, Random effects models, Arellano-Bond estimator in dynamic panel data models.

  4. Quantile regression estimation.

  5. Nonlinear Models:
     
     probit models, logit models (including their multivariate forms), Tobit models, models for count data, censored and missing data schemes.

- **Suggested Readings**


### 7.4.9 Applied Environmental Analysis: EC409

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
7. ELECTIVE COURSES

- Credits: 5

- Course Objectives
This course focuses on empirical applications in environmental and natural resource economics. It comprises applied optimal control and dynamic optimization problems; computable general equilibrium (CGE) models; and applied econometrics—cross section, panel data (static, dynamic and non-linear models) and discrete choice (limited dependent variable) models.

- Course Learning Outcomes
The emphasis is on understanding tools and techniques and applying them in a hands-on manner with environmental and natural issues as the context.

- Content: Unit-wise
1. Non-market valuation techniques: revealed and stated preferences.
2. Quasi-experimental methods in environmental economics
3. Environmental valuation at firm level: environment as an input in production; multi-output production technologies; emission generating production technologies.
4. Environmental valuation at the macro level: reduced form and computable general equilibrium models.
5. Environment and technological progress: econometric studies.
6. Dynamic applications: renewable and non-renewable resources; stock pollutants.

- Suggested Readings
Moreover, readings in the form of journal articles and working papers.

7.4.10 Coding Basics with Economic Applications: EC410

- Marks: Assignments - 50, Exam - 50

- Duration (per week): 5 hours

- Credits: 5

- Course Objectives
This course will introduce the basics of writing code and applying it to economics. As designed, it will work with the Python programming language. It will begin with an
introduction to data types in Python, basic techniques (iteration, defining functions, branching etc.), some of the Python libraries, and object-oriented programming. It will then introduce basic numerical methods (numerically solving nonlinear equations, optimisation, integration, Monte Carlo and simulation, numerical dynamic programming) and discuss their implementation in Python. The instructor will then have a choice of alternative modules. She can apply these techniques to relatively simple but modern macroeconomic models (Part 3 below), or industrial organisation models (Part 4). Or she can spend more time developing applications to probability and statistics (Part 5). If this last option is chosen, Part 2 of the course, on numerical methods, will have to be reduced and reorganised appropriately.

- **Course Learning Outcomes**
  The students will develop programming and computing skill on simulation and numerical dynamic programming

- **Content : Unit-wise**
  3. Applications from macroeconomics: job search, stochastic optimal growth, rational expectations equilibrium, asset pricing.
  5. Applications from probability and statistics: generating random numbers and computing probabilities and distributions from first principles, Monte Carlo sampling methods, using the Scipy and Sympy statistics modules to illustrate types of convergence, estimation, confidence intervals, hypothesis testing, Bootstrapping, kernel density estimation, connections with machine learning using the Scikit-learn module.

- **Suggested Readings**


7.4.11 Environmental Econometrics: EC411

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course will provide students with practical applications of econometric and other quantitative techniques to environmental problems especially for developing countries. These techniques include, but are not limited to, panel data regression, semi-parametric and nonparametric estimation, experimental and quasi-experimental techniques, numerical computational methods and machine learning. Ideally, students in this course should have prior exposure to econometric methods and impact evaluation at the level of Courses EC401, EC 402. Any new technique introduced in this course will only be covered in a practical how-to manner. The emphasis in this course will not be on the techniques, per se, but on how they are applied to environment problems especially in developing countries. The pedagogy will be through hands-on learning and projects.

**Course Learning Outcomes**

1. Students will become aware of the limitations of conventional, associational studies and the need for more varied empirical techniques.
2. They will acquire familiarity with policy-oriented research in the field of environment.
3. They will get hands-on experience in applying these techniques using real-world datasets and statistical software.

**Content: Unit-wise**

1. Review of econometric and impact evaluation methods.
2. Introduction to numerical computational methods, machine learning and Python.
3. Applications of impact evaluation methods: Environmental policies and programs.
4. Environmental applications of numerical computational methods and machine learning.
5. Spatial Econometrics application in environmental and urban economics

**Suggested Readings**


Other readings from journal articles and working papers.

## 7.5 Finance: Theory, Institutions and Modelling

### 7.5.1 Corporate Finance: EC501

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

The course will mainly focus on the interaction of firms and financial markets, and corporate governance. The study of corporate finance focuses on how firms raise finance and structure their liabilities. In the presence of agency problems, raising finance is
fraught with moral hazard and adverse selection problems. The course will study different aspects of lender-borrower relationships and their market outcomes. Theoretical models will be taught to the students with the help of game theory and information economics. The course would have journal articles and some textbooks as readings.

- **Course Learning Outcomes**
  
The students will be familiarised with the advanced theory and practices in corporate finance.

- **Course Content**
  
  1. Credit rationing
  2. Capital structure
  3. Capital acquisition and initial public offering
  4. Dividend policy
  5. Market for corporate control
  6. Takeovers and acquisitions
  7. Financial intermediation
  8. Corporate governance and corporate board

- **Suggested Readings**


### 7.5.2 Real Estate Economics and Finance: EC502

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours.

- **Credits**: 5.

- **Course Objectives**

  This course is an introduction to the theoretical and practical functioning of urban real estate markets using concepts from urban economics, finance and real estate economics. Starting with the productive and consumption advantages of urban areas and location patterns within cities, we study the implications for demand and supply of residential and commercial real estate, and for real estate asset prices. Subsequently, the objective is to understand valuation techniques for real estate, financial leverage and portfolio considerations, and the impact of policy, particularly taxation and urban planning.
• Course Learning Outcomes
This course will be particularly relevant for students interested in understanding real estate related fields in the public or private sector; or for students who are considering further education in this field. The students will draw on theory to assess the impact of a shift in supply and demand on residential and commercial property markets.

• Course Content: Unit-wise
1. Real Estate values over space and time
2. Why do cities exist? Agglomeration economies and urban consumption
3. Monocentric City Model and spatial equilibrium City Systems, city size and prices
4. Real estate supply
5. Public policy and real estate
6. Real estate price measurement: median price, hedonic regression, repeat sales
7. Valuation and risk-assessment of income-producing properties
8. Financial leverage Real estate investment trusts
9. Optimal portfolio theory Dynamics of the last housing boom and bust
10. Emerging market forces in commercial real estate

• Suggested Readings


7.5.3 Financial Markets: EC503

• Marks: Assignments - 30, Exam - 70

• Duration (per week): 5 hours

• Credits: 5

• Course Objectives
This course aims to familiarize the students with the concepts and theories related to financial markets. The course focuses on the money market, credit market, stock market, financial derivatives and foreign exchange market. The course also includes a discussion on the interlinkages between the various financial markets.
• **Course Learning Outcomes**

On successful completion of this course, students will be able to: 1. Understand the basic concepts and working of financial markets.
2. Relate to the theories pertaining to financial markets and their link with monetary policy.
3. Use econometric software to analyse financial data (optional).

• **Content: Unit-wise**

1. Money Market:
   - Analytics of Monetary Policy; Rules v/s Discretion; Optimal Instruments of Monetary Policy; Transmission Channels of Monetary Policy; Unconventional Monetary Policy.

2. Credit Market:
   - Imperfect Information in Credit Market; Market Failure.

3. Stock Market:
   - Portfolio Selection-Markowitz Approach, Feasible and Efficient Set; New Portfolio Theory-Capital Asset Pricing Model, Arbitrage Pricing Theory; Consumption Capital Asset Pricing Model, Equity Premium Puzzle.

4. Financial Derivatives Market:
   - Options and Futures, Pricing of Options-Black-Scholes Model and Binomial Option Pricing Model; Pricing of Futures.

5. Foreign Exchange Market:
   - Exchange Rate-Portfolio Balance Model; Monetary Model; Dornbusch Model of Overshooting Exchange Rates; Asian Financial Crisis; Global Financial Crisis.

• **Suggested Readings**


7.6 Public Policy: Theory and Institutions

7.6.1 Public Economics I: EC601

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
- **Course Objectives**

  Public Economics is a large and rapidly expanding field of research. It is concerned with normative and positive aspects of a government’s activities in an economy. Normative analysis is concerned with how a government should behave to improve social welfare and positive analysis studies the implications of government activities on the behavior of individuals and communities. Governments intervene through regulation, taxation, redistributive transfers, and the provision and production of private and public goods. This course will focus on public spending on public goods, regulation in the presence of externalities and redistributive policy. It will cover important theoretical results in the field and a number of case studies from across the world.

- **Course Learning Outcomes**

  By the end of the course, students will be familiar with important theoretical results in this area and with empirical trends in public spending across the world. They will also be guided in developing their writing skills to express ideas within this field to popular readers.

- **Content**: Unit-wise

  1. The emergence of a social state:
     The evolution of social spending across the world since the early twentieth century.

  2. Efficiency in the provision of public goods:
     The types and quantities of public goods that should be provided.

  3. Externalities and their regulation:
     Sources of externalities, their relationship to contracts and markets and their regulation.
4. Inequality and Distributive Justice:
   Theories of justice. Discrimination. Public policies to tackle group inequalities.

5. Preference Aggregation and Public debate:
   How do we determine provision when we do not know preferences? Voting and other forms of information aggregate in democracies.

- **Suggested Readings**


  Robert Nozick: *Anarchy, state, and utopia*, Basic books (2013)


**7.6.2 Public Economics II: EC602**

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours.

- **Credits**: 5.

- **Course Objectives**

  This course covers several topics in Public Economics at an advanced level. The course contents draw upon the recent theoretical and empirical research on the issues covered. The focus of the course is on the following areas: Taxes, Land Markets, Procurement of Public Goods, and Public vs. Private organizations. Each area covered starts with a mathematical model that serves as a basic framework of analysis. The analytical framework is then extended to cover results from contemporary research works. The reading material and classroom lectures make use of mathematical tools of economic analysis, especially the optimization techniques, and the basic results from the game-theory and information economics.

- **Course Learning Outcomes**

  The learning outcomes of the course as follows: First, students successfully completing this course will enhance their skill to develop formal analytical framework to examine the settings and areas covered in the course. Second, they will learn about the incentive
structure for the individuals and firms involved. Finally, they will learn to draw the policy conclusions related to Taxes, Land Markets, Procurement of Public Goods, and Public vs. Private organizations.

• **Content: Unit-wise**

  1. **Taxation:**
     - Direct Tax, Optimal Taxation; Property and Wealth Taxes; Stamp-Duty Tax; Indirect Tax and Goods and Services Tax (GST); Taxation in India; Tax Evasion and Black Income; Income Inequalities.
  2. **Land Markets:**
     - Land as a Factor of Production; Market in land property, Anti-commons and Land Assembly Problem; Compensation-Efficiency Paradox; Economics and Politics of Land Acquisition; Land supply regulations.
  3. **Public Goods and Public Procurement:**
     - Public Goods; Public versus Private Provisions; Public versus Private Investment; Procurement Contracts; Public Private Partnerships (PPPs) versus Privatization; Incentives and Outcomes under PPP Contracts; Theories of neighborhood development.
  4. **Public versus Private Organization:**
     - Basics of Contract Theory; Risk allocation and Moral Hazard; Incentives in Private and Public versus Private organizations; Bureaucrats versus Managers; Multi-tasks, etc.

• **Suggested Readings**


  Bernard Salanie: *Economics of Taxation* 2nd Ed. MIT Press (2011)


### 7.6.3 Environmental Economics: EC603

• **Marks:** Assignments - 30, Exam - 70

• **Duration (per week):** 5 hours.

• **Credits:** 5.
7. ELECTIVE COURSES

- **Course Objectives**
  
The objective of this course is to present an economic approach to environmental problems such as air and water pollution. Alternative methods of addressing pollution, namely, direct regulation and market based instruments (taxes and tradable permits) are compared and contrasted, especially in the presence of asymmetric information. This is followed by techniques for measuring the benefits of environmental improvements and their applications.

- **Course Learning Outcomes**
  
  A logical, coherent and sensible understanding of the reasons for (and solutions to) environmental problems. In particular, an ability to apply economic theory to environmental issues with a view to developing effective and rational environmental policies.

- **Course Content: Unit-wise**
  
  1. Externalities and public goods
  2. Corrective mechanisms (taxes, subsidies, permits)
  3. Regulation with moral hazard and adverse selection
  4. Valuation of non-market goods and amenities: overview and basic theory.
  5. Revealed preference (indirect market methods); health valuation; constructed markets (direct market methods).
  6. Cost-benefit analysis: measuring the cost of environmental policy; estimation of abatement cost functions; damage function assessment; discounting.

- **Suggested Readings**
  
  
  
  
  
  
  Articles from journals and working papers.

7.6.4 **Law and Economics: EC604**

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours.

- **Credits**: 5.
Course Objectives
This course examines how the legal and regulatory rules shape rules of the game in a market economy which, in turn, shape the incentive structure for private individuals, firms and other economic agents, and affect the allocation of resources, efficiency and equity.

Course Learning Outcomes
This course will educate students about how to apply an economic approach toward thinking about the law and regulatory rules. Students will learn how the law is an important organizing force that influences actions of the private citizens as well as various official and regulatory agencies. Students will also learn how the law can support and, at times, can conflict with the functioning of the market and the government, the latter are other organizing forces important for functioning of an economy. The course will enhance critical thinking and inter-disciplinary approach towards law and economics. Thereby, the course will help develop inter-disciplinary approaches and skills and enhance the employability of the students.

Content: Unit-wise
1. Introduction:
   Efficiency criteria in Law and Economics.
2. Contract Law:
   Need for a contract; Legal contract; Role of Contracts for functioning of markets; Efficient contracts; Complete and Incomplete Contracts; Reliance: Damages measures and their efficiency properties; Contracts as instrument of risk-allocation and information revelation; Regulatory Contracts; Contracts and Courts.
3. Property Law and Eminent Domain:
   Property Rights and their role in resource allocation; Transaction costs and Coase theorem; Legal remedies for breach of property rights; Intellectual Property Rights; Eminent Domain and Compulsory acquisition of land and other private property.
4. Civil Liability and Criminal Law:
   Tort law; liability rules versus property rights; accident law; product liability; efficiency properties of liability rules; efficiency-compensation trade-off; Rational crimes; Crime and Punishment; Severity versus Certainty of punishment
5. Litigation and Arbitration:
   Litigation and Arbitration; Litigation under asymmetric information; Litigation over compensation under eminent domain;
6. Topics in Law and Economics in India:
   Topics and Debt Contracts; Insurance Contracts; Insolvency and Bankruptcy Code.

Suggested Readings
7. ELECTIVE COURSES


In addition to the above readings, the course will use several research papers.

### 7.6.5 Natural Resource Economics: EC605

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

The objective of this course is to examine the allocation of renewable and non-renewable resources over time from positive and normative points of view. The role of markets and institutions is examined.

**Course Learning Outcomes**

Students will acquire the ability to delve into the Microeconomic foundations of resource management, and the use of public policy to encourage the optimal use of natural resources.

**Content**: Unit-wise


**Suggested Readings**


7.6. PUBLIC POLICY: THEORY AND INSTITUTIONS


Moreover, readings in the form of journal articles and working papers.

7.6.6 Energy Economics: EC606

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.
- **Course Objectives**

This course would explore theoretical and empirical perspectives on the topics related to energy demand, energy supply, energy markets, environmental consequences of energy use, and policies and regulatory mechanism for the sector. Main topics of the course would be illustrated with the relevant global regulatory experiences of the energy sector.

- **Course Learning Outcomes** This course would intends to provide theoretical and empirical perspectives on the topics related to energy demand, energy supply, energy markets; environmental consequences of energy use, and policies and regulatory mechanism for the sector.

- **Content**: Unit-wise
  1. Energy demand analysis and forecasting
  2. Economics of energy supply
  3. Energy markets
  4. Economics of energy-environment interaction
  5. Regulation and governance of energy sector
  6. Energy efficiency and innovations


Moreover, readings in the form of journal articles and working papers.
7.6.7 Welfare Economics: EC607

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

The aim of the course is to examine alternative ways in which microeconomic theory might be applied to analyse collective decision making. A normative approach based on the assumption that government is benign assumes government will maximise social welfare. By comparison, a positive approach (premised on analysis of the objectives and constraints faced by actors in decision-making processes) offers an alternative application of microeconomic theory.

**Course Learning Outcomes**

1. Learn economic models that study how policy makers and governments take decisions.
2. Develop the ability to: apply microeconomic theory to analyse collective action and public policy; assess reform of public spending and taxation against a set of criteria (which includes efficiency and equity), and explain why there is dissonance between analysis of what governments and policymakers should do and what they actually do.

**Content: Unit-wise**

1. Reasons for collective choice:
   - Public goods, Externalities, Redistribution.
2. Public choice in direct and representative democracies:
   - Collective decision making and voting rules; Voting and median voter model; Rent seeking, Lobbying and corruption.
3. Some applications:
   - Fiscal policies and taxation; Local public goods; Market failure vs. Government failure.

**Suggested Readings**


Articles from journals and working papers.

### 7.6.8 Economics of Regulation: EC608

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

The objective of this course is to introduce the role of government in altering market outcomes when either competitive forces are weak or competitive equilibrium fails. It draws from areas such as welfare economics, public economics, and industrial organisation.

**Course Learning Outcomes**

Student learning will focus on competition policy and economic regulation. They will also be introduced to a growing area of study and policy design, that of the introduction of market mechanisms into formerly regulated industries.

**Content : Unit-wise**

3. Theories of regulation: normative and positive analysis, interest groups theory.
4. Public Enterprise. The origins of public ownership as a way to regulate economic activity. Public vs. private ownership. Does the threat of nationalisation/municipalisation discipline private firms?
5. Regulating natural monopolies:
   (a) Pricing strategies, rate structure, peak load pricing. Averch-Johnson model.
   (b) Sustainability of natural monopolies and contestability
   Incomplete information games. Mechanism design and implementation theory. Revelation principles.
8. Regulation of innovation and patents.

- **Suggested Readings**

### 7.6.9 Climate Change Economics: EC609

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

#### Course Objectives

The objective of this course is to analyse climate change from an economic perspective. The problem is characterised as one of regulating a global stock externality in an intertemporal setting and in the presence of uncertainty and irreversibility.

- **Course Learning Outcomes**
  1. A logical, coherent and sensible understanding of the reasons for (and solutions to) climate change.
  2. Develop the ability to apply economic theory to climate issues with a view to developing effective and rational policies to address climate change.
7.7. DEVELOPMENT ECONOMICS

- Content: Unit-wise
  1. Overview:
     Basics of climate science; international response to climate change.
  2. Integrated Assessment Models (IAMs) and the social cost of carbon; choice of discount rate for climate policy; declining discount rate (DDR).
  3. Technical change and fossil energy consumption: responses to climate change in an endogenous growth model with clean and dirty technologies; implications of a transition to clean technologies in an IAM.
  4. Stern Review on the economics of climate change: analytical foundations, findings and policy implications.
  5. ?Tipping points? and non-linearities in the climate system and their role in formulating climate policy: fat tail probability distributions and Weitzman Dismal Theorem.
  6. Mitigation (tradable permits and carbon taxes); economic impacts and adaptation.
  7. Green paradox and carbon leakage.
  8. Environmental treaties; applying non-co-operative and co-operative game theory.

- Suggested Readings
  Articles from journals and working papers.

7.7 Development Economics

7.7.1 Topics in Development Economics: EC701

- Marks: Assignments - 30, Exam - 70
- Duration (per week): 5 hours
- Credits: 5

- Course Objectives
  This course intends to acquaint students with knowledge about some important development issues.

- Course Learning Outcomes
  Knowledge about development issues, both from a theoretical as well as empirical perspective.
• **Content: Unit-wise**

1. International debt and development
   - Two-gap models; transfer paradox; international debt issues; loan pushing; debt forgiveness; loan buybacks; debt-equity swaps; empirical studies
2. Intellectual property rights and development
   - TRIPs Agreement; innovation systems; IPR and technology transfer, problems with IPR
3. Wage Rigidity and Unemployment
   - Theory of implicit cooperation; labour turnover model; nutrition-based efficiency theory of wages
4. Rural Credit Markets
   - Lender’s risk hypothesis; monopolistic markets; implicit interest charges; credit as insurance; micro-finance
5. Interlinkage in Rural Markets
   - Potential risk; models of interlinked markets; implications for theory and policy; moral hazard and interlinkage
6. Inequality and Development
   - Reasons for a direct relation; reasons for an inverse relation; empirical studies

• **Suggested Readings**


7.7. DEVELOPMENT ECONOMICS


7.7.2 Trade and Development: EC702

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Objectives**

Flow of international trade and capital can create employment, enhance access to technology and knowledge, raise productivity, increase the variety and quality of goods available to consumers, stimulate capital inflows, increase foreign exchange earnings, and generate resources for sustainable development and poverty reduction. However, this positive relationship is not automatic and does not necessarily take place in all countries and contexts. This course is designed to make the students familiar with application of the existing trade theories and policies on the emerging debates in relation to the growth and development. Specifically, the impact of trade policies on welfare gains, employment, pro-poor growth, inequality and environment would be discussed along with role of WTO.

**Course Learning Outcomes**

The students will be exposed to standard empirical tools applied for estimating welfare gains from trade, gravity modelling, productivity analysis and pro-poor growth. It will update the understand the effects of tariffs and subsidies on trade patterns and the welfare of trading nations, explain how international negotiations and agreements have promoted world trade as well as Identify and measure the sources of economic growth using conventional and advanced methods.

**Content: Unit-wise**

1. Trade policies (tariff and non-tariff barriers) and implications
2. Analytical Approaches to Global Institutions (Public and Private) and Trade Policy
3. Trade creation and diversion and gravity modelling
4. Political economy of trade agreements and role of WTO
5. Issues in Trade, Welfare and Growth
   - Trade - gains and methods
   - Trade, FDI and growth (immiserating growth, spillovers, competition effects)
   - Trade, inequality, distributive conflict, pro-poor growth
6. Emigration, trade and development
7. Global production and issues

- Fair trade and industrial policy - labor standards, environment

- Suggested Readings


7.7.3 Environment and Development: EC703

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Outline**

The objective of this course is to examine the interaction between environmental and natural resources and economic development with a focus on South Asia. The emphasis is on analysing environmental problems associated with economic development using the tools of economic analysis.

**Course Learning Outcomes**

The course will provide an understanding of the underlying causes of environmental problems such as deforestation and pollution. It will also enable students to operationalise the concept of sustainable development through concepts such as green accounting.

**Content: Unit-wise**

1. Overview: Environmental problems and economic development in South Asia. Inter linkages between poverty, population and environmental degradation.
2. Sustainability: Concepts and measures of sustainability and whether sustainable development is desirable and feasible.
3. Economic growth and environment: Does economic growth inevitably result in environmental degradation? Is there a turning point beyond which increases in income lead to better environmental quality?
4. Institutions for management of common pool natural resources; applications in the context of deforestation and water.
5. Interlinkage in Rural Markets: Potential risk; models of interlinked markets; implications for theory and policy; moral hazard and interlinkage.
6. Urban/industrial environmental problems: Dimensions, special features (small-scale industries and informal sector), regulatory approaches, alternatives (judicial, market-based instruments).

**Suggested Readings**


Articles from journals and working papers.

7.7.4 Agricultural Economics: EC704

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5
- **Course Outline**
  The aim of this course is to provide students with an in-depth understanding of the issues relating to Indian agriculture and farmers’ welfare. The focus is on analyzing structural patterns in Indian agriculture, and how policies have influenced farmers’ choices and incomes. The approach is modular, and will depend on the policy discourse.

- **Course Learning Outcomes**
  Students will be able to participate in decision making related to the agricultural sector, and to have sufficient background to undertake independent research in this area.

- **Content: Unit-wise**
  1. Agricultural productivity trends and climate change
  2. Input-use efficiency and climate-related risk-mitigation strategies:
     - Seeds; Water (and electricity); Fertilizer; Labour.
  3. Agricultural insurance
  4. Market infrastructure
  5. Price policy
  6. Agriculture and nutrition

- **Suggested Readings**
  Given the nature of the course, readings may be updated annually.


Articles from journals and working papers.

### 7.7.5 Economics of Health and Education: EC705

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5
• **Course Objectives:**

Education and health are two critical aspects of well-being. The objective of this course is to explore how these are determined and related to other features of a society. This involves thinking about the proper measurement of outcomes in these areas, modelling individual, community and government decisions and evaluating public policy programs.

• **Course Learning Outcomes:**

Students will learn to develop microeconomic models that relate family and neighborhood composition to health outcomes and schooling choices. They will also learn how to estimate treatment effects in order to evaluate public programs.

• **Content: Unit-wise**

1. **Measurement and trends:** Correlation between alternative measures of well-being. The spread of education across the world. Budgetary allocations across space and time.

2. **Institutional design** Alternative systems for service delivery. The role of imperfect information, incentives and contracts.

3. **Discrimination and inequality:** Models of preference-based and statistical discrimination. Effective policies to address historical inequalities

4. **Environmental health:** Estimating impact and designing appropriate regulation to regulate social damages through environmental externalities

5. **The political economy of public policy:** The role of community structure in determining the distribution of public goods. Models of voting and collective action.

6. **Evaluating policy impact:** The estimation of treatment effects in randomized experiments and in observational data.

• **Selected Readings**


### 7.8 Industrial Economics

#### 7.8.1 Industrial Organisation: EC801

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours.
- **Credits**: 5.

**Course Objectives**

This course provides a foundation for the study of theoretical models of industrial organisation. This field of study is mainly concerned with different strategic motives and interactions in oligopolistic markets, employing the techniques taught in the compulsory course on Game Theory. It also provides a theoretical framework for analysis of antitrust/competition policy, as well as other policies relating to regulation, innovation, intellectual property rights, and strategic trade policy, which are covered in other courses.

**Course Learning Outcomes** Upon completing this course, the student would have learned to think analytically, using game theoretic tools, about the principal issues concerning oligopolistic markets, competition, and apply them to the real world of industry. They would also be prepared to understand competition policy more naturally and foundationally.

**Content : Unit-wise**

2. Spatial models of horizontal and vertical product differentiation.
4. Entry and entry deterrence strategies.
5. Vertically related markets and vertical contracts between firms.


**7.8.2 Economic Theory of the Firm: EC802**

• **Marks**: Assignments - 30, Exam - 70

• **Duration (per week)**: 5 hours.

• **Credits**: 5.

• **Course Objectives**
The firm is the foundation for all production activity. The course analyses the factors determining the boundaries of firms with special focus on vertical integration and horizontal expansions. The design of internal organisation and managerial roles are studied.

• **Course Learning Outcomes**
The student will understand the nature of the firm and its governance structure and also the different strategic aspects of firms’ decision making.

• **Content: Unit-wise**
1. Boundaries and nature of the firm
2. Vertical and horizontal integration
3. Make or buy decisions and outsourcing of inputs
4. Managerial behaviour and incentives
5. Technology innovation and efficiency

• **Suggested Readings**
The course is based on many journal articles and some of them are listed below:


### 7.8.3 Topics in Industrial Organisation: EC803

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Objectives**

This course will deal with some recent developments in the field of Industrial Organisation theory. Keeping in view how the different market imperfections are created and perpetuated by firms in a modern economy, the course will study the following topics in particular, along with other recent developments.

**Course Learning Outcomes** By the end of the course, the student will acquire a theoretical understanding of a variety of phenomena in industrial organisation and be prepared for research in this field.
7. ELECTIVE COURSES

- **Content : Unit-wise**

1. Innovation and intellectual property rights:
   R&D race and innovation incentive, organisation of R&D, patent vs. trade secrecy, licensing and joint ventures.

2. Bundling and tying:
   Economics of bundling and tying, strategic reasons and efficiencies, market structures and outcomes

3. Competition with switching Costs, network effects and network standards:
   Consumer search, consumer inertia, competitive effects of switching cost, market with network goods, network effect, network effects and switching costs, markets for several network goods, oligopoly pricing and standardisation, strategies in standards wars.

4. Product quality, reputation and advertising:
   Vertical product differentiation, quality choice, demand effect, advertising and competition, advertising and price signals, advertising and quality, informative and persuasive advertising.

5. Markets with intermediated goods:
   Intermediaries as dealers, intermediaries as match-makers, intermediaries as two-sided platforms, intermediation and information, information overload, intermediation and reputation

6. Public policies in network goods:
   Regulation, auction and auction markets.

- **Suggested Readings**


7.8.4 Economics of Innovation: EC804

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours

- **Credits**: 5

- **Course Objectives**

  During last 40 years or so the Economics of Innovation has become an independent field of enquiry for the growth and development of society. The process of innovation is a
very complex phenomenon and thus, on the one hand, it requires proper organisational design to encourage and incentivise and on the other it requires awarding appropriate property rights for management and transfer of the innovation towards the greater social good. Technological progress is an endogenous process and largely determined by the interplay of different organisational and legal structures of an economy. The course will focus on various static and dynamic aspects of technology creation and technology transfer both from the theoretical and empirical perspective.

- **Course Learning Outcomes**
  The student will learn to think about technology and technological progress using the tools of economics. They will develop an understanding of what goes into the making of technological advancement and success for an economy.

- **Content : Unit-wise**
  1. Incentives and management of innovation
     - Intellectual property rights
     - Sequential and complementary innovation
     - Network effect and standards
  2. Patents and R&D:
     - Patents and litigation
     - Patent pool
     - R&D tournaments, race and R&D organisation
  3. Diffusion of Innovation
  4. Technology transfer and licensing
  5. Innovation and public policy.


### 7.9 General

**7.9.1 Ethics and Economics: EC901**

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5
• Course Objectives
This course is designed to highlight the relevance of moral concerns to the practice of both positive and normative economics. It will also sensitize students to the influence of economic theory and its tools on moral philosophy.

• Course Learning Outcomes
Students will take away an understanding of, and ability to think about, fundamental categories such as rights, justice, equality, and their relationship to economics.

• Content: Unit-wise
1. Introduction: The economic importance of morality; morality and economic outcomes; ethics and the market; economists and morality- an overview.
2. Morality and economic rationality:
   Preferences vs. rights; preferences vs. rights vs. needs; norms and economic behavior; adaptive preferences.
3. Morality and Welfare:
   The Pareto principle and its critics; outcomes vs. procedures. Liberty and rights.
4. The doctrine of equality: types of equality; critics of equality.
5. Theory of Justice.

• Suggested Readings


7.9.2 Issues in Economic Systems and Institutions: EC902
• Marks: Assignments - 30, Exam - 70

• Duration (per week): 5 hours.

• Credits: 5.
• **Course Objectives**

Even relatively unregulated market economies do not operate in a vacuum. Transactions and contracts arise in a specific institutional setting, encompassing the legal and political system, corporate and social structure as well as cultural norms. Many relevant decisions are not mediated through a price system, e.g. allocations within a firm, verdicts delivered by a jury, job references provided by professors, etc. The way these systems and institutions are designed may affect resource allocation and outcomes significantly. The purpose of this course is to examine the linkage between institutions and economic performance.

• **Course Learning Outcomes**

The student will learn to analyze seemingly somewhat disparate issues using a theoretical framework to study them. The main tool they will gain facility in, in doing so, is game theory, especially games of incomplete information.

• **Content: Unit-wise**

1. Incentives and Motivation
2. Communication
3. Norms, Expectations and Coordination
4. Information Aggregation
5. Reputation
6. History

• **Suggested Readings**

The course is based on papers drawn from a variety of economic contexts. A sample follows.


### 7.9.3 Economics of Discrimination: EC903

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5
- **Course Objectives**

This course familiarises students with theories and empirical tools to understand and measure economic discrimination based on social group identities, such as caste, race, gender, tribal status, ethnicity and so on. The course will also deal with policy options targeting group-based disparities and discrimination, with a focus on affirmative action policies. This component will outline the various types of affirmative action, including quotas or reservation, and discuss debates around affirmative action, focusing on evidence-based research gauging its impact.

- **Course Learning Outcomes**

Students will develop an understanding of discrimination from economic and other perspectives, get a good handle on theoretical and empirical tools to study related research questions, and an appreciation of economic policy alternatives.

- **Content**: Unit-wise

1. **Theories**:
   - Statistical discrimination, taste for discrimination, signalling models.
2. **Overlap between economics of discrimination and related sub-disciplines**:
   - “Identity Economics”, pioneered by George Akerlof and Rachel Kranton, “Feminist Economics” and “Stratification Economics”.
3. **Empirical methods of estimating discrimination in market settings**: decomposition techniques
4. **Experimental methods**: both field-based as well as lab-based experiments to gauge discrimination outside the labour market.
5. **Affirmative action**
7.9. GENERAL

- **Suggested Readings**

7.9.4 Political Economics: EC904

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 5 hours

- **Credits**: 5

- **Course Objectives**
  
  This course introduces students to the political economy of institutions and development. We explore the interrelation and interaction between state, power and economic outcomes. Lectures will mainly focus on theoretical framework. Empirical papers will be covered through class discussions and student presentations. As a supplement we may also read original texts on Liberalism and Marxism.

- **Course Learning Outcomes**
  
  Students will develop an understanding of the interrelationships between institutions and development.

- **Content**: Unit-wise
  
  1. Democracy or dictatorship
  2. Political rent, corruption, cronynism
  3. Power of propertied classes in democracy
  4. Divide and rule
  5. Imperialism and colonialism
  6. Role of media and experts
  7. Collective action

- **Suggested Readings**
  
  Acemoglu, D.: Lecture Notes.
  
  http://economics.mit.edu/files/8753

7. ELECTIVE COURSES

7.9.5 Behavioural Economics: EC905

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Objectives**

This course will introduce the fast-evolving field of behavioural economics. This area has evolved through an interaction between experimental results (mostly from lab experiments, but also from field experiments) and the development of theory. While the evidence rejects some predictions of classical decision theory, it is yet to settle down on a firm alternative interpretation. Similarly, at present, there is often a multiplicity of theories to explain the evidence from behavioural experiments. Thus there is a good deal of leeway in the selection of material. The topics listed below are indicative and not meant to be comprehensive.

**Course Learning Outcomes**

Students would have learned the leading examples of departures in behaviour from that predicted by earlier economic theory, as well as the main models formulated to explain these departures.

**Content: Unit-wise**

1. Decision-making under risk and uncertainty.
2. Reference dependence and loss aversion.
3. Intertemporal decision-making.
4. Social preferences.
5. Behavioural game theory.

**Suggested Readings**


7.9.6 Economics of Organisations: EC906

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Objectives**

This course concerns the existence, nature, design and performance of organisations. It deals with co-ordination and interactions both within and across firms. In particular it will focus on decision-making in organisations, agency problems, social relations and contracts. The course would study in oligopolistic market environment the relevant issues from the perspective of internal organisation and interactions between firms. The foundation of the theory is based on empirical observations in different market contexts. Finally, the interplay of policy, institutions and organisations will be studied. This is an upcoming field and therefore the readings will be mostly from journal articles and the Handbook.

**Course Learning Outcomes**

By doing this course, students will extend their understanding of economics to how it impacts behaviour and outcomes within organisations.

**Content : Unit-wise**

1. Boundaries of firms: transaction cost economies, property rights and incentives
2. Hierarchy, authority, leadership and efficiency
3. Agency and incentive problems in organisational design
4. Vertical and horizontal relations between firms
5. Outsourcing and in-house productions
6. Labour union and oligopolistic competition
7. Delegation and incentives
8. Formal and relational contracts between firms
9. Research and development and technology transfer
10. Corporate social responsibility
11. Economics of non-profit organisations
12. Lobbying and corruption
13. Regulation and public policy.

### 7.9.7 Health Economics: EC907

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

**Course Outline**

This course analyses theoretical and empirical issues in health using economics tools, namely, microeconomics, game theory, behavioural economics and econometrics.

**Course Learning Outcomes**

1. A better understanding the economic theory of health and healthcare through a study of economic models of health, addiction, demand for healthcare and demand for insurance.
2. Learn to evaluate and interpret empirical findings in health economics.

**Content : Unit-wise**

1. Introduction to health economics: the economic way of thinking about health; health measurement, determinants and long run trends; health and socioeconomic status.
2. Economic models of health
3. Health Insurance: introduction and moral hazard; adverse selection in health insurance; social insurance in India and global examples.
4. The behavioural economics of health; unhealthy behaviour-evidence and policy issues.
5. Health and economic development
7. Externalities and public health: air pollution, pandemics.

**Suggested Readings**


Articles from journals and working papers.

### 7.9.8 Labour Economics: EC908

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 5 hours
- **Credits**: 5

#### Course Objectives

The objective of this course is to introduce the student to labour economics with an emphasis on microeconomic theory and empirics. The material covered would help the student to understand real world issues pertaining to labour markets and also to assess related public policy measures.

#### Course Learning Outcomes

The student will learn basic economic forces behind employment and wages, sources of labour market imperfections, driving forces for education and skill upgradation, discrimination among the workers and public polices for labour welfare.

#### Content: Unit-wise

1. **Labour Supply**: Choice between Consumption and Leisure; Incorporating Household Production and Decisions.
2. **Labour Demand and Equilibrium**: Labour Demand Function, Competitive Equilibrium, Compensating Wage Differentials and Hedonic Theory of Wages
3. **Investment in Education**: Theory of Human Capital, Education as a Signalling Device, Returns to Education
4. **Job Search**
5. **Discrimination**: Theories of Discrimination, Measuring Discrimination, Affirmative Action
7. Incentives, Agency and Efficiency Wages

8. Migration

- **Suggested Readings**


  Articles from journals and working papers.

### 7.10 Open Electives

The department will offer one of following courses in each semester as an open elective course.

#### 7.10.1 Mathematical Economics: EC1001

- **Marks**: Assignments - 30, Exam - 70

- **Duration (per week)**: 4 hours.

- **Credits**: 4.

- **Course Objectives**

  This course is designed for students who plan to do further graduate level work in economic theory, especially those with a keen interest in creating, as opposed to consuming, pure theory.

- **Course Learning Outcomes**

  The course aims for students to learn the following: (1) a rigorous exposure to a selection of basic mathematical tools that are used by economic theorists, and (2) applications of these methods to some areas of economic theory including duality theory, game theory, the Arrow-Debreu model and comparative statics.

- **Content**: Unit-wise

  1. Set theory and preliminaries
  2. Topological Spaces:
     Metric spaces, topological spaces and continuous functions; various useful constructions, e.g., projective and inductive topologies
     Countability and separability properties
     Compactness, completeness, connectedness, etc.
7.10. OPEN ELECTIVES

Topologies on function spaces; linear spaces, weak topologies; topologies on space of probability measures
Convex analysis; separation theorems
Set-valued mappings, fixed point theorems
3. Arrow-Debreu model: existence and optimality
4. Debreu-Scarf theorem
5. Duality theory
6. Nash’s existence theorem

• Suggested Readings


7.10.2 Macroeconomics of Development: EC1002

• Marks: Assignments - 30, Exam - 70

• Duration (per week): 4 hours.

• Credits : 4.

• Course Objectives

The course is motivated by two fundamental queries: (i) What explains the vast divergence in growth patterns across the world? (ii) What is an appropriate government policy (if any) in a low income-low growth country which can usher in a “high growth” regime? Modern growth theory has moved beyond the neoclassical framework to provide answers to these set of questions. This course takes a closer look at these alternative theories.

• Course Learning Outcomes

This course will enable students to understand, evaluate and compare various policies that promote growth. It will also help them understand the deeper institutional and cultural characteristics that might be the root cause of underdevelopment in many poor countries.

• Content: Unit-wise
1. Proximate Causes of Growth:
   (a) Human Capital: The Ben Porath model of human capital accumulation; The Nelson-Phelps model of skill-technology complementarity.
   (b) Technology: Distance to the frontier and technology diffusion; Directed technological change; Appropriate versus inappropriate technologies.

2. Deeper Causes of Growth:
   (a) Imperfect Markets: Credit Market Imperfection and Indivisibility of investment; Risk, diversification and financial institutions.
   (b) Political Economy: Inequality, Taxation and Growth; Democracy versus Oligarchy.
   (c) History versus Expectations: Underdevelopment as coordination failure; Multiple equilibria in technology adoption.

- **Suggested Readings**
  This course is primarily based on journal articles too numerous to list here. A broad overview of the topics can be found in the following text books:


  A few representative articles are listed:


7.10.3 Public Economics: EC1003

- **Marks:** Assignments - 30, Exam - 70
- **Duration (per week):** 4 hours.
- **Credits:** 4.
- **Course Objectives**
  
  Public Economics is a large and rapidly expanding field of research. It is concerned with normative and positive aspects of a government’s activities in an economy. Normative analysis is concerned with how a government should behave to improve social welfare and positive analysis studies the implications of government activities on the behavior of individuals and communities. Governments intervene through regulation, taxation, redistributive transfers, and the provision and production of private and public goods. This course will focus on public spending on public goods, regulation in the presence of externalities and redistributive policy. It will cover important theoretical results in the field and a number of case studies from across the world.

- **Course Learning Outcomes**
  
  By the end of the course, students will be familiar with important theoretical results in this area and with empirical trends in public spending across the world. They will also be guided in developing their writing skills to express ideas within this field to popular readers.

- **Content: Unit-wise**
  
  1. The emergence of a social state:
     The evolution of social spending across the world since the early twentieth century.
  2. Efficiency in the provision of public goods:
     The types and quantities of public goods that should be provided.
  3. Externalities and their regulation:
     Sources of externalities, their relationship to contracts and markets and their regulation.
  4. Preference Aggregation and Public debate:
     How do we determine provision when we do not know preferences? Voting and other forms of information aggregate in democracies.

- **Suggested Readings**
  


Robert Nozick: *Anarchy, state, and utopia*, Basic books (2013)


### 7.10.4 Environmental Economics: EC1004

- **Marks**: Assignments - 30, Exam - 70
- **Duration (per week)**: 4 hours.
- **Credits**: 4.

#### Course Objectives

The objective of this course is to present an economic approach to environmental problems such as air and water pollution. Alternative methods of addressing pollution, namely, direct regulation and market based instruments (taxes and tradable permits) are compared and contrasted, especially in the presence of asymmetric information. This is followed by techniques for measuring the benefits of environmental improvements and their applications.

#### Course Learning Outcomes

A logical, coherent and sensible understanding of the reasons for (and solutions to) environmental problems. In particular, an ability to apply economic theory to environmental issues with a view to developing effective and rational environmental policies.

#### Course Content: Unit-wise

1. Externalities and public goods
2. Corrective mechanisms (taxes, subsidies, permits)
3. Regulation with moral hazard and adverse selection
4. Valuation of non-market goods and amenities: overview and basic theory.
5. Revealed preference (indirect market methods); health valuation; constructed markets (direct market methods).

#### Suggested Readings


Articles from journals and working papers.