

### Whom will the course benefit?

- Engineering college faculty members from CS, EE, ECE, Industrial engineering disciplines.
- Researchers from R&D Labs and Industrial Research labs.

### Course Outline and Objectives:

Game Theory and mechanism design offer an important tool traditionally used in microeconomics. Recently game theory has been embraced by computer science, electrical, and industrial engineering disciplines in the context of many emerging web-based applications. Current applications include auctions, markets, electronic commerce, network economics, multiagent systems, and supply chain management.

The objective of this course is to provide a foundation of game theory and mechanism design to help teachers and research professionals apply game theory to problem solving in a rigorous way.

At the end of this course, the participants can expect to be able to model real-world situations using game theory, analyze the situations using game theoretic concepts, and design correct and robust solutions (mechanisms, algorithms, protocol) that would work for rational and intelligent agents.

The participants will have an opportunity to obtain an exposure to and a serious appreciation of the seminal contributions of celebrities such as Von Neumann, John Nash, Lloyd Shapley, Robert Aumann, William Vickrey, Leonid Hurwicz, Eric Maskin, and Roger Myerson.

### Course Contents:

1. **Non-Cooperative Game Theory:** Game Theory and Mechanism Design: Big Picture; Strategic Form Games, Dominant Strategy Equilibria, pure strategy Nash equilibria, mixed strategy Nash equilibria, Nash theorem, two player zero sum games. Problem Solving session and quiz.
2. **Algorithmic Game Theory:** Computation of Nash equilibria; Computational complexity of Nash equilibrium; Price of anarchy; Routing and Network Games; Approximate Equilibria; Problem Solving session and quiz.
3. **Cooperative Game Theory:** Correlated equilibria, Nash bargaining theory; Coalitional games; The Core; Shapley value; Matching algorithms; Problem Solving session and quiz.
4. **Mechanism Design:** Bayesian Games; Mechanism properties; Gibbard-Satterthwaite Theorem; Vickrey-Clarke-Groves Mechanisms; Auctions. Problem solving session and quiz.
5. **Curriculum Development and Research Perspectives:** Curriculum development Workshop for teaching a course on Game Theory and Mechanism Design (3 Hours); Research Perspectives Session on current and Future Research Directions (3 Hours).

### Faculty:

The lectures will be delivered by faculty members of the Indian Institute of Science, Bangalore, IIT-Gandhinagar, IIIT-Hyderabad, and industry researchers.

### Eligibility:

The course is meant for faculty of engineering colleges recognized by All India Council for Technical Education (AICTE), National Institutes of Technology (NIT's) and National Institute of Technical Teachers' Training & Research (NITTTRs). Selected teachers will be paid TA at actual subject to the limit of Three tier AC train/bus fare by the shortest route from the place of work to Bengaluru and back. **However, the maximum TA payable is Rs.3000/-.** They will be provided with a daily allowance of Rs.500/- (for 5 days only) towards boarding and lodging as per QIP rules, and will be supplied with the course materials. **The lodging charges will be Rs.300/- per day. Local participants will be paid DA @ Rs.150/- per day for 5 days.**

In addition, a few seats are available for non-sponsored (self-support) teachers, scientists from research labs, practicing engineers from industries and other interested persons.

**Academic Institutes, Govt. R&D Labs : 10,000 INR**  
**Private Industries & others : 15,000 INR**

This will entitle them to participate in the course and receive the course material. Single room **accommodation** is available on the Institute campus at the **Hoysala House**. The participants have to request in advance along with the registration form for such accommodation. The lodging charges will be **Rs.1000/- per day**, for self-support college teachers and **Rs.1500/- per day** for industry participants, subject to availability of accommodation.

**This course will be limited to 30 candidates. Hence early registration is strongly encouraged.**



CENTRE FOR CONTINUING EDUCATION  
Indian Institute of Science,  
Bengaluru

## QIP Short Term Course On **ALGORITHMIC GAME THEORY AND MECHANISM DESIGN**

**10<sup>th</sup>-14<sup>th</sup> April, 2017**

### Registration Form

(Please mail to reach before 11<sup>th</sup> March 2017)

1. Name.....
2. Age:..... Sex: Male/Female
3. Office address.....  
.....  
.....
4. Landline No. with STD code:.....
5. Mobile No. ....
6. EmailID:.....
7. Academic Qualifications  
Degree subject year University  
Diploma/B.Sc./B.A.....  
B.E/B.Tech/M.Sc. ....  
M.E/M.Tech./M.Phil.....  
Ph.D. Completed/Pursuing/Intend pursuing:.....  
Thesis title/Proposed Research Area:.....  
.....  
.....
8. Teaching Experience.....(Years)

9. Industry Experience .....(Years)  
10. Course taught/professional responsibilities.....  
.....  
.....

11. Accommodation required Yes/No

12. Self-support candidate :

Academic institutes, R&D Labs: **Rs.10,000**

Private industries & others : **Rs.15,000**

DemandDraftNo.....dated.....

I agree to abide by the rules of the QIP courses. If selected, I shall participate in the course for the entire duration.

Date:

Place:

Signature

The applicant Mr/Ms.....

.....  
from our institution will be permitted to attend the QIP Short Term Course on "ALGORITHMIC GAME THEORY AND MECHANISM DESIGN" to be held during **10-14 April 2017** at the Indian Institute of Science, Bengaluru, if selected. He/she will be granted necessary leave of absence.

It is certified that our college is recognized by AICTE Order No:.....Date:.....

Place:

Date:

Signature of Head of the Department

Signature and Seal of the Principal of the Institution

(Photocopy of this form may also be used)

Intending participants may use the attached application form or a photocopy of the same. Applicants from AICTE recognized colleges, NIT's and NITTTRs are required to submit their applications sponsored by their colleges.

Non-sponsored (self-support) teacher applicants should send their application along with a **DD** drawn in favor of "Registrar, Indian Institute of Science, Bengaluru - 560012" payable at Bengaluru. The course fee will be **Rs.10,000/-** for participants from academic institutions and government R&D labs, and **Rs.15,000/-** for private industries and others.

**Deadlines:**

Receiving completed applications: **11<sup>th</sup> March 2017**

Intimation of selection: **16<sup>th</sup> March 2017**

**Please mail the filled-in application form to:**

The Officer-in-charge  
Centre for Continuing Education  
Indian Institute of Science  
Bengaluru - 560 012  
Telephone: 080-23600911, 22932055  
Email: so@cce.iisc.ernet.in/  
office@cce.iisc.ernet.in

**To reach on or before: 11<sup>th</sup> March 2017**

**QIP Short Term Course On**

**ALGORITHMIC GAME THEORY AND MECHANISM DESIGN**

**10<sup>th</sup>-14<sup>th</sup> April, 2017**

**Coordinators**

**Prof. Y Narahari and Prof. Siddarth Barman**

**Dept. of Computer Science and Automation**

Sponsored by  
AICTE, NEW DELHI



Centre for Continuing Education  
Indian Institute of Science  
Bengaluru - 560 012  
<http://www.cce.iisc.ernet.in>