

### Whom will the course benefit?

Engineering college teachers handling subjects such as physics, mathematical methods, material science, electromagnetism and semiconductor devices.

### Course Objective:

To strengthen the understanding of mathematical methods applied to solid state physics to enable better teaching and research activities in related domains.

### Course Contents:

- **Vector space:** Hilbert space, inner product, ortho-gonalization
- **Vector calculus:** Vector integration, differentiation, Conversion between volume, surface and line integrations of vector and scalar (Gauss theory, Strokes law and Gree's theorem)
- **Matrix:** Definitions, operations, eigen value problem
- **Tensor:** Basic and invariance of tensor
- **Complex number:** Complex variable, multivalued function, analytic function, Complex differentiation and integration
- Ordinary and Partial Differential equation solution
- **Special functions:** Gamma, Beta, Zeta, Airy, Error functions
- Drude Model
- Sommerfeld model
- Lattice, reciprocal lattice, Brillouin zone, X-ray diffraction, structure factor, periodic potential, Empty Lattice Approximation
- Fermi surface, De-Haas-Van Alphen Effect, Bloch Oscillations, Phonon, Debye Approximation, Magnetization

### Faculty:

Dr. Anindya Das and Dr. Tanmoy Das, Dept. of Physics, IISc. will deliver the lectures and handle the hands-on sessions.

### 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 on payment basis as under.

### Course Fee:

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



CENTRE FOR CONTINUING EDUCATION  
Indian Institute of Science,  
Bengaluru -560 012

### QIP Short Term Course On

## “Mathematical Methods and Solid State Physics”

24-28 July 2017

### Registration Form

(Please mail to reach before **04 July 2017**)

1. Name.....
2. Age:..... Sex: Male/Female
3. Designation:.....
4. Office address  
.....  
.....  
.....
5. Landline No. with STD code:.....
6. Mobile No. ....
7. Email ID:.....
8. 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:.....  
.....
9. Teaching Experience.....(Years)
10. Industry Experience .....(Years)

11. Course taught/professional responsibilities.....  
.....  
.....  
.....

12. Accommodation required Yes / No

13. Self-support candidate :  
Academic Institutes, Govt. R&D Labs: **Rs. 10,000**  
Private Industries : **Rs. 15,000**

Demand Draft No..... 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 “**Mathematical Methods and Solid State Physics**” to be held during **24-28 July 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:.....

Date: \_\_\_\_\_  
Place: \_\_\_\_\_ Signature of Head of the Department \_\_\_\_\_

Signature and Seal of the Principal of the Institution

Please provide Phone number of

Principal: .....

HOD: .....

Intending participants may use the attached application form or a xerox copy 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 for the course fee** 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 research labs**, and **Rs. 15,000** for participants from **other organizations**.

**Deadlines:**

Receiving completed applications: **4<sup>th</sup> July 2017**

Intimation of selection: **7<sup>th</sup> July 2017**

*Please mail the filled-in application form to*

Section Officer  
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: 4<sup>th</sup> July 2017**

(Xerox copy of this form may also be used)

**QIP Short Term Course On**  
**“Mathematical Methods and Solid State Physics”**

**24-28 July 2017**

**Coordinator(s)**

**Dr. Anindya Das**  
**Department of Physics**

Sponsored by  
AICTE, NEW DELHI



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