



MHRD

Government of India
Ministry of Human Resource Development



Aligarh Muslim University



**GLOBAL INITIATIVE OF ACADEMIC NETWORKS
(GIAN)**

Study of Neutrino Oscillation at the Accelerator Experiments

Department of Physics at the Aligarh Muslim University is organizing a two week course on the Study of Neutrino Oscillation at the Accelerator Experiments from the 10th November, 2018 (Saturday) to 24th November, 2018 (Saturday).

Prof. Sanjib Mishra will be the speaker from abroad. Besides his lectures there will be many guest lectures.

- **Prof. Sanjib R. Mishra**
M.J. Mungo Distinguished Professor,
Department of Physics & Astronomy,
University of South Carolina.
712 Main St; Columbia, SC, 29208.
Email: *sanjib@sc.edu*, *sanjib0704@gmail.com*
Tel: (803)-777-2668, 777-4121.

- **Prof. Uma Shankar**
Department of Physics
I.I.T. Bombay
Mumbai, India

- **Prof. M. Sajjad Athar**
Department of Physics
Aligarh Muslim University
Aligarh, India

- **Prof. Brajesh Choudhary**
Department of Physics and Astrophysics
University of Delhi
Delhi, India

- **Prof. Sanjib Agarwalla**
Department of Physics
Institute of Physics
Bhubaneswar, India

Duration of Lectures: 1hr 30 mins + 15mts interactive session.

Duration of Tutorial: 1 hr 30 mins

Prof. Uma Shankar's lectures will be of 1hr 40 mins + 20 mins interaction session.

Lectures and Tutorials

Speaker	Lectures 1 hr 30 mins	Tutorials 1 hr 30 mins
Prof. Sanjib Mishra	15	4
Prof. Uma Shankar	3	1
Prof. M. Sajjad Athar	4	-
Prof. Brajesh Choudhary	1	-
Prof. Sanjib Agarwalla	3	1

<p>Saturday 10 Nov</p>	<p>➤ Lecture #1: Introduction to the Standard Model of Electroweak Interaction - I</p> <p style="text-align: right;">Prof. Uma Shankar</p>
<p>Sunday 11 Nov</p>	<p>➤ Lecture #2: Introduction to the Standard Model of Electroweak Interaction -II</p> <p style="text-align: right;">Prof. Uma Shankar</p>
<p>Monday 12 Nov</p>	<p>➤ Lecture #3: Neutrinos in Particle Physics: An introduction to the most ubiquitous and the least understood fermion that make up the world we live in.</p> <p style="text-align: right;">Prof. Sanjib Mishra</p> <p>➤ Lecture #4: Introduction to the Standard Model of Electroweak Interaction -III</p> <p style="text-align: right;">Prof. Uma Shankar</p>
<p>Tuesday 13 Nov</p>	<p>➤ Lecture #5: Neutrinos in Accelerator: The status and the future of the accelerator neutrinos.</p> <p style="text-align: right;">Prof. Sanjib Mishra</p> <p>➤ Lecture #6: Neutrino-electron scattering</p> <p style="text-align: right;">Prof. Mohammad Sajjad Athar</p>
<p>Wednesday 14 Nov</p>	<p>➤ Lecture #7: Neutrinos in Accelerator: The future of the accelerator neutrinos.</p> <p style="text-align: right;">Prof. Sanjib Mishra</p> <p>➤ Lecture #8: Neutrino Oscillations: Status of the neutrino oscillation; PMNS matrix and neutrino mass hierarchy; the open questions and challenges.</p> <p style="text-align: right;">Prof. Sanjib Mishra</p>
<p>Thursday 15 Nov</p>	<p>➤ Lecture #9: Neutrino Inclusive Cross Section: A summary of the inclusive neutrino cross section, emphasizing the dominant errors in current measurements.</p> <p style="text-align: right;">Prof. Sanjib Mishra</p> <p>➤ Lecture #10: Neutrino-nucleon scattering</p> <p style="text-align: right;">Prof. Mohammad Sajjad Athar</p> <p>➤ Tutorial on lecture #3 and #5.</p>

<p>Friday 16 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #11: Neutrino Flux: Neutrino species; Measurements of Neutrino Flux; proposed experiments to measure the flux (Neutrino & Hadron-production experiments). Prof. Sanjib Mishra ➤ Lecture #12: Exclusive Neutrino Processes — Quasi Elastic & Resonance Processes: The status and challenges of the neutrino induced Quasi Elastic and Resonance processes. Prof. Sanjib Mishra ➤ Tutorial on lecture #7, #8 and #9
<p>Saturday 17 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #13: Exclusive Neutrino Processes-II Prof. Sanjib Mishra ➤ Lecture #14: Accelerator based long base line experiments Prof. Brajesh Choudhary
<p>Monday 19 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #15: The status and challenges of the neutrino induced Quasi-Elastic and Resonance processes. Prof. Sanjib Mishra ➤ Lecture #16: One pion production Prof. Mohammad Sajjad Athar
<p>Tuesday 20 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #17: Neutrino Production of the Coherent-Mesons: The status and challenges of the neutrino induced coherent processes. Prof. Sanjib Mishra ➤ Lecture #18: Neutrino oscillation Phenomenology in three-flavour scheme - I Prof. Sanjib Agarwalla ➤ Tutorial on lecture #11 and #12.

<p>Wednesday 21 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #19: How to predict the neutrino spectra the ‘far’ location and associated errors Prof. Sanjib Mishra ➤ Lecture #20: Neutrino oscillation Phenomenology in three-flavour scheme - II. Prof. Sanjib Agarwalla ➤ Tutorial on lecture #18.
<p>Thursday 22 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #21: Neutrino Energy Scale and Prediction of Neutrino Spectra at the 'Far-Detector Prof. Sanjib Mishra ➤ Lecture #22: Search for New Physics using Neutrinos: Select topics on windows to the new physics using neutrinos. Prof. Sanjib Mishra ➤ Lecture #23 Neutrino oscillation Phenomenology in three-flavour scheme – III. Prof. Sanjib Agarwalla
<p>Friday 23 Nov</p>	<ul style="list-style-type: none"> ➤ Tutorial on lecture #20. ➤ Lecture #24: Search for New Physics using Neutrinos: Select topics on windows to the new physics using neutrinos (Part-I) Prof. Sanjib Mishra ➤ Lecture #25: Sterile Neutrinos Prof. Sanjib Agarwalla
<p>Saturday 24 Nov</p>	<ul style="list-style-type: none"> ➤ Lecture #26: Search for New Physics using Neutrinos: Select topics on windows to the new physics using neutrinos (Part-II) Prof. Sanjib Mishra ➤ Lecture #27: Deep inelastic scattering Prof. Mohammad Sajjad Athar ➤ Feedback Session: 1 hr. ➤ Test based on Lectures delivered.

Who can attend:

- Students from different institutions who are interested in the understanding of neutrino physics, particle physics and those who are involved in research in neutrino physics can attend the workshop.
- Last date of Registration: **15th September, 2018.**

Registration fees:

The participation fees for taking the course are as follows:

Participants	Amount
Ph.D. student	2000 INR
M. Sc. Student (*)	1000 INR
From Abroad	4000 INR
Faculty	3000 INR

❖ The above fees include all local hospitality (accommodation and food).

(*) The accommodation of outstation M.Sc. participants will be arranged on payment basis in the University campus.

Registration:

- ❖ **Applicants have to first register at the GIAN portal.**
(<http://www.gian.iitkgp.ac.in/ccourses/approvecourses3>)
The candidates will be informed about the selection on 20th September, 2018. The participants are requested to email the transaction details to gian.physics.amu@gmail.com.

Mode of Payment

Money can be transferred on “**GIAN COURSE
COORDINATOR, DEPTT. OF PHYSICS**”

Account number: **5247101004984**

Bank: **CANARA BANK**

Address: **CANARA BANK, ALIGARH MUSLIM
UNIVERSITY, ADMINISTRATIVE BLOCK, LAL
DIGGI, ALIGARH-202001.**

Branch: **AMU, Aligarh**

IFSC code: **CNRB0005247**

Branch code: **005247**

MICR code: **202015013**

**Mohammad Sajjad Athar
Professor and Course
Coordinator, GIAN course
Department of Physics
Aligarh Muslim University
Aligarh- 202002
sajathar@gmail.com
0091-9634990796**

**Dr. M. J. Warsi
University GIAN Coordinator
Department of Linguistics
Aligarh Muslim University
Aligarh-202002
warsimj@gmail.com
0091-9068771999**