

**Report on
Science Academies' 70th Refresher Course in Experimental Physics
at
Department of Physics
Goa University
Taleigao Plateau, Goa 403206
(May 13 to 28, 2015)**

As a part of MoU between Indian Academy of Sciences, Bangalore and Goa University to conduct Refresher courses in Experimental Physics, the third course (70th of the series) was organized at the Goa University from May 13 to 28, 2015. The announcement of the course was made well in advance through advertisements in Current Science and Resonance as well as through letters to Principals of all affiliated colleges of Goa University.

In all 87 applications were received out of which 36 were teachers and 51 students. Some teacher applicants were from the north east of India and hence after discussion with Prof. R. Srinivasan, they were asked to apply for Experimental Physics Refresher course conducted at Aizwal. Initially 34 participants (31 teachers and 3 students) were selected. Out of these 31 participants sent their confirmations by email as well as by post. About 20 of them sent copies of their tickets. Participants were constantly reminded to send their confirmation as well update their travel plans on the website. About two weeks before the start of the course, the coordinator sent SOS messages to all participants who had not confirm to immediately reply about their willingness to attend the course. Some of them expressed their inability while some said they would come by purchasing tickets under tatkal quota. Sensing trouble, another 10 participants, mostly students belonging to nearby areas like Udupi, Sangli, Mumbai were contacted and asked about their willingness to attend the course. Most of them said yes but finally only three arrived. Of the other 20 confirmed participants only 13 reported for the course. Hence finally we had only 16 confirmed participants. Some of the participants informed on May 12th while some did not even care to inform and Coordinator had to telephone and ask them if they were coming. Since there were such a large number of applications, it's a shame to run the course with only 16 participants.

All the participants showed keen interest in all the experiments. All of them completed their calculations of all the experiments and their results were verified by us. The participants expressed their satisfaction at the way the course was conducted. Some of the participants made enquiries about the kit and conducting such a refresher course at their institute. Most of the interest was shown by two teacher participants from Rani Durgavati Vishwavidyalaya, Jabalpur and Govt. Gandhi Memorial College, Jammu.

Resource persons also expressed their satisfaction in conducting the course for these participants. Most fruitful sessions were the discussion sessions, where the participants resolved their difficulties by discussing their results and asking questions about experiments. All the experiments worked well, they were happy to see a very good agreement between theory and experimental results. Their difficulties were discussed and suggestions on how to overcome them using this kit were made. This time with a demand from participants, all resource persons gave an additional lecture on how several more

experiments that could be performed using the kit. Designs and circuits of these additional experiments were discussed with the participants.

There were four special lectures - one each by Dr. Eurico D'Sa, Louisiana State University, Louisiana, USA on "Optical methods and Satellite Ocean colour for water quality monitoring in coastal environments" and Dr. D. Shankar, National Institute of Oceanography, Goa on "A old story with a new answer: Why is mean sea level along the Indian coast higher in the Bay of Bengal compared to the Arabian Sea?" Dr. T. G. Ramesh who specially came from Bangalore gave two special lectures on "Novel thermoelectric materials" and "Experimental techniques in Phase transition studies". In addition he spent two days in the laboratory and had discussions on different aspects of Experimental Physics with the participants.

All the participants were housed in Goa University guest house and were provided with all lodging and boarding facilities. They also had access to internet through wifi network of the University. Feedback was collected from all the participants about the experiments and allied facilities and some of them gave their impressions at the valedictory function. Prof. P. R. Sarode, Retd. Professor, Department of Physics, Goa University, was the chief guest for the valedictory function. He was the Course coordinator of the first two refresher courses held at Goa University in 2001 and 2003. Participants were awarded certificates for their successful completion of the course as well as three books, viz. Solid State Physics by C. Kittel, Statistical Mechanics by K. Huang and Principles of Electronics by A. P. Malvino as a gift from the three Science Academies. Overall the participants expressed their satisfaction about the experiments, their working, and the availability of resource persons to address their difficulties as well as about the other facilities made available to them.

Accounts of the course are presently being finalized and an audited statement will be submitted once all bills are paid.

K. R. Priolkar
Course Coordinator

70th REFRESHER COURSE IN EXPERIMENTAL PHYSICS
May 13 to May 28, 2015
AT
GOA UNIVERSITY, GOA
Sponsored by
INDIAN ACADEMY OF SCIENCES, BANGALORE
INDIAN NATIONAL SCIENCE ACADEMY, DELHI
NATIONAL ACADEMY OF SCIENCES OF INDIA, ALLAHABAD

TIME TABLE

Day and Date	09.30 - 10.30	10.45 – 11.45	11.45 – 12.45	14.00 – 15.00	15.15 – 16-15	16.15 – 17.15
Wednesday 13 May `15	Registration/Inauguration Introduction		ED1	SMS1	MN1	ED2
Thursday 14 May `15	MN2	SMS2	KRP1	ED3	SMS3	MN3
Friday 15 May `15	SPL1	KRP2	ED4	SMS4	MN4	KRP3
Saturday 16 May `15	ED5	SMS5	MN5	KRP4	ED6	SMS6
Sunday 17 May `15						
Monday 18 May `15	KRP5	LAB1		LAB2		
Tuesday 19 May `15	SPL2	LAB3		LAB4		
Wednesday 20 May `15	Discussion	LAB5		LAB6		
Thursday 21 May `15	SPL3	LAB7		LAB8		
Friday 22 May `15	SPL4	LAB9		LAB10		
Saturday 23 May `15	Discussion	LAB11		LAB12		
Sunday 24 May `15						
Monday 25 May `15	Discussion	LAB13		LAB14		
Tuesday 26 May `15	Discussion	LAB15		LAB16		
Wednesday 27 May `15	Discussion	LAB17		LAB18		
Thursday 28 May `15	Feedback and Valedictory					

LUNCH 13-14 HRS

COFFEE/TEA BREAK

10-30 TO 10-45 HRS
15-00 TO 15-15 HRS

LECTURES

LECTURES BY Dr. EFREM DESA (ED)

1. Constant current source
2. TCR of Copper and Bandgap of silicon
3. Stefan's constant
4. Thermal and electrical conductivity of Copper and thermal conductivity of a poor conductor.
5. Calibration of Si diode and Thermocouple as temperature sensor
6. Young's Modulus and Rigidity Modulus of brass bar

LECTURES BY Mr. MANOHAR NAIK (MN)

7. Signal Generator and power amplifier
8. AC Experiments
9. Passive filters and AC Bridges
10. High Resistance by leakage and k/e using transistor
11. B-H curve

LECTURES BY PROF. S. M. SADIQUE (SMS)

12. DC differential amplifier
13. Capacitance meter – measurement of capacitance
14. Dielectric constant of benzene and dipole moment of acetone.
15. Verification of Curie Weiss Law for a ceramic capacitor
16. Phase sensitive detection and calibration of a lock in amplifier
17. Measurement of mutual inductance and low resistance with a lock in amplifier.

LECTURES BY Dr. K. R. PRIOLKAR (KRP)

18. Thermal Relaxation of a Light bulb
19. Thermal diffusivity of brass
20. Non-linear dynamics – Feigenbaum circuit and Chua circuit
21. Inversion temperature of Fe-Cu thermocouple
22. Error Analysis

SPECIAL LECTURES

SPL1 – Optical methods and Satellite Ocean colour for water quality monitoring in coastal environments, **Dr. Eurico D'Sa**, Louisiana State University, Louisiana, USA.

SPL2 – An old story with a new answer: Why is mean sea level along the Indian coast higher in the Bay of Bengal compared to the Arabian Sea?, **Dr. D. Shankar**, National Institute of Oceanography, Goa.

SPL3 – Novel thermoelectric materials, **Dr. T. G. Ramesh**, National Aeronautical Laboratory, Bangalore/Indian Academy of Sciences, Bangalore.

SPL4 – Experimental techniques in Phase transition studies, **Dr. T. G. Ramesh**, National Aeronautical Laboratory, Bangalore/Indian Academy of Sciences, Bangalore.

List of participants who successfully completed the course

Sr. No.	Name	Address for correspondence	email
1	AJAY RAMLAKHAN YADAV St. Xaviers College, Mumbai	Dept. of Physics, St.Xavier's College, Next to Cama Hospital, Mahapalika Marg, Mumbai 400 001	ajay.yadav@xaviers.edu
2	BUBUNU BISWAL, Talcher College, Talcher	3rd Year Student, Talcher Autonomous College, Talcher, Angul, Odisha	biswalbubun444@gmail.com
3	GULZAR AHMED, Mewar University, Chittorgarh	Asst. Prof, Dept. of Physics, Mewar University, Chittorgarh, Rajasthan	gulzarahmed61@gmail.com
4	JASMIRKAUR B RANDHAWA, Govt. Engg. College, Amravati	Dept. of Physics, Government College of Engineering Amravati, Kathora Naka, Amravati 444604 (M.S.)	jbrandhawa2@gmail.com
5	MADAN LAL, Govt. PG College Una (HP)	Asst. Professor (Physics) Deptt. Of Physics, Govt. PG college Una, Dist. Una, Himachal Pradesh	gera_phy_hpu@yahoo.co.in
6	MANJUSHA M.V., The Cochin College, Cochin:2	Asst. Professor, Dept. of Physics, The Cochin College, Cochin:2	manjusha_mv@yahoo.com
7	PULKIT GHODERAU, IIT Bombay	1st year student, Engg. Physics, IIT Bombay, Powai, Mumbai 400076	pulkitsg@rediffmail.com
8	RAJENDRA KUMAR DUBEY, Rani Durgavati Vishwavidyalaya, Jabalpur	131, Indrapuri Colony, Gwarighat Road, Jabalpur, 482008 M.P.	drkdubey@gmail.com
9	RAKESH KUMAR, Govt. Gandhi Memorial College, Jammu	Govt. Gandhi Memorial Science College, Jammu, Jammu, J&K 180001	rkguptt@gmail.com
10	RAMKUMAR GUPTA, Rani Durgavati Vishwavidyalaya, Jabalpur	D-30, New Teachers Colony, University Campus, Pachpeddi, Jabalpur 482001 (M.P.)	ramkumargupta001@gmail.com
11	ROHITASH KUMAR, University of Rajasthan	Center for Converging Technology, University of Rajasthan, Jaipur	rkmandia123@gmail.com

12	SUHAS GORE, Yuvaraja's College, Mysore	s/o Ramesh Gore, Piliyoor, Andinje Post & Village, Betthangady Tq., D. K. Karnataka 574242	goresuhas644@yahoo.com
13	SUSHILA SAHOO, Talcher College, Talcher	3rd Year Student, Talcher Autonomous College, Talcher, Angul, Odisha	sushilasahoo12@gmail.com
14	VAISHALI GAONKAR, Goa University	Research Scholar, Dept. of Physics, Goa University, Taleigao Plateau, Goa 403206	vaishaligaonkar86@gmail.com
15	VIMAL SARASWAT, BNPG Girls College, Udaipur	Deptt. Of Physics, B.N.P.G.Girls College, Udaipur, 313002 Rajasthan	vimal_saraswat80@rediffmail.com
16	YATIN DESAI, Chowgule College, Margao	Dept. of Physics, Parvatibai Chowgule College, Gogol, Margao, Goa	ypd001@chowgules.ac.in



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Goa University

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