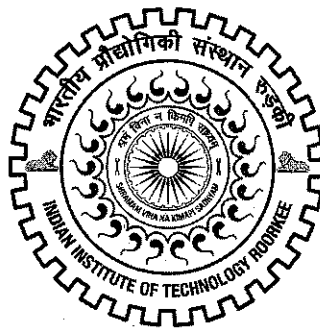


सीनेट की 66^{वीं} बैठक का कार्यवृत्त
MINUTES OF THE 66TH MEETING OF THE SENATE

11 अगस्त 2016

11TH AUGUST 2016



भारतीय प्रौद्योगिकी संस्थान रुड़की
रुड़की – 247 667 (भारत)
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE – 247 667 (INDIA)

भारतीय प्रौद्योगिकी संस्थान रुड़की
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
रुड़की 247 667
ROORKEE – 247 667



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MEETING SECTION
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE



Minutes of the 66th Meeting of the Senate held on 11.08.2016 in the Senate Hall of the Institute.

Following were present:

- | | | |
|-----|-------------------------|----------------------------------|
| 1. | Prof. Pradipta Banerji | Director |
| 2. | Prof. P. K. Ghosh | Deputy Director |
| 3. | Prof. (Mrs.) Pushplata | (Architecture & Planning) |
| 4. | Prof. V. Devdas | (Architecture & Planning) |
| 5. | Prof. Partha Roy | (Biotechnology) |
| 6. | Prof. Shishir Sinha | (Chemical Engineering) |
| 7. | Prof. P.P. Kundu | (Chemical Engineering) |
| 8. | Prof. Ravi Bhushan | (Chemistry) |
| 9. | Prof. Anil Kumar | (Chemistry) |
| 10. | Prof. (Mrs.) Mala Nath | (Chemistry) |
| 11. | Prof. U.P. Singh | (Chemistry) |
| 12. | Prof. M.R. Maurya | (Chemistry) |
| 13. | Prof. K.C. Gupta | (Chemistry) |
| 14. | Prof. Bina Gupta | (Chemistry) |
| 15. | Prof. S.S. Jain | (Civil Engineering) |
| 16. | Prof. C.S.P. Ojha | (Civil Engineering) |
| 17. | Prof. S.K. Ghosh | (Civil Engineering) |
| 18. | Prof. Mahendra Singh | (Civil Engineering) |
| 19. | Prof. M. Parida | (Civil Engineering) |
| 20. | Prof. Praveen Kumar | (Civil Engineering) |
| 21. | Prof. N.K. Samadhiya | (Civil Engineering) |
| 22. | Prof. Akhil Upadhyay | (Civil Engineering) |
| 23. | Prof. Kamal Jain | (Civil Engineering) |
| 24. | Prof. B.R. Gurjar | (Civil Engineering) |
| 25. | Prof. Vipul Prakash | (Civil Engineering) |
| 26. | Prof. Manoj Mishra | (Computer Science & Engineering) |
| 27. | Prof. M.L. Sharma | (Earthquake Engineering) |
| 28. | Prof. Yogendra Singh | (Earthquake Engineering) |
| 29. | Prof. B.K. Maheshwari | (Earthquake Engineering) |
| 30. | Prof. Pankaj Agrawal | (Earthquake Engineering) |
| 31. | Prof. Manish Shrikhande | (Earthquake Engineering) |
| 32. | Prof. Sandeep Singh | (Earth Sciences) |
| 33. | Prof. A.K. Sen | (Earth Sciences) |
| 34. | Prof. Pramod Agarwal | (Electrical Engineering) |

- | | | |
|-----|--|-----------------------------------|
| 35. | Prof. S.P. Singh | (Electrical Engineering) |
| 36. | Prof. S.P. Srivastava | (Electrical Engineering) |
| 37. | Prof. N.P. Padhy | (Electrical Engineering) |
| 38. | Prof. G.N. Pillai | (Electrical Engineering) |
| 39. | Prof. N.K. Goel | (Hydrology) |
| 40. | Prof. Nagendra Kumar | (Humanities & Social Sciences) |
| 41. | Prof. Y.S. Negi | (Paper Technology) |
| 42. | Prof. S.C. Sharma | (Paper Technology) |
| 43. | Prof. (Mrs.) Rama Bhargava | (Mathematics) |
| 44. | Prof. V.K. Katiyar | (Mathematics) |
| 45. | Prof. (Mrs.) Sunita Gakkhar | (Mathematics) |
| 46. | Prof. Kusum Deep | (Mathematics) |
| 47. | Prof. Tanuja Srivastava | (Mathematics) |
| 48. | Prof. Dinesh Kumar | (Mechanical & Industrial Engg.) |
| 49. | Prof. B.K. Gandhi | (Mechanical & Industrial Engg.) |
| 50. | Prof. B.K. Mishra | (Mechanical & Industrial Engg.) |
| 51. | Prof. Ravi Kumar | (Mechanical & Industrial Engg.) |
| 52. | Prof. D.K. Dwivedi | (Mechanical & Industrial Engg.) |
| 53. | Prof. S.K. Nath | (Metallurgical & Materials Engg.) |
| 54. | Prof. Anjan Sil | (Metallurgical & Materials Engg.) |
| 55. | Prof. B.S.S. Daniel | (Metallurgical & Materials Engg.) |
| 56. | Prof. Ujjwal Prakash | (Metallurgical & Materials Engg.) |
| 57. | Prof. Rajesh Srivastava | (Physics) |
| 58. | Prof. Vir Singh | (Physics) |
| 59. | Prof. (Mrs.) Tashi Nautiyal | (Physics) |
| 60. | Prof. K.L. Yadav | (Physics) |
| 61. | Prof. Davinder Kaur Walia | (Physics) |
| 62. | Prof. G.D. Varma | (Physics) |
| 63. | Prof. Deepak Khare | (WRD&M) |
| 64. | Prof. S.K. Mishra | (WRD&M) |
| 65. | Prof. R.P. Saini | (Alternate Hydro Energy Centre) |
| 66. | Prof. M.P. Sharma | (Alternate Hydro Energy Centre) |
| 67. | Dr. Z. Rahman, Head, Department of Management Studies | |
| 68. | Dr. A.K. Sharma, Associate Dean, Academic Studies | |
| 69. | Dr. R.K. Peddiniti, Associate Dean (Academic Research) | |
| 70. | Dr. Inderdeep Singh, Associate Dean of Students' Welfare (Discipline) | |
| 71. | Dr. C. Jayakumrar, Librarian, M.G. Central Library | |
| 72. | Dr. Vipul Rastogi, Associate Professor, Department of Physics | |
| 73. | Dr. Manish Mishra, Associate Professor, Dept. of Mech. & Indl. Engineering | |
| 74. | Dr. Umesh Sharma, Associate Professor, Department of Civil Engineering | |
| 75. | Dr. Rajat Agarwal, Associate Professor, Department of Management Studies | |
| 76. | Mr. Prashant Garg, Registrar & Secretary, Senate | |

The Chairperson welcomed the members to the 66th Meeting of the Senate.



Before taking up the agenda, the Chairman thanked the under-mentioned outgoing Senate members and recorded its appreciation for their valuable contributions in the meetings of the Senate:

1. Prof. Vinod Kumar, Department of Electrical Engineering
2. Prof. R. Anbalagan, Department of Earth Sciences
3. Prof. R.N. Goel, Department of Chemistry
4. Prof. (Mrs.) Amita Sinval, Department of Earthquake Engineering
5. Prof. Deepak Kashyap, Department of Civil Engineering
6. Prof. A.K. Singh, Department of Chemistry
7. Prof. Ashok Kumar, Department of Earthquake Engineering
8. Dr. R.D. Garg, Chief Warden, Jawahar Bhawan

The Senate noted the communications received from the following members for not attending the current meeting:

1. Prof. Girishwar Mishra, Vice-Chancellor, M.G.A. Hindi Vishwavidyalaya, Wardha
2. Prof. P.K. Gupta, Department of Civil Engineering
3. Prof. Dharmendra Singh, Department of Electronics & Commn. Engg.
4. Prof. K.S. Hari Prasad, Department of Civil Engineering
5. Prof. Ila Gupta, Department of Architecture & Planning
6. Dr. K.R. Justin Thomas, Department of Chemistry

The Agenda was then taken up:

Item No. 66.1: To confirm the minutes of the 64th and emergent meeting (65th meeting) of the Senate held on 19.04.2016 and 11.05.2016, respectively.

As no comments were received, the minutes of the 64th and emergent meeting (65th meeting) of the Senate held on 19.04.2016 and 11.05.2016, respectively were confirmed.

One of the members raised the objections against the corrigendum issued on Item No.65.1 that the distribution of seats under MHRD and under Self-Finance categories was not discussed in Senate. The matter was clarified by the Chairman that financial matters need not be deliberated in Senate. However, the Chairman discussed the issue in ECS meeting held on May 3, 2016 and decided that the 50% seats will be filled with MHRD fellowship and rest of the seats with Self-Finance category candidates.



Item No.66.2: To receive a report on the actions taken to implement the decisions taken by the Senate in 64th and emergent meeting (65th meeting) of the Senate held on 19.04.2016 and 11.05.2016, respectively.

The Senate noted the actions taken on the resolutions of the 64th and emergent meeting (65th meeting) of the Senate held on 19.04.2016 and 11.05.2016, respectively.

The members were informed that the Visitor has approved that the Honoris Causa Degree be awarded to Sri Mukesh Ambani, Chairman, Reliance Industries in the forthcoming Convocation of the Institute on 30.09.2016.

Item No. 66.3: To consider the modified formats of Ph.D. Completion Certificate and the degree of Ph.D. to be awarded at the time of completion of requirement.

The Senate considered the modified formats of Ph.D. Degree and Ph.D. Degree Completion Certificate to be awarded in the convocation. The problems faced by the students registered in interdisciplinary departments were also considered and after detailed discussion it was decided that Broad Academic Entity/Area of Specialization relevant to the department and de-novo approved by the Senate be mentioned in the Ph.D. Degree.

It was also decided that Broad Academic Entity/the Area of Specialization be also mentioned on the Degree Completion Certificate. The Senate further decided that Degree Completion Certificate be prepared on the same quality paper as of Ph.D. Degree and be signed by the Director and the Registrar. The modified formats of the Ph.D. Degree and the Ph.D. Degree Completion Certificate are given in **Appendix 'A'**. This should be applicable from Convocation 2017.

Item No. 66.4: To consider the tuition fee for Research Scholars in view of enhanced fee of PG students.

Considered the proposal of enhancing tuition fee for Research Scholars and decided that the tuition fee for Ph.D. candidates admitted under MHRD be increased to Rs.10000/- per semester. It was also decided that tuition fee



for candidates admitted under other categories be also increased to Rs.10000/- per semester but they will not be provided any benefit of contingency.

Further, it was decided that the International Students shall have separate tuition fees as already approved.

Item No.66.5: To consider the IBM-xxx: Rural Governance, Institutions and Finance received from the Head, Department of Management Studies to be included as an Open Elective for the students of Undergraduate III year.

Considered the syllabus of **IBM-310: Rural Governance, Institutions and Finance** as recommended by IAPC and decided that the same be approved. The syllabus of the course is given in **Appendix 'B'**.

Item No. 66.6: To consider the change in the Educational Qualification for Ph.D. Admission in Department of Mathematics.

Considered the recommendation of IRC regarding minimum educational qualification as given below, for admission to Ph.D. programme in Department of Mathematics and decided the same be approved.

1. M.A/M.Sc./M.Tech. in Mathematics/ Applied Mathematics/ Industrial Mathematics/ Statistics/ Operation Research/ Applied Operation Research/ Mathematics and Computing.
2. M. Stat or Equivalent

Item No. 66.7: To consider the letter from Prof. Tashi Nautiyal, Chairperson, DRC, Department of Physics regarding inconsistency in the CGPA and % of marks for admission eligibility in Ph.D.

Considered the recommendation of IRC regarding inconsistency in CGPA and % marks for admission eligibility in Ph.D. and decided that the following equivalent be followed wherever it appears in admission brochure:

- a) CGPA 6.0 or 60%
- b) CGPA 7.0 or 70%
- c) CGPA 5.5 or 55%



Item No. 66.8: To consider the response received from various departments regarding submission of thesis at the end of the maximum duration for Ph.D. in the absence of acceptance of paper.

Considered the recommendations of IRC regarding submission of Ph.D. thesis in the absence of publication of any paper and after detailed discussion decided that the same be approved with minor modification as given below:

"The students are required to publish paper as per Ph.D. Ordinances & Regulations. In the exceptional cases, where the candidate has submitted his/her research paper(s) for publication in the peer-reviewed journals within 4½ year, however, no communication has been received on the review process even after six months, the SRC may recommend for submission of thesis after ensuring that the candidate has finished his/her work as proposed at the time of candidacy. However, the viva-voce examination shall be held only after the acceptance of the paper."

Item No. 66.9: To consider the requirement of co-supervisor after conversion from Full-Time to Part-Time.

Considered the requirement of co-supervisor by the research scholar after conversion of status from full-time to part-time before the completion of 3 years and decided that if there is no Ph.D. qualified person in the same area of research in his/her organization then the candidate be asked to comeback after taking leave from the organization to complete the remaining Ph.D. work or leave the Ph.D. programme. The maximum period of Ph.D. duration shall remain same as 7 years including the absence period. During the absence period, his/her candidature be kept in abeyance and no fee shall be charged during that period.

Item No. 66.10: To consider the request of a Research Scholar in the Department of Earth Sciences regarding exemption from taking co-supervisor from his host organization.

Considered the request of Research Scholars from the Department of Earth Sciences regarding exemption from taking co-supervisor from his host organization and decided that the student be asked to leave the Ph.D. programme if there is no Ph.D. qualified person in the same area of research in the organization.



Item No. 66.11: To consider the recommendation of DFC of Department of Physics to drop programme elective PH-639: Advanced Atomic and Molecular Physics and the revised syllabi of PH-518 and PH-626.

Considered the syllabi of **PHN-518: Atomic, Molecular and Laser Physics** and **PHN-626: Advanced Atomic and Molecular Physics** as recommended by the IAPC and decided that the same be approved. The syllabi of the courses are given in **Appendix 'C'**.

Item No. 66.12: To consider the proposals received from various departments in response to letter sent to departments/centers to modify their PG programme.

Considered the recommendation of IAPC regarding modification of PG courses in response to the proposal made in the PG admission committee meeting and decided that the as recommended by the IAPC, the existing M.Tech. programmes in all departments will run as such with no modifications. However, the number of seats with fellowships in each programme shall be decided depending on the availability of the funds and acceptance of the programmes by the industries.

Item No. 66.13: To consider the proposal of Department of Chemistry about increasing the strength of the M.Sc. students admitted through JAM from 25 to 50.

Considered the proposal of Department of Chemistry about increasing the strength of M.Sc. students admitted through JAM in view of phased out Integrated M.Sc. (Chemistry) programme and decided the strength be increased from existing 25 to 45.

Item No. 66.14: To consider the award of the Ph.D. Degree to the students who have completed the requirements for the award of the Ph.D. Degree in various disciplines as per the list annexed w.e.f. April 12, 2016 till date (86 students).

Approved the award of the Ph.D. degrees to the students as given in **Appendix 'D'**, who have completed the requirements for the award of the Ph.D. Degree in various disciplines w.e.f. April 19, 2016 to till date.



Item No. 66.15 To report the modified criteria for MCM scholarships.

Reported the modified criteria as given below for MCM scholarships as approved by the Chairman, Senate:

- (i) CGPA/YGPA whichever is higher, be more than 6.00.
- (ii) All registered courses shall be cleared and
- (iii) Should not be penalized due to unfair means/discipline.

Item No. 66.16: To consider the proposal of dropping Supervisor as one of the Examiners.

Considered the proposal of IRC of dropping Supervisor as one of the Examiners of Ph.D. thesis and decided that as the supervisor has already gone through the thesis submitted by his/her student and approved the submission, the supervisor be not asked to evaluate the thesis again. The thesis shall be evaluated only by the Indian and Foreign Examiners as per existing rules.

Item No.66.17: To consider the clarification received from the MHRD vide letter dated 2nd August 2016 regarding new dispensation on Merit-cum-Means Scholarship to general and OBC (NCL) students.

The Senate decided as under:

- (i) Merit-cum-Means scholarship be closed and pocket allowance be given to all the students of Economically Weaker Sections (EWS) (whose family income is less than Rs. 1.0 lac per annum) irrespective of their categories as recommended by the Senate.
- (ii) Letter F.No. 24-2/2016Ts.1 dated 8th April 2016 of MHRD be implemented. **(Appendix 'E')**



Item No. 66.18: To reconsider the criteria of 5.00 CGPA requirement at I Year level to continue the undergraduate programme

The members were informed that in 2014, a proposal was put before Senate to consider the cases of undergraduate students completing the credits requirement but failing to get CGPA 5.00 or more than 5.00 for the award of degree. At that time it was decided that the name of students who fail to get CGPA 5.00 in any year will be struck off so that at the end of final year no student be denied degree due to less CGPA. It was also decided that till then the such students be asked to do more courses for 1 or 2 semesters at the most to improve their CGPA and whatever may be their CGPA after one extra year, the degree will be awarded.

Accordingly, in 2015 the names of 71 students were struck off. Later on, on humanitarian ground, 64 students, whose names were struck off due to less CGPA only, were re-admitted. During this whole exercise it was also decided that the minimum CGPA requirement of 5.00 will be applied only to first year students and not in subsequent years.

It was also decided during discussion in Senate that, henceforth, undergraduate students will also be asked to fill an undertaking regarding this at the time of admission. It was implemented in 2015 admission. Although extra care was taken throughout the year by organizing programmes for then such as Talerang, students' mentorship, slow pace programmes etc. but even then the names of 11 students were stuck off in June 2016 on the basis of final result and names of 8 more students were stuck off after the result of re-examination.

These students have now appealed for mercy as they have no other choice. It was informed that the undergraduate students admitted through JEE have no degree and it is not easy for them to get admission in other Institutes therefore, there is a need to look into this problem once again. The members were also informed that since the requirement of 5.00 CGPA at other levels has been withdrawn, the **original problem remains as such** because it will not be possible to ensure that every student maintains minimum CGPA at every year.



After due discussion, it was decided that the requirement of minimum CGPA of 5.00 be dispensed with. The student has to clear all the courses as prescribed for the degree and complete the credits requirement for the award of degree. However, the minimum requirement of credits for continuation of study as per table of Appendix-J shall stand.

Further, it was also decided that those undergraduate students of first year of 2015-16 batch whose names were struck off due to less CGPA but completed all the course requirement be re-admitted as afresh. They have to do all the courses again alongwith the students of 2016-17 batch. They shall be governed by the Undergraduate Ordinances and Regulations 2016. However, they will have to pay the fee as per admission year.

The meeting ended with a vote of thanks to the Chair.

A handwritten signature, possibly 'A. N.', is written in black ink. It consists of a large capital 'A' followed by a smaller capital 'N' and a period, all connected by a horizontal line.

Serial No. 160001

Enrolment No. 10918001

भारतीय प्रौद्योगिकी संस्थान रुड़की

अभिषद् की अनुशंसा पर

मल्टी-फेज ऑर्डर डाइवज
में विद्या वाचस्पति
की उपाधि

Broad Academic Entity

आरिफ इकबाल

को, जिन्होंने इस उपाधि की अर्जाति हेतु विनियम विहित अपेक्षाओं को दिनांक दिसम्बर 17, 2015 में सफलतापूर्वक पूरा कर लिया है, एतद्वारा प्रदान करता है।
भारतीय गणराज्य के अन्तर्गत रुड़की में आज, दिनांक सितम्बर 30, 2016, संस्थान की मुद्रा अंकित यह उपाधि दी गई।

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

On the recommendation of the Senate hereby confers the degree of

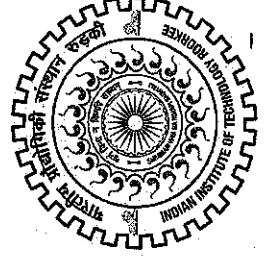
Doctor of Philosophy in **Multi-phase Order Drives**

upon

ARIF IQBAL

Broad Academic Entity

who has successfully completed on December 17, 2015 the requirements prescribed under the regulations for the award of this degree given this day, September 30, 2016, under the seal of the Institute at Roorkee in the Republic of India.



अध्यक्ष, अभिशासक परिषद्
Chairman, Board of Governors

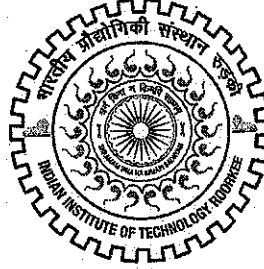
निदेशक एवं अध्यक्ष, अभिषद्
Director & Chairman, Senate

कुलसचिव
Registrar

Appendix 'A'
Item No. Senate/66.3

भारतीय प्रौद्योगिकी संस्थान रुड़की
रुड़की

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE



Serial No.

DOCTOR OF PHILOSOPHY COMPLETION CERTIFICATE

Enrolment No. : 10918001
Name of Student : Mr. Arif Iqbal
Department/Centre : Electrical Engineering
Research Area : Multi-phase Order Drives
Title of Thesis : ANALYSIS OF SIX-PHASE
SYNCHRONOUS MOTOR
Name of Supervisor (s) : Dr. G.K. Singh
Dr. Vinay Pant
Date of Viva Voce : December 15, 2015
Date of Provisional Degree Certificate : December 17, 2015

निदेशक एवं अध्यक्ष, अभिषद्
Director & Chairman, Senate

Date: September 30, 2016

कुलसचिव
Registrar

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: DEPARTMENT OF MANAGEMENT STUDIES

1. Subject Code: IBM-310 Course Title: Rural Governance, Institutions and Finance
2. Contact Hours: L: 2 T: 1 P: 0
3. Examination Duration (Hrs.): Theory: 2 Practical: 0
4. Relative Weightage: CWS: 25 PRS: 0 MTE: 25 ETE: 50 PRE: 0
5. Credits: 3 6. Semester: Both 7. Subject Area: OEC
8. Pre-requisite: Nil
9. Objective:
To apprise students with basic understanding of Rural Structure, Governance, Finance and Development.
10. Details of Course:

S. No.	Contents	Contact hours
1.	Introduction and Constitutional framework - Definition of rural/village, Villages of India: Diversity based on geography, demographics and social context, Issues and challenges, Governance and Indicators of good governance; Different forms of democratic governance, Legislature, Executive and Judiciary, Constitution; its Preamble, 73rd constitutional amendment, Panchayats (Extension to Scheduled Areas) Act, 1996 or PESA, Federal form of government in India, Decentralization and Three tier system of government and focus on the third tier, Panchayati Raj System, Various district level bodies.	4
2.	Rural Planning under decentralized framework - Panchayati Raj Institutions, Devolution of power, function and functionaries, participation of marginalized groups, including women in the grassroots planning process, assessment of existing capacity and organizational and capacity building issues; social audit, role of district planning committee, district and perspective plans etc.	4
3.	Institutional Arrangement - Ministry of Rural Development, Department of Land Resources, Department of Rural Development, Ministry of Panchayati Raj: Panchayati Raj Institutions - Structure and their major functions, Gram Sabha, District Panchayat, Block Panchayat and Gram Panchayat; Parastatals bodies: DRDA, NRRDA, CAPART, DHS, DWSC, and FFDA; Training Institutes: National Institute for Rural Development and Panchayati Raj (NIRD & PR), State Institute for Rural Development (SIRD) and Extension Training Centers (ETCs).	5
4.	Rural Development : Major Schemes and Programmes - Structural changes in Rural Economy; Approaches to Rural development: growth oriented, welfare-oriented, empowerment-oriented and right-based; Rural non-farm sector, rural poverty and migration; Role of rural technology in livelihood improvement, Corporate Social Responsibility and Rural Skills Development Rural Development Initiatives: Community Development	6

Ph.

	Programme, Special Area Programmes, Programmes on Minimum Basic Needs, Self-employment Programmes, Wage Employment Generating Schemes (WEGS), Social Welfare Oriented Programmes (SWOP), Rural Housing Schemes, Programmes on Education and Health, and other Programmes.	
5.	Funding of Panchayats - Grants from the Union Government based on the recommendations of the Central Finance Commission as per Article 280 of the Constitution, Devolution from the State Government based on the recommendations of the State Finance Commission as per Article 243, Loans/grants from the State Government, Program specific allocation under Centrally Sponsored Schemes and Additional Central Assistance and Internal Resource Generation (tax and non-tax)	3
6.	Rural Credit - Introduction, History, Multi Agency Approach for rural finance in India, Evolution, Shortcomings of institutional credit, Problems with Multi-agency approach, Role of RBI and NABARD; Cooperative Credit Institutions; PACS, CCBs, SCBs and CARDBs ; Commercial Banking in Rural Finance; Role and RBI Guidelines; Regional Rural banks; Latest Developments in Rural Credit, Micro finance or micro credit, Kisan Credit Card Scheme (KCC), Agricultural Insurance, White Label ATM and Business Correspondents; Financial Inclusion, Pradhan Mantri Mudra Yojana, Payment Banks and Small Finance Banks, Challenges in Rural Banking Sector.	6
Total		28

Note: Field Visits will also be made as part of the curriculum.

II. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication / Reprint
1.	Sreedhar G. and Rajasekhar D., "Rural Development in India: Strategies and processes", Kaveri Books	2014
2.	Hazra, A., "Rural India and the Emerging Developmental Challenges", Mittal Publications	2013
3.	Rao, K N., Singh H., Sukhwai, A., "Rural Management in Post Reform Era", Bookwell	2012
4.	India Rural Development Report 2013-14", Report by IDFC	2014
5.	E-Book of Ministry of Rural Development", MORD	2015
6.	Report on Local Governance"- 2 nd Administrative Reforms Commission	2007
7.	Fourteenth Finance Commission"- Ch.9- Local Governments	2015
8.	Thirteenth Finance Commission"- Ch.10- Local Bodies	2010

Ph

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: **DEPARTMENT OF PHYSICS**

1. Subject Code: **PHN-518** Course Title: **Atomic, Molecular and Laser Physics**

2. Contact Hours: **L: 3 T: 1 P: 0**

3. Examination Duration (Hrs.): **Theory : 3 Practical: 0**

4. Relative Weightage: **CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0**

5. Credits: **4** 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

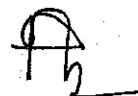
9. Objective: To introduce basics of Atomic, Molecular and Laser Physics.

10. Details of Course:

Sl.No.	Contents	Contact Hours
1.	Atomic Spectroscopy-I: Spectra of hydrogen and hydrogen-like atoms, Electron spin and magnetic moment, Fine structure splitting: spin-orbit interaction and relativistic corrections to kinetic and potential energy of the electron; Lamb shift, hyperfine structure and isotope shifts; excited states of atoms; exotic atoms.	10
2.	Atomic Spectroscopy-II: Many-electron atoms, Pauli exclusion principle, Helium spectra, Angular momentum coupling schemes: L-S and j-j coupling, equivalent and non-equivalent electrons, Hund's rules, ground state configurations of elements in periodic table; atoms in electric and magnetic fields; X-ray spectra.	10
3.	Molecular Spectroscopy: Types of molecular energy states and molecular spectra, rotational spectra and vibrational spectra; rotation-vibration spectra; transitions and selection rules; Raman spectra; electronic spectra, Franck-Condon principle, Fortrat diagram, Hund's coupling cases.	12
4.	Laser Physics: Characteristics of laser light: directionality, intensity, mono-chromaticity, spatial and temporal coherence; interaction of radiation with matter; spontaneous emission, absorption and stimulated emission processes and their transition rates; line broadening mechanisms; Optical amplification, Population inversion, Basic concepts of 2-, 3- and 4- level systems, optical resonator, Ruby lasers and He-Ne lasers; characteristics of semiconductor lasers; basic concepts of holography; recent developments in laser spectroscopy.	10
	Total	42

11. Suggested Books:

S.No.	Name of Authors/ Books/Publishers	Year of Publication/ Reprint
1.	Haken H. and Wolf H. C, "The Physics of Atoms and Quanta", Springer-Verlag	2007
2.	Demtroder W., "Atoms, Molecules and Photons", Springer-Verlag	2010
3.	Bransden B. H. and Joachian C. J., "Physics of Atoms and Molecules" Prentice Hall India	2012
4.	Struve W. S., "Fundamentals of Molecular Spectroscopy", John Wiley & Sons	1989
5.	Banwell C. N. and McCash E. M., "Fundamentals of Molecular Spectroscopy", McGraw Hill Education (India).	2013
6.	Svelto O., "Principles of Lasers", Springer-Verlag	2010
7.	Demtroder W., "Laser Spectroscopy", Springer-Verlag	2003



INDIAN INSTITUTE OF TECHNOLOGY

NAME OF DEPTT./CENTRE : DEPARTMENT OF PHYSICS

1. Subject Code: **PHN-626** Course Title: **Advanced Atomic and Molecular Physics**
2. Contact Hours: **L: 3** **T: 0** **P: 0**
3. Examination Duration (Hrs.): **Theory : 3** **Practical : 0**
4. Relative Weightage: **CWS: 25** **PRS : 0** **MTE : 25** **ETE : 50** **PRE : 0**
5. Credits: **3** 6. Semester: **Autumn** 7. Subject Area: **PEC**
8. Pre-requisite: A basic course on atomic and molecular physics and quantum mechanics.
9. Objective: The course aims at introducing methods to study atomic and molecular structure and explore their properties
10. Details of Course:

Sl.No.	Contents	Contact Hours
1.	Many-electron Atoms: The central field approximation, Thomas-Fermi potential, Hartree- and Hartree-Fock approximation, self-consistent field procedure, Dirac-Hartree-Fock method, Coulomb and Breit interaction terms, electron correlation effects, basic concepts of post-mean field methods.	12
2.	Interaction of atoms with radiation: Transition rates, Einstein coefficients, electric dipole (E1) approximation, E1 selection rules, oscillator strengths, line intensities, line shapes and line widths; retardation effects, magnetic dipole and electric quadrupole transitions, lifetimes of excited states; photoelectric effect, Bremsstrahlung.	10
3.	Molecular Structure and Properties: The Born-Oppenheimer Approximation, Application to H_2^+ , Molecular orbital theory, LCAO approach, homonuclear and heteronuclear diatomic molecules, orbitals of polyatomic molecules; Ionic and Covalent bonds; Mechanical properties: sizes, shapes, masses, specific heat, kinetic energy - of molecules; electric and magnetic properties of molecules.	10
4.	Molecular Symmetry and Symmetry Groups: Symmetry elements and symmetry operations, symmetry classification of molecules, point groups; reducible and irreducible group representations; character tables for point groups; normal modes of molecular vibrations, applications of group theory to molecular vibrations.	10
	Total	42

11. Suggested Books:

S.No.	Name of Authors/ Books/Publishers	Year of Publication / Reprint
1.	Szabo A. and Ostlund N. S., "Modern Quantum Chemistry", Dover Publications	1996
2.	Bransden B. H. and Joachain C. J., "Physics of Atoms and Molecules", Pearson Education	2004
3.	Haken H and Wolf H. C., "Molecular Physics and Elements of Quantum Chemistry", Springer-Verlag	2004
4.	Atkins P. and Friedman R., "Molecular Quantum Mechanics", Oxford University Press	2010
5.	Atkins P. and Paula J. D., "Physical Chemistry", Oxford University Press	2010
6.	Cotton F. A., "Chemical Applications of Group Theory", Wiley-Blackwell	1990

New PDC Complete List 3rd Senate

S.No.	Name	Deptt.	Topic	Supervisor	Examiner (For./Ind.)	PDC Date
1.	Mr. Gopiya Naik S.	AHEC	PLANNING OF DISTRIBUTION SYSTEM USING DISTRIBUTED GENERATION	Dr. D. K. Khatod Dr. M. P. Sharma	Prof. E. El-Saadany / Canada Dr. D. Thukaram / IISc. Bangalore	18.07.16
2.	Ms. Ila Dashora	AHEC	HYDROLOGICAL INVESTIGATIONS AND ANALYSIS FOR HYDROPOWER PROJECTS	Dr. Sunil K. Singhal Dr. D. K. Srivastava	Prof. Yusuf Mohamoud / USA Dr. A. K. Gosain / IIT Delhi	27.07.16
3.	Ms. Rashmi Kumari	AR	PLANNING FOR SUSTAINABLE DEVELOPMENT OF PATNA REGION	Dr. V. Devadas Dr. R. Chandra	Prof. Anupam Nanda / UK Dr. C. R. Pathak / SLC Kolkata Dr. Virupaxi Bogodi / GEC Haveri	26.05.16
4.	Mr. Nand Kumar	AR	ENERGY MANAGEMENT IN JAIPUR CITY, INDIA	Dr. V. Devadas Dr. R. Chandra	Prof. Mohammed Arif / UK Dr. Hina Zia / SHDT N. Delhi	31.05.16
5.	Mr. Rawal Tejas Sharadchandra	AR	PLANNING FOR OPTIMUM TRANSPORTATION SYSTEM FOR SUSTAINABLE DEVELOPMENT IN KANYAKUMARI DISTRICT, TAMIL NADU	Dr. V. Devadas	Prof. Dillip Kumar Das / South Africa Dr. C. R. Pathak / SLC Kolkata Prof. R. Murugesan / AU Tamilnadu	03.06.16
6.	Mr. Ashok Kumar	AR	PERFORMANCE EVALUATION AND GREEN RETROFIT STRATEGIES FOR CSIR LABORATORIES	Dr. P. S. Chani Dr. Rajesh Deoliya	Prof. John Bell / Australia Dr. S. K. Bhattacharya / IIT Kharagpur	24.06.16
7.	Ms. Prachi S. Deshpande	ASE	SECURITY AND STORAGE ISSUES IN CLOUD ENVIRONMENT	Dr. S. C. Sharma Dr. P. Sateesh Kumar	Prof. Kun Ma / University of Jinan, China Dr. Manoj Thakur / IIT Mandi Dr. Abdul Quaiyum Ansari / JMI Delhi	30.05.16
8.	Ms. Luxmi Rani	ASE	THE STUDY OF SPECTRAL PROPERTIES OF IRON BASED SUPERCONDUCTORS	Dr. Ajay	Prof. Ferdinando Mancini / Italy Prof. Saurabh Basu / IIT Guwahati	29.04.16
9.	Ms. Shruti Sharan	BT	ENDOCRINE DISRUPTING ACTION OF TRIBUTYL TIN IN REPRODUCTIVE AND METABOLIC FUNCTIONS	Dr. Parth Roy	Prof. Ishwar Parhar / Malaysia Dr. Subeer S. Majumder / NIT Delhi Dr. Malabika Dutta / CSIR Delhi	19.05.16
10.	Mr. Pradeep T. P	BT	INTERACTION OF FLAVONOIDS AND MITOXANTHONE WITH TETRAHYMENA G-QUADRUPLEX DNA SEQUENCE	Dr. Ritu Barthwal	Prof. M. W. Germann / Georgia Dr. M. R. Rajeswari / AIIMS Delhi	13.05.16
11.	Mr. Tapas Bhattacharyya	BT	CHEMICAL GENETIC APPROACHES TO COMBAT MULTIPLE DRUG RESISTANCE IN GRAM-NEGATIVE BACTERIA	Dr. Ranjana Pathania	Prof. T. J. Silhavy / USA Dr. H. Nandanwar / CSIR Chandigarh Dr. Amit Ghosh / NIC Kolkata	04.05.16
12.	Mr. Umesh Kumar Tanwar	BT	TRANSCRIPTOME ANALYSIS GUAR AND EVALUATION OF GUAR GUM DRUG DELIVERY SYSTEM	Dr. G. S. Randhawa Dr. Vikas Pruthi	Prof. G. S. Johal / USA Dr. H. S. Ginwal / FRI Dehradun	01.07.16
13.	Ms. Shre Garg	CSE	NETWORK BEHAVIOR ANALYSIS BASED EFFECTIVE DETECTION OF BOTNETS	Dr. A. K. Sarje Dr. P. Sateesh Kumar	Prof. V. Vardharajan / NSW Australia Dr. C. K. Mohan / IIT Hyderabad Dr. Lalit Kumar Awasthi / NIT Hamirpur	22.04.16
14.	Ms. Yogita	CSE	APPLYING DATA MINING TECHNIQUES FOR OUTLIER DETECTION FROM DATA STREAMS	Dr. Durga Toshniwal	Prof. Ajith Abraham / USA Dr. S. K. Gupta / IIT Delhi Dr. G. Sarker / NIT Durgapur	17.02.16

15.	Ms. Sweety Rathni	CY	SOME ASPECTS OF MANGANESE AND IRON CHEMISTRY WITH POLYDENTATE LIGANDS	Dr. Kaushik Ghosh	Prof. Pradip Mascharak / USA Dr. C. Mukherjee / IIT Guwahati Dr. S. P. Rathni / IIT Kanpur	02.05.16
16.	Mr. Neeraj Saini	CY	SYNTHESIS, REACTIVITY AND CATALYTIC APPLICATIONS OF MOLYBDENUM COMPLEXES	Dr. M. R. Maurya	Prof. Keith Woo / USA Dr. S. Lata Jain / CSIR Dheradun Dr. Dillip Kumar Chand / IIT Madras	25.04.16
17.	Mr. Sudheer Kumar Yadav	CY	SYNTHESIS AND CHARACTERIZATION OF METAL OXIDE/METAL SULFIDE NANOCOMPOSITES	Dr. P. Jeevanandam	Prof. V. Thangadurai / Canda Prof. N. Munichandraiah / IISc Bangalore Prof. Rajamani Nagarajan / DU, Delhi	19.05.16
18.	Ms. Mahima Khandelwal	CY	STUDY ON CHEMICAL REDUCTION OF GRAPHENE OXIDE INTO GRAPHENE - THEIR PHYSICO-CHEMICAL BEHAVIOR	Dr. Anil Kumar Dr. R. Nath	Prof. Detlef Bahnemann / Germany Prof. Tarasankar Pal / IIT Kharagpur Dr. J. P. Mittal / BARC, Mumbai	25.04.16
19.	Mr. Inderjeet Tyagi	CY	DEVELOPMENT OF NOVEL ADSORBENTS FOR REMOVAL OF NOXIOUS IMPURITIES FROM WASTEWATER	Dr. V. K. Gupta	Prof. Merv Fingas / Canada Dr. Anushree Malik / IIT Delhi Prof. Deepak Pathania / SU Solan.	29.06.16
20.	Mr. Syam Kundula	CY	SYNTHESIS OF CORE-SHELL NANOPARTICLES AND STUDIES ON THEIR PROPERTIES AND APPLICATIONS	Dr. P. Jeevanandam	Prof. Ryan M. Richards / USA Dr. Sameer Sapra / IIT Delhi Dr. Parameswar K. Iyer / IIT Guwahati	26.07.16
21.	Mr. Monu	CY	SYNTHESIS OF METAL OXIDES NANOSTRUCTURES FOR THE REMOVAL OF TOXIC RESIDUES	Dr. V. K. Gupta Dr. Ramesh Chandra	Prof. Merv Fingas / Canada Dr. Kunwar P. Singh / CSIR Lucknow Prof. Alok Mittal / MANIT Bhopal	27.07.16
22.	Mr. Nikhil Saboo	CE	STRENGTH CHARACTERISTICS OF POLYMER MODIFIED ASPHALT BINDERS AND MIXES	Dr. Praveen Kumar	Prof. Musharraf Zaman / USA Dr. Veeraragavan / IIT Madra	02.05.16
23.	Mr. Sushil Kumar	CE	PHOTOGRAMMETRIC MAPPING WITH TOTAL STATION	Dr. Kamal Jain	Prof. Armin Gruen / Switzerland Dr. K. Kumar / CRR I New Delhi Prof. G.L. S.K. Babu / IISc Bangalore	21.04.16
24.	Mr. Himanshu Sharma	CE	ENHANCED TRANSVERSE MIXING OF POLLUTANTS IN STREAMS WITH SUBMERGED VANES	Dr. Z. Ahmad	Prof. David Zhu / Canada Prof. Sarbjit Singh / Thapar Uni. Patiala Prof. U. P. Gupta / R. K. Puram, Delhi	12.04.16
25.	Mr. Upendra Kumar	CE	A STUDY OF IMAGE FUSION TECHNIQUES FOR MULTI-SENSOR SATELLITE DATASET	Dr. S. K. Ghosh Dr. Anil Kumar	Prof. A. Stein / Netherland Dr. I. V. Murali Krishna / JNTU Hyderabad Prof. Manjunath Joshi / DAICT Gujrat	12.05.16
26.	Mr. Chandrasekar	CE	AMBIENT AIR QUALITY MODELING USING SOFT COMPUTING TECHNIQUES	Dr. B. R. Gurjar Dr. C. S. P. Ojha	Prof. Toshimasa Ohara / Japan Prof. Mukesh Khare / IIT Delhi	06.06.16
27.	Mr. Mohd Shoab	CE	KNOWLEDGE BASED TRAIN NAVIGATION SYSTEM	Dr. Kamal Jain Dr. M. Shashi	Prof. G. Retscher / Australia Prof. Onkar Dikshit / IIT Kanpur	23.06.16
28.	Mr. Ambika Behl	CH	PERFORMANCE CHARACTERISTICS OF WARM MIX ASPHALT	Dr. V. K. Agarwal Dr. Satish Chandra Dr. S. Gangopadhyaya	Prof. Rajib Basu Malik / USA Dr. A. Krishna Swamy / IIT Delhi	19.04.16

Ph.

29.	Mr. Gupta Ravikant Radhysham	CH	CFD STUDIES AND EFFECT OF RHEOLOGY ON HOLLOW-FIBER ULTRAFILTRATION OF MACROMOLECULES	Dr. Shri Chand Dr. Vineet Kumar	Prof. Andrew Zydney / USA Prof. Sharad K. Gupta / IIT Delhi	13.04.16
30.	Mr. Partha Kundu	CH	FLOW OF EMULSIONS THROUGH POROUS MEDIA	Dr. Vimal Kumar Dr. I. M. Mishar	Prof. K. Nandakumar / USA Prof. Suddhasatwa Basu / IIT Delhi Prof. S. Pushpavanam / IIT Madras	07.06.16
31.	Mr. Amit Arora	CH	INFLUENCE OF SURFACTANTS ON THE FORMATION AND DISSOCIATION OF GAS HYDRATES IN FIXED BED MEDIA	Dr. C. B. Majumder Dr. Rajnish Kumar	Prof. Sarma V. Pisupati / USA Dr. Uma Shankar / BHU Varanasi	25.07.16
32.	Mr. Varun Mittal	CH	PREPARATION AND CHARACTERIZATION OF BAGASSE- WHEAT STRAW FIBER/EPOXY BLENDED COMPOSITES	Dr. Shishir Sinha	Prof. Simant R. Upreti / Canada Prof. K. K. Pant / IIT Delhi Prof. Anupama Sharma / PU Chandigarh	20.07.16
33.	Mr. Vinod K. Yadav	CH	SIMULATION OF SINGLE CHAR PARTICLE GASIFICATION IN CONDITIONS OF A COAL GASIFIER	Dr. Vineet Kumar	Prof. Michael D. Mann / USA Prof. S.N. Upadhyay / BHU Varanasi	20.07.16
34.	Mr. Ankur Gupta	CH	REMOVAL OF CHROMIUM AND PHENOL FROM SINGLE AND BINARY SIMULATED SYNTHETIC TANNERY WASTE WATER	Dr. C. B. Majumder	Prof. S.A. Sherif / USA Prof. R. Banerjee / IIT Kharagpur Prof. Ashok K. Srivastava / IIT Delhi	26.07.16
35.	Mr. Ribhu	ECE	ADAPTIVE TECHNIQUES FOR CYCLOSTATIONARY SPECTRUM SENSING IN COGNITIVE RADIOS	Dr. D. Ghosh Dr. D. K. Mehra	Prof. Danijela Cabric / USA Prof. A. Jangannatham / IIT Kanpur	17.05.16
36.	Ms. Menka	ECE	MODELING AND SIMULATION OF DOUBLE GATE TUNNEL FIELD EFFECT TRANSISTOR (DG-TFET)	Dr. S. Dasgupta Dr. Anand Bulusu	Prof. Adrian M. Ionescu / Switzerland Dr. S. Karmalkar / IIT Madras Prof. C. K. Maiti / Flat - 2w, Kolkata	12.05.16
37.	Mr. Om Prakash Acharya	ECE	A HEALING SYSTEM FOR FAILED ANTENNA ARRAY USING EVOLUTIONARY COMPUTATIONAL TECHNIQUES	Dr. A. Patnik Dr. S. N. Sinha	Prof. D. Anagnostou / USA Prof. A. Chakrabarty / IIT Kharagpur	11.05.16
38.	Mr. Sudhir Shukla	ES	PALEOGENE LARGER FORAMINIFERAL BIOSTRATIGRAPHY OF PARTS OF WESTERN INDIAN SHELF	Dr. Sunil Bajpai	Prof. K. Matsumaru / Japan Dr. Anil K. Gupta / WIG, Dehradun	17.05.16
39.	Mr. Mohd Yawar Ali Khan	ES	SEDIMENT FLOW PATTERNS AND WATER QUALITY IN RAMGANGARIVER, GANGA BASIN, INDIA	Dr. G. J. Chakrapani	Prof. Stefan Wöhlisch / Germany Prof. Santanu Banerjee / IIT Bombay	06.07.16
40.	Ms. Sugandha Panwar	ES	CHARACTERIZATION OF SEDIMENTS OF THE ALAKNANDA RIVER, GARHWAL HIMALAYA, INDIA	Dr. G. J. Chakrapani	Dr. C. France-Lanord / France Dr. S. K. Srivastava / IIRS Dehradun	27.06.16
41.	Mr. Chinmoy Kumbhakar	ES	SEISMIC TOMOGRAPHY METHODS AND SUBSURFACE STUDIES OF THE KUMAON HIMALAYA	Dr. Anand Joshi	Prof. Chun-Hsiang-Kuo / Taiwan Dr. Sushil Kumar / WIJ Dehradun Prof. Dinesh Kumar / LU Kurukshetra	16.06.16
42.	Mr. Kiran Jyoti Mishra	ES	URANIUM AND ASSOCIATED MINERALIZATION IN SONRAI BASIN, BUNDELKHAND CRATON, INDIA	Dr. A. K. Sen	Prof. Cuneu Michel / France Dr. Minati Roy / AE Hyderabad	26.07.16

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43.	Mr. Narsimha D. S.	EQ	TOPOGRAPHIC AMPLIFICATION AND SEISMIC RISK ASSESSMENT IN HILLS	Dr. Yogendra Singh Dr. M. L. Sharma	Prof. Sergio Molina – Palacios / Spain Prof. A. K. Mahajan / Himachal Pradesh	10.05.16
44.	Ms. Vandana	EQ	SOURCE AND PATH CHARACTERISTICS AROUND BILASPUR REGION OF THE HIMACHAL HIMALAYA	Dr. Ashwani Kumar Dr. S. C. Gupta	Prof. S. Krishna / Mexico Prof. S. Chopra / ISR Gandhinagar Dr. Ajay Paul / WIH Dehradun	12.07.16
45.	Mr. Prabhat Kumar	EQ	EFFECT OF NEAR-FAULT GROUND MOTION ON DYNAMIC RESPONSE OF BUILDINGS ON HILLSLOPE	Dr. Ashwani Kumar Dr. A. D. Pandey	Prof. Ahmed Ghobarah / Canada Prof. Alok Goyal / IIT Bombay Prof. Sajal K. Deb / IIT Guwahati	28.07.16
46.	Mr. Dhanavath Suresh	EE	MLI BASED ACTIVE POWER FILTER FOR POWER QUALITY IMPROVEMENT	Dr. S. P. Singh	Prof. Geza Joos / Canada Prof. Vivek Agarwal / IIT Delhi	25.04.16
47.	Mr. Nagendra H.	EE	EVALUATION OF PHYSIOLOGICAL PARAMETERS FOR COGNITIVE PERFORMANCE	Dr. Vinod Kumar Dr. S. Mukherjee	Prof. U. Rajendra Acharya / Singapore Dr. Ram Bilas Pachori / IIT Indore	12.05.16
48.	Mr. Subramanya M. B.	EE	CLASSIFICATION OF B-MODE ULTRASOUND KIDNEY AND LIVER IMAGES	Dr. Vinod Kumar Dr. S. Mukherjee Dr. Manju Saini	Prof. Olaf Doessel / Germany Prof. C. Chakraborty / IIT Kharagpur	24.05.16
49.	Ms. Padma Ganasala	EE	FUSION OF ANATOMICAL AND FUNCTIONAL NEUROLOGICAL IMAGES	Dr. Vinod Kumar	Prof. Atulya Nagar / England Prof. Vikram M. Gadre / IIT Bombay	25.04.16
50.	Mr. Pushkar Tripathi	EE	FAULT CLASSIFICATION AND LOCATION IN SERIES COMPENSATED TRANSMISSION LINES	Dr. G. N. Pillai Dr. H. O. Gupta	Prof. Eugeniusz Rosolowski / Poland Prof. S. Mishra / IIT Delhi	29.04.16
51.	Ms. Sandeep Kaur	EE	DISTRIBUTED GENERATION PLANNING USING HYBRID OPTIMIZATION APPROACHES	Dr. G. B. Kumbhar	Prof. Anil Pahwa / USA Prof. S. N. Singh / IIT Kanpur Prof. K. Shanti Swarup / IIT Madras	21.04.16
52.	Mr. K. S. Sajan	EE	SYNCHROPHASORS BASED POWER SYSTEM MONITORING AND VOLTAGE CONTROL	Dr. Barjeev Tyagi Dr. Vishal Kumar	Prof. Istvan Erlich / Germany Dr. Saikat Chakrabarti / IIT Kanpur	19.04.16
53.	Mr. Afzal Sikander	EE	REDUCED ORDER MODELLING FOR LINEAR SYSTEMS AND CONTROLLER DESIGN	Dr. Rajendra Prasad	Prof. Nitish Patel / Auckland Prof. Jayanta Pal / IIT Bhubaneswar Prof. Somnath Pan / ISM Dhanbad	16.06.16
54.	Mr. KSH Milan Singh	EE	VIBRATION PARAMETER ESTIMATION TECHNIQUE FOR ULTRASONIC MEASUREMENT SYSTEMS	Dr. P. Sumathi	Prof. Ravi Managuli / USA Prof. R. Bahl / IIT Delhi	18.07.16
55.	Ms. Pinki Sharma	HY	PRETREATMENT OPTIONS WITH RO AS TERTIARY TREATMENT FOR DISTILLERY SPENTWASH	Dr. Himanshu Joshi	Prof. M. Hunsom / Thailand Prof. Mihir K. Purkait / IIT Guwahati	21.04.16
56.	Mr. Yarramala Jaipaul	HSS	MULTICULTURALISM AND DIASPORA: SHORT STORIES OF CHITRA BANERJEE DIVAKARUNI AND JHUMPA LAHIRI	Dr. Nagendra Kumar Dr. S. K. Mishra	Prof. Stephen Gill / Canada Prof. S. N. Pandey / BHU, Varanasi	12.04.16
57.	Mr. Pradosh Singhal	BM	A STUDY OF SUPPLY CHAIN MANAGEMENT IN PUBLIC DISTRIBUTION SYSTEM	Dr. Rajat Agrawal Dr. Vinay Sharma	Prof. D. K. Sharma / USA Dr. Hardik Shah / Ghaziabad Prof. D. Das Gupta / IIM Lucknow	25.04.16

(Signature)

58.	Ms. Jyoti	BM	IMPACT OF STRESS ON QUALITY OF CARE: THE MODERATING ROLE OF WORKPLACE SPIRITUALITY	Dr. R. L. Dhar	Prof. S. K. Ojha / Nepal Prof. R. Kumar / NIT Kurukshetra Prof. Manju Bhagat / BIT Ranchi	12.04.16
59.	Mr. Vikas Thakur	BM	STUDY OF WASTE MANAGEMENT ISSUES IN INDIAN HEALTHCARE SUPPLY CHAIN	Dr. A. Ramesh	Prof. Park Kiho / Korea Prof. R. Sridharan / NIT Calicut	07.06.16
60.	Mr. Arun Kumar Kaushik	BM	MEASURING CONSUMER INNOVATIVENESS TOWARDS SELF-SERVICE TECHNOLOGY IN SERVICE INDUSTRY	Dr. Z. Rahman	Prof. Tzong-Ru Lee / Taiwan Prof. O. P. Wali / IIFT Delhi	12.07.16
61.	Mr. Gaurav Kabra	BM	MODELLING AND ANALYSIS OF INFORMATION TECHNOLOGY ISSUES IN HUMANITARIAN SUPPLY CHAIN MANAGEMENT	Dr. A. Ramesh	Dr. Birasnav Muthuraj / USA Prof. Rajendra Sahu / ABV-IIITM, Gwalior	26.07.16
62.	Mr. Devendra Kumar Dewangan	BM	ENHANCING THE COMPETITIVENESS OF MANUFACTURING SECTOR THROUGH SUPPLY CHAINS IN INDIA	Dr. Rajat Agarwal	Prof. N. Theodorakopoulos / UK Dr. S. Bhattacharya / IIT Kharagpur Prof. Ashwani Kumar / IIM Lucknow	14.07.16
63.	Mr. Mradul Veer Singh	MA	APPROXIMATION OF FUNCTIONS IN Lp(p-1) SPACES USING SUMMABILITY TECHNIQUES	Dr. M. L. Mittal	Prof. R. N. Mohapatra / USA Prof. Huzoor H. Khan / CVAD, Aligarh Prof. Prem Chandra / Ujjain (M.P)	01.06.16
64.	Mr. K. Venkateshwarlu	MA	MATHEMATICAL MODELING OF CONTROLLED ENVIRONMENT	Dr. V. K. Katiyar Dr. Bhupendra Singh	Prof. Ashok Singh / Denmark Prof. S. Bhattacharya / IIT Kharagpur Prof. Prawal Sinha / IIT Jodhpur	22.04.16
65.	Mr. Tilahun Melak	MA	INTERACTOME NETWORK ANALYSIS TO IDENTIFY DRUG TARGETS OF MYCOBACTERIUM TUBERCULOSIS H37RV	Dr. Sunita Gakkhar	Prof. Yudong Cai / China Prof. S.K. Brahmachari / CSIR New Delhi Dr. N. Chandra / IISc Bangalore	03.05.16
66.	Ms. Garina Singh	MA	NEW PSO BASED MEMBRANE ALGORITHMS FOR CHESS, SUDOKU AND OTHER APPLICATIONS	Dr. Kusum Deep	Prof. Efrén Mezura-Montes / Mexico Prof. N. C. Sahoo / IIT Bhubaneswar Prof. Debasish Ghose / IISc Bangalore	10.05.16
67.	Mr. Amarjeet Singh	MA	NOVEL GRAVITATIONAL SEARCH ALGORITHMS AND THEIR APPLICATIONS	Dr. Kusum Deep	Prof. Siarry Patrick / France Prof. A. Chatterjee / JU, Kolkata	10.05.16
68.	Mr. Tasneem Ahmed	MA	DEVELOPMENT OF LAND SURFACE MONITORING ALGORITHMS FOR SATELLITE IMAGES	Dr. R. Balasubramanian Dr. Dharmendra Singh	Prof. V. Ladshmi / USA Dr. A. K. Verma / ISRC, Ahmedabad Prof. K. P. Singh / IIT Varansi	17.05.16
69.	Mr. Sujeet Kumar Singh	MA	DEVELOPMENT OF ALGORITHMS FOR SOME OPTIMIZATION PROBLEMS IN INTUITIONISTIC FUZZY ENVIRONMENT	Dr. Shiv Prasad Yadav	Prof. C. R. Bector / Canada Dr. S. Singh / IIM Calcutta	12.04.16
70.	Mr. Gossaye Mekonnen	MA	WIRELESS HYBRID VISUAL SERVING ALGORITHMS FOR MOBILE ROBOTS	Dr. Sanjeev Kumar Dr. P. M. Pathak	Prof. Rochdi Merzouki / France Prof. Subir Kumar Saha / IIT Delhi Dr. R. Prasanth Kumar / IIT Hyderabad	17.06.16
71.	Mr. Anurag Shukla	MA	APPROXIMATE CONTROLLABILITY OF SEMILINEAR DELAY CONTROL SYSTEMS	Dr. N. Sukavanam Dr. D. N. Pandey	Prof. Nazim Mahmudov / Turkey Prof. A. K. Nandakumaran / IISc Bangalore	12.07.16
72.	Mr. Krishnakant Dhakar	MIE	INVESTIGATIONS ON NEAR-DRY EDM AND ANALYSIS OF PROCESS PERFORMANCE	Dr. Akshay Dvivedi	Prof. Noe-G. Alba-Baena / USA Prof. R. K. Garg / NIT Jalandhar	23.06.16

73.	Mr. Sanjeev Kumar Sajjan	MIE	VAPOR CONDENSATION OF R-600a OVER SINGLE HORIZONTAL INTEGRAL-FIN TUBES	Dr. Ravi Kumar Dr. Akhilesh Gupta	Prof. Akio Miyara / Japan Prof. Sanjeev Jain / IIT Delhi Prof. C. Balaji / IIT Madras	25.05.16
74.	Mr. Dilbagh Panchal	MIE	PERFORMANCE ANALYSIS AND MAINTENANCE PLANNING FOR THE REAL OPERATING SYSTEMS	Dr. Dinesh Kumar	Prof. Rajbir Bhatti / Canada Prof. Kripa Shankar / IIT Kanpur Prof. V. N. A. Naikan / IIT Kharagpur	03.05.16
75.	Mr. Gananath Doulat Thakre	MIE	μ -EHL STUDIES ON LINE CONTACTS	Dr. S. C. Sharma Dr. S. P. Harsha Dr. M. R. Tyagi	Prof. Dong Zhu / China Prof. N. C. Murmu / CSIR Durgapur	29.04.16
76.	Mr. Rajeev Sehrawat	MME	SYNTHESIS AND CHARACTERIZATION OF LiFePO_4/C -POLYMER CATHODE MATERIAL FOR LI-ION BATTERY	Dr. Anjan Sil	Prof. Jagdish / Raleigh Dr. Rajendra N. Basu / CSIR Kolkata Prof. S. Basu Majumder / IIT Kharagpur	11.05.16
77.	Mr. Maruff Hussain	MME	MECHANICAL BEHAVIOUR OF ULTRAFINE GRAINED Al-Mg-Si ALLOY PROCESSED THROUGH SPD	Dr. R. Jayanganathan	Prof. Manoj Gupta / Singapore Dr. Akhileendra Singh / IIT Patna Dr. S. K. Panigrahi / IIT Madras	19.04.16
78.	Ms. Poornima Dubey	NT	SILVER NANOPARTICLE AND GRAPHENE OXIDE BASED NANOCOMPOSITES FOR BIOMEDICAL APPLICATIONS	Dr. P. Gopinath	Prof. Matthias Epple / Germany Prof. S. Krishnakumar / OP Chennai	06.07.16
79.	Mr. Hempal Singh	PH	OPTICAL PROPERTIES OF HIGH T_c SUPERCONDUCTORS	Dr. B. D. Indu	Prof. Citrad Uher / USA Prof. R. P. Gairola / GU, Srinagar Prof. Dinesh Varshney / DA Univ. Indore	17.05.16
80.	Ms. Gurpreet Kaur	PH	HETEROSTRUCTURES OF Al DOPED ZnO AND Cu_2O THIN FILMS FOR SOLAR CELL APPLICATION	Dr. K. L. Yadav Dr. A. Mitra	Prof. Cesar Clavero / USA Prof. P. K. Giri / IIT Guwahati Prof. N. Khare / IIT Delhi	03.05.16
81.	Ms. Maneesha Dharwan	PH	STUDY OF 732.0 nm AND 844.6 nm DAYGLOW EMISSIONS UNDER VARYING SOLAR ACTIVITY CONDITIONS	Dr. Vir Singh	Prof. Gordon G. Shepherd / Canada Prof. Harish Chandra / PRL Ahmedabad Prof. M. S. Tiwari / GC Uni. Sagar (M. P.)	12.04.16
82.	Mr. Kakade Uttamkumar Sakahari	PH	QUARKONIUM SUPPRESSION: A PROBE TO THE QGP AT FINITE TEMPERATURE AND DENSITY	Dr. B. K. Patra	Prof. Ralf Rapp / USA Prof. Sajay Kumar Ghosh / BI Kolkata	17.06.16
83.	Mr. Sant Kumar	PH	GROUND AND EXCITED STATE PROPERTIES OF SPIN-1/2 FALICOV-KIMBALL MODEL ON A TRIANGULAR LATTICE	Dr. Ishwar singh Dr. Tulika Mitra	Prof. Qinfang Zhang / China Prof. A. Taraphder / IIT Kharagpur	26.07.16
84.	Ms. Archana Gautam	PT	PRODUCTION AND CHARACTERIZATION OF XYLANASES AND THEIR APPLICATION IN BLEACHING	Dr. Dharam Dutt	Prof. Md. Sarwar Jahan / Bangladesh Prof. Mahendra Patel / Ainthapali	23.05.16
85.	Mr. Birendra Bharti	WRDM	HYDROLOGICAL MODELLING AND EVALUATION OF BEST MANAGEMENT PRACTICES IN A WATERSHED	Dr. S. K. Tripathi Dr. Ashish Pandey	Prof. Yutaka Matsuno / Japan Prof. M. P. Tripathi / IGKV Raipur	31.05.16
86.	Mr. Navneet Kumar	WRDM	ANALYSIS OF DOUBLY-FED INDUCTION MACHINE OPERATING AT MOTORING MODE	Dr. T. R. Chelliah Dr. S. P. Srivastava	Prof. Akhtar Kalam / Australia Prof. T. Ilamparithi / GMP Karnataka	12.07.16



F. No. 24-2/2016 TS 1
Government of India
Ministry of Human Resource Development
Department of Higher Education

New Delhi, dated 8th April 2016

To
The Directors of all IITs

Subject: Revision of tuition fee for the undergraduate programmes

Sir,

With a view to further strengthen the IITs, Chairperson of IIT Council, after examining the report of the Committee on funding of IITs and the recommendations of the Standing Committee of the IIT Council (SCIC) for revision of tuition fee in IITs, has approved revision of tuition fee in the IITs to Rs. 2 lakh a year from the academic year 2016-17, subject to the following for protecting the interests of the socially and economically backward students:

- a) The SC/ST/PH students shall get complete fee waiver.
- b) The most economically backward students (whose family income is less than Rs. 1 lakh per annum) shall get full remission of the fee.
- c) The other economically backward students (whose family income is between Rs. 1 lakh to Rs. 5 lakh per annum) shall get remission of 2/3rd of the fee.
- d) All students shall have access to interest free loan under the Vidyalaxmi scheme for the total portion of the tuition fee payable.

2. Further, all IITs are requested to utilize funds accrued through the increased student fee for the purpose of building good quality Infrastructure with the assistance of the Higher Education Funding Agency (HEFA).

3. The Directors of all IITs are requested to take action accordingly.

Yours faithfully,

(R. Subrahmanyam)
Additional Secretary (TE)