भारतीय पेट्रोलियम और ऊर्जा संस्थान, विशाखापट्टणम

(संसद के एक अधिनियम द्वारा राष्ट्रीय महत्व का संस्थान)

INDIAN INSTITUTE OF PETROLEUM AND ENERGY, VISAKHAPATNAM

(An Institute of National Importance by an Act of Parliament)

छठी सीनेट बैठक के कार्यवृत्त

MINUTES OF THE 6th MEETING OF SENATE

दिनांक	:	सोमवार, 22 अगस्त 2022
Date	:	Monday, 22nd August 2022
समय	:	सुबह 10:30 बजे
Time	:	10:30 AM
स्थान	:	डॉ. ए. पी. जे. अब्दुल कलाम समावेश प्राँगण
Venue	:	Dr. A. P. J. Abdul Kalam Conference Hall

No. IIIPE/ACAD/SENATE-06/2022 Date: 22.08.2022

MINUTES OF 6th MEETING OF THE SENATE HELD ON 22nd AUGUST 2022 AT 10:30 AM IN THE CONFERENCE ROOM (ROOM NO. 301)

The following members were present in the meeting*:

Sl. No.	Chairperson	
1	Prof. Shalivahan, Director and Chairperson, Senate	
Sl. No.	**External Experts**	**Organisation**
2	Prof. Suddhasatwa Basu (Attended Online)	Director, CSIR – IMMT Bhubaneswar
3	Shri Saloma Yomdo (Leave on absence)	CGM (Res) & Head, COEES OIL India Ltd
4	Shri S.K. Ghulyani	Executive Director (Training and HR-Policy)/OIC, GTI
5	Shri Deepak V Shastry (Special Invitee)	Ex-ED (Training, R&D as Start Up), GAIL (India) Ltd. & Ex-Director, GAIL Gas Ltd
6	Prof. B.C. Meikap (Special Invitee)	Professor, IIT Kharagpur
Sl. No.	**Deans and Assoc. Deans**	**Section**
7	Prof. K. Vijaya Kumar	Dean (Research & Development)
8	Dr. A. Seshagiri Rao	Assoc. Dean (Faculty Affairs)
9	Dr. Deepak Amban Mishra	Assoc. Dean (Academic Affairs & Admin)
10	Dr. Pratibha Biswal	Assoc. Dean (Students' Affairs)
11	Dr. P. Aparoy	Assoc. Dean (Research & Development)
12	Dr. G. Nagesh	Assoc. Dean (Planning Resources & Alumni)
13	Dr. Rajat Jain	Assoc. Dean (International Relation and Alumni affairs)
14	Dr. Ranjan Pramanik	Assoc. Dean (Innovation, Incubation and Entrepreneurship)
Sl. No.	**Head of the Department**	**Department**
15	Dr. Himangshu Kakati (Attended Online)	PIC-Examination Cell & HoD Petroleum Engineering
16	Dr. P. Venkata Reddy (Attended Online)	Chemical Engineering
17	Dr. Arun Kumar Pujari (Attended Online)	Mech. Engg. & other Engg. Programs
18	Dr. Somnath Ghosh (Attended Online)	Humanities & Sciences
Sl. No.	**Faculty members**	**Department**
19	Dr. C.V. Rao (Attended Online)	Mech. Engg. & other Engg. Programs
20	Dr. R. Ramunaidu (Attended Online)	Humanities & Sciences
21	Dr. T. Hemanth Kumar (Attended Online)	Chemical Engineering
Sl. No.	**Registrar** (As Ex-officio Secretary)	**Section**
22	Dr. B. Muralikrishna	Administration

*Shri Saloma Yomdo, Shri V Ratanraj, and Shri Rama Sakthivel could not attend the meeting.

At the outset, Chairman Senate welcomed all the members in the meeting and requested Dean of Academic and Administration (DoAA) present the agenda items for discussion.

Item No. 06.01	**Confirmation of the Minutes of the 5th Academic Senate of IIPE held on 09th May 2022 and submission of Action Taken Report.**

The Action taken report of 5th meeting of Senate was presented before the Senate and were informed that the minutes of the 5th Academic Senate was circulated to all the member of Senate. Since no suggestions were received hence, it was proposed to approve the same.

Resolution: The Action Taken Report and proposal to confirm minutes of 5th meeting of Senate was deliberated by the Senate in detail and Confirmed the minutes of 5th Academic Senate and noted the Action Taken Report.

Item No. 06.02	**The announcement by the Director**

The following points were announced:

1. A Memorandum of Understanding (MoU) was signed by the Institute with the University of Burgen. Moving forward with this, Institute will shortly submit projects under Act 4.
2. Updated the status of the Land Acquisition.
3. Institute has introduced cumulative contingency and sandwich Ph. D program to promote foreign collaboration.
4. Institute's Faculty got recognition from the various National and International level Organization. The name of the faculty against the recognition are as follows:
    - *Dr. Sheshagiri Rao Ambati being nominated as member of the Appraisal Committee (Industry-2), Ministry of Environment, Forest and Climate Change, Govt. of India.*
    - *Dr. Raka Mandal selected for Prestigious SIRE Award.*
    - *Dr. Dipankar Pal selected for Outstanding Research in Chemical Engineering in 8th Venus International Science and Technology Award- VISTAA 2022.*
5. In the academic year 2021-22, a total of 87 students (42 from Chemical Engineering and 45 from Petroleum Engineering) were successfully graduated. Total of 74 students registered themselves for the Institute's placement drive, out of which 73 were placed including 19 in PSUs (5 in HPCL, 2 in IOCL and 12 in ONGC). Remaining 13 students has opted for the higher education.
6. Institute has implemented a scheme where Faculty Members can host foreign nationals for a duration of one month to 12 months. The foreign nationals can be academicians, post-doc, or Ph.D. Scholars.

All Senate members appreciated the efforts made by the Institute.

Item No. 06.03	**2nd Convocation on 7th September 2022**

Dr. Deepak Amban Mishra, DoAA, informed all the members of Senate that Consequent to the completion of the Under Graduate program, 2nd convocation program of IIPE is scheduled on 7th September 2022. Ms Hemlatha Annamalai, Founder and Vice Chair, Green Collar Agritech Solutions Pvy. Ltd. And Founder CEO, Ampere Vehicles Pvt. Ltd. will grace the

occasion as the Chief Guest. Chairman, Senate invited all the esteemed members, for upcoming 2nd Convocation to be held on 7th September 2022.

Resolution: The proposal was deliberated in detail and recommended by Senate to the BoG.

[Action: Dean (Acad)]

Item No. 06.04	**List of Graduating students in the academic Year 2021-2022**

The Senate may consider and recommend the following list of graduating students of the Academic Year 2021-2022 to the BoG for the award of the Degree:

CHEMICAL ENGINEERING		
S. NO	***ROLL NO***	***STUDENT NAME***
1	16CH10049	YEDDU PREETHAM
2	17CH10026	KAKANI SAI VARADEEP
3	18CH10001	AVIK ROY
4	18CH10002	KARTHIK RAJ S
5	18CH10003	G DINNESH
6	18CH10004	NAGINENI NAVEEN KUMAR
7	18CH10005	KOLLI SRINIVASA KIREETI
8	18CH10006	SUDHANSHU UPADHYAY
9	18CH10007	S F CHANT ADORAT
10	18CH10008	SAYAN CHATTERJEE
11	18CH10009	POTHEDAR CHANDRA KIRAN
12	18CH10011	KRUPA VINAY MEDIDI
13	18CH10012	TARLADA SAI DEEPAK
14	18CH10013	REKAPALLI V S K SAI SIDDHARTH
15	18CH10014	ANANEY KHANDELWAL
16	18CH10015	AKKANAPALLI LAXMA REDDY
17	18CH10016	K.THULASIMANI
18	18CH10017	ABHISHEK ANAND
19	18CH10018	SAI ROHITH MUVVA
20	18CH10019	ANKIT RAWAL
21	18CH10020	KANNA BALAJI
22	18CH10021	POTTA SAI CHAITANYA
23	18CH10022	GOWDU KARTHIK
24	18CH10023	MAHESH NALLAMOTHU
25	18CH10024	PRAGATI RAJ
26	18CH10025	NISTALA VENKATA SUBRAHMANYAM
27	18CH10026	K SHANMUKH SAI
28	18CH10027	M JAYADEEKSHITHA
29	18CH10028	SUNKARI SATYA PRASANTH
30	18CH10029	K MUKESH KUMAR
31	18CH10030	VINDHYA VASINI DEVI KOMMARAJU
32	18CH10031	RAHUL BAJAJ
33	18CH10032	SANJEET SHRIVASTVA
34	18CH10033	APURVA SUMAN
35	18CH10034	SOURAV GHOSH
36	18CH10035	PRASANNA GOPALRAO SHINDE
37	18CH10037	CHIDURALA HRUTHIK

38	18CH10038	A V SRIDHAR
39	18CH10039	GAURAV SINGH
40	18CH10040	AGNISHEKHAR CHAKRABORTY
41	18CH10042	MOHD ANAS
42	18CH10043	BURIGALA DINESH
	PETROLEUM ENGINEERING	
1	17PE10002	ABDUL KIBERIYA
2	18PE10001	UJJWAL DUBEY
3	18PE10002	S S SASI KIRAN YOGI
4	18PE10003	DASARI SUBASH CHOUDARY
5	18PE10004	GUMMA SRI RANGA NAGA SAI GOHITH
6	18PE10005	VIKRAM SINGH LAKHAWAT
7	18PE10006	MANISH KUMAR
8	18PE10007	PRIYANSHU AGRAWAL
9	18PE10008	M. SUDHARSHAN BHAT
10	18PE10009	SHAKSHAM GUPTA
11	18PE10010	SHASHWAT HARSH
12	18PE10011	RAHUL PANDEY
13	18PE10012	PRANAY SINHA
14	18PE10013	RITIK SINGH JADOUN
15	18PE10014	PALADI VENKATA VARUN
16	18PE10015	PRASHANT KUMAR
17	18PE10016	RISHABH BHARADWAJ
18	18PE10017	ABHIJITH GANESH
19	18PE10019	SUBHAM SAHA
20	18PE10020	ADARSH GUPTA
21	18PE10021	KANIPELLI KARUN TEJ
22	18PE10022	SAURABH GOYAL
23	18PE10023	SHASHWAT SINGH
24	18PE10024	ABHISHEK KUMAR
25	18PE10025	PENTAPATI JAY TILAK
26	18PE10026	POTTA SAI KUMAR
27	18PE10027	RAVI SRI SAI AKHIL KUMAR
28	18PE10028	AKSHAI BABU
29	18PE10029	RAJDEEP B
30	18PE10031	DEEPILLI SATYA TEJA
31	18PE10032	ROHIT KUMAR BINDAL
32	18PE10033	GAURAV GUPTA
33	18PE10034	TIRUMALASETTI HEMDEEP
34	18PE10035	GOLUKONDA SOMESH KUMAR
35	18PE10036	AYUSH TYAGI
36	18PE10037	KISLAY KUMAR
37	18PE10038	VASU MUDGAL
38	18PE10039	A BALAJI
39	18PE10040	BHAVYA KUMARI
40	18PE10041	VANGAPANDU VENKATA VAMSI ROHITH
41	18PE10042	GANESH V
42	18PE10043	KUMARI AGRANI
43	18PE10044	GOLLAPALLI RAHUL SURYA
44	18PE10046	ASTHA PATEL
45	18PE10047	PALA MANIKANTA

Further, the Senate may consider and recommend he Institute Gold Medal for the topper of the batch of Petroleum and Chemical Engineering and President's Gold Medal:

- *Institute Gold Medal for best academic performance in C.E.: Mr. Ch. Hruthik (18CH10037)*
- *Institute Gold Medal for best academic performance in P.E.: Ms. Kumari Agrani (18PE10043)*
- *Presidents Gold Medal for best all-round performance: Ms. Kumari Agrani (18PE10043)*

Resolution: The proposal was deliberated in detail and the Senate recommended the list of graduating Students of the Academic Year 2021-2022 and the Names of President and Institute Gold Medals to the BoG for award of Degree and the conferment of the Gold Medals respectively.

[Action: Dean (Acad)]

Item No. 06.05	**Approval of UG Manual**

The proposal was presented before the Senate and discussed the salient feature of the same **(Annexure 3)**

The proposal was deliberated in detail by the Senate and suggested that the Maximum Credit Should be in between 165 to 180. Further, it has been suggested that Institute should place at least of one foreign language in the curriculum.

Resolution: The Senate has recommended the agenda item to the BoG.

[Action: Dean (Acad)]

Item No. 06.06	**Renaming the Departments**

The proposal was presented before the Senate and elaborated the need of renaming the departments. In tune with the 5th Senate meeting regarding generalizing the nature of Department name, the proposals:

(A) to change the name of Department of Mechanical Engineering and other engineering to Department of Mechanical Engineering and
(B) to introduce new department viz Department of Energy Science & Engineering was presented in detail.

Resolution: The proposal was deliberated in detail and recommended to the BoG.

[Action: Dean (Acad)]

Item No. 06.07	**Uniform syllabus for B. Tech. first-year across all branches of the Institute.**

The proposal was presented before the Senate and elaborated on the need to have a uniform syllabus with a new format for B. Tech first year across all branches of the Institute. **(Annexure II).** This new syllabus will be effective from 2022-2023 batch

Resolution: The proposal was deliberated in detail and recommended to the BoG.

[Action: Dean (Acad)]

Item No. 06.08	**Admission of foreign students into PG program.**

The proposal was presented before the Senate and informed all the members that Institute is planning to open admission to foreign nationals. In tune with the various requests and demands for foreign admission, Institute has come with the proposal for the same with in-detailed execution plan, admission procedure, fee structure, etc **(Annexure III)**.

Resolution: The proposal was deliberated in detail and recommended to the BoG.

[Action: Dean (IRAA)]

Item No. 06.09	**Online courses from SWAYAM, NPTEL etc to be included in the grade sheet of Ph.D Students.**

The proposal was presented before the Senate and informed that most of the Research Scholars of the Institute have opted online programs/courses like NPTEL, SWAYAM, etc. based on research interest to fulfil the course criteria. It was proposed to include the NPTEL, etc. in the grade sheet of the student.

Resolution: The proposal was deliberated in detail. The Senate unanimously resolved that the External Candidates (i.e., Industry Sponsored Candidates) need to spend one semester at the Institute. In the second semester of their course work, they may take courses from NPTEL/SWAYAM portals.

Further, Full time Ph.D. Scholars, the courses in general to be offered by the Faculty members of the Institute. However, if the need arises, only specialized courses may be taken from SWAYAP/ NPTEL like platforms. It is desired that the Faculty Members also take such courses. Doctoral Scrutiny Committee may recommend audit courses some courses from such platforms. The courses taken from such platforms will be reflected in the Grade Card. Proposal was recommended to the BoG

[Action: Dean (Acad)]

Item No. 06.10	**Discussion and introduction of new proposed course related to Energy under Institute Elective.**

Prof Arun K Pujari, Mechanical Engineering and Prof Ravi Sonwani, Chemical Engineering proposed Principle of Energy Conversion (Elective – I) and Waste to Energy Conversion (Elective – I) respectively as Institute Elective **(Annexure IV)**.

Resolution: The proposal was deliberated in detail. The Senate appreciated the efforts of Prof Ravi Sonwani and Prof Arun K Pujari for introducing which have been bench marked with *University of Sheffield, IIT Bombay, IIT Kanpur and Micihigan Technical University.* The Senate recommended the agenda item to the BoG.

[Action: Dean (Acad)]

Item No. 06.11	Discussion on Expert list for Faculty Selection

The proposal was presented before the Senate and informed the Institute has prepared draft list of Experts from the esteemed organizations, for the selection of faculty in the various department of the Institute. Adding the necessity of the same Chairman, Senate elaborated on the significance of having a list of experts for various faculty recruitment.

Resolution: The proposal was deliberated in detail and recommended the agenda item to the BoG.

[Action: Dean (FA)]

Item No. 06.12	Any other item with the permission of the chair.

The procedure to be followed in the Convocation **(Annexure V)** was placed before the Senate.

Resolution: The proposal was deliberated in detail, and Senate recommended the proposed procedure to the BoG.

[Action: Dean (Acad)]

Item No. 06.12.02: Implementation of SATHI

The proposal to implement SATHI (Sophisticated Analytical and Technical Help Institutes) a DST Scheme was presented before the Senate. The proposal to rollout along with aim and scope of SATHI was deliberated in detail.

Resolution: The Senate appreciated the efforts of the Institute in submitting such proposals and recommended the agenda item to FC.

[Action: Dean (R&D)]

On the record, Chairman Senate sought advice from the External Senate members for the all-round development of the Institute, and the members advised the following:

1. For the development of the Institute and to play key pedagogical roles, Institute should implement the practice of "Professor of Practice (PoP)".
2. All faculty members should have at least one external funded project.
3. Institute should consider for the Industry sponsored projects and cater solutions to Industrial problems.

Chairman, Senate informed that in the past three months, faculties of the Institute have submitted 22 projects proposal to the different funding agencies.

The meeting ended with thanks to the chair.

26/8/22.

Registrar (I/c)

REGISTRAR
INDIAN INSTITUTE OF PETROLEUM & ENERGY
VISAKHAPATNAM

Manual of

PROCEDURES & REQUIREMENTS

for

UNDERGRADUATE PROGRAMMES

Indian Institute of Petroleum and Energy

(IIPE), Visakhapatnam

Effective from 2022-23

Contents

INDIAN INSTITUTE OF PETROLEUM AND ENERGY

NOTIFICATION

Visakhapatnam, the 2nd November, 2020

No. CA-31037/5/2019-CA/PNG.—The following is published for general information:

THE ADMISSION OF THE STUDENTS TO THE INSTITUTE (SECTION-34 (A) OF IIPE ACT, 2017)

CHAPTER – 1

UG PROGRAMMES OF STUDY

The Indian Institute of Petroleum and Energy (IIPE) Visakhapatnam offers a number of undergraduate programmes leading to 4-year B.Tech. The regulations as provided herein details the procedures and requirements of UG programmes being offered by the Institute. The Institute admits students to its UG programme through JEE (Advanced).

1.1. Academic Programmes offered by (IIPE) Visakhapatnam for UG (B.Tech.)

S.N.	Programmes	Duration	Total Intake
(a)	Chemical Engineering	4-year	50
(b)	Petroleum Engineering	4-year	50

1.2. Admission to UG Programmes

1.2.1. The admission to B. Tech. Programmes shall be made once in a year normally in July through Joint Entrance Examination (JEE) Advanced Ranking, conducted on an All India Level / Basis by IITs.

1.2.2. The candidates, seeking admission in B. Tech. programmes, shall fulfil the following criteria in addition to the rank in the merit list of Joint Entrance Examination (JEE) Advanced of the respective year. Candidates should have passed intermediate (10+2 (PCM)) with Science Subjects or equivalent examination with minimum 75% marks in aggregate (65% marks in case of students SC/ST/PWD categories).

1.2.3. How to apply: All candidates fulfilling the criteria as mentioned in Paras - 1.2.1 & 1.2.2 above shall apply online at 'www.iipe.ac.in' after making the payment of Application Fee on giving advertisement by the Indian Institute of Petroleum and Energy (IIPE) separately.

1.3. Reservation of Seats

Reservation policy will be applicable as per the Government of India norms.

1.3.1. In admission to Undergraduate and all such other courses of the Institute, seats shall be reserved for the candidates as per the Government of India norms who fulfil the minimum eligibility criteria as stated above. Any other reservation as enacted by the Government of India, from time to time including EWS and supernumerary seats for female candidates will be applicable.

1.3.2. The merit list for admission to all programmes shall be published separately for each branch by allocating seats to the candidates of reserved categories.

1.3.3. It is mandatory that the candidate of SCs/STs/OBCs/PWD shall mention their category at the time of submission of the application form in the prescribed format and produce the original Caste Certificate of the respective reserved category issued by the competent authority at the time of counselling.

1.3.4. The candidates of reserved categories shall submit the certificates in original issued from an approved District Authority stating the category of Scheduled Caste/Scheduled Tribe / Other

Backward Class, to which the candidate belongs. A list of approved authorities from which the respective category certificates can be procured by the candidates is given below:

(a) District Magistrate/ Additional Magistrate/ Deputy Commissioner / Collector /Additional Deputy Commissioner/Deputy Collector /1st Class Stipendiary Magistrate / City Magistrate (not below the rank of 1st Class Stipendiary Magistrate), Sub-Divisional Magistrate/Taluka Magistrate/ Executive Magistrate / Extra Assistant Commissioner.
(b) Revenue Officer not below the rank of Tahasildar.
(c) Sub-Divisional Officer of the area where the candidates and/ or his/her family normally resides.
(d) Administrator/ Secretary to Administration/ Development Officer (Laccadive & Minicoy Islands).
(e) Any other authority approved by state government/union territory.

1.3.5. It is mandatory that the candidate seeking admission under Reserved categories/classes shall produce the caste/category certificate in his/her name at the time of counselling. The certificate in the name of either of the parents (Mother/Father) shall not be acceptable.

1.3.6. The validity of OBC-NCL certificate would be 1 year (Office Memorandum dated 31st March 2016 issued by DoPT), hence, candidates belonging to this category shall produce OBC-NC certificate, issued by competent authority in the same financial year.

1.3.7. A certificate shall be issued to PWD by a duly notified Medical Board of a District/Government Hospital set up for examining the physically challenged candidates under the provision of the PWD (Equal Opportunities, Protection of Rights and Full Participation) Act 1995.

1.3.8. The certificate of PWDs shall indicate the extent of (i.e., percentage of) the physical handicap, it should bear the photograph of the candidate concerned, and one of the Doctors of the consulting Board, issuing the certificates, should countersign it.

1.3.9. The 3% reservation PWD is distributed horizontally over all category and shall not be considered for less than 40% of disabled person.

1.4. Casual / Non-Degree Students

A Casual / Non-degree student is one who is registered for a degree in a recognized Institute (other than IIPE Visakhapatnam) or a University in India or abroad, and who is officially sponsored by that Institute or the University to complete a part of her/his academic programme at IIPE Visakhapatnam. For that purpose, the non-degree student may carry out research, take courses for credit or otherwise, or may use other academic facilities at IIPE Visakhapatnam. An official transcript of work done at IIPE Visakhapatnam, along with grades obtained, if any, would be given to the non-degree student for her/his use as she/he may deem appropriate. However, any credits earned at the Institute by a non-degree student cannot be counted towards any degree programme of IIPE Visakhapatnam at any time. A candidate will be admitted as a casual / non-degree student on the basis of a sponsored application to the Dean (Academic) through the Departmental committee, who will recommend admission of the candidate on the approval of the Chairman, Senate. A non-degree student may be admitted for a maximum period of two semesters and the summer term (a maximum of one year). There will be no bar

on the number of casual / non-degree students being admitted to a programme. A non-degree student shall be registered on payment of all applicable fees as discussed by the Board from time to time. All such students admitted shall be governed by the Code of Conduct for the students and the regulations and discipline of IIPE Visakhapatnam.

1.5. Validity of Admission and Its Cancellation

A candidate is admitted to a UG programme, if s/he is:

(a) eligible for admission to a specified programme;
(b) completed all the steps laid down under the procedure for admission; and
(c) paid the prescribed fees.

All such candidates are required to submit pertinent documents, such as copies of their marks/grade sheets, original/ provisional certificate of the qualifying examination, category certificate, if under reserved category, in the prescribed format on or before the last date of submission as specified. All admissions to the Institute are subject to approval of the Senate. The admission of a student may be cancelled by the Senate, if it is found that the student has failed to submit all the documents by the due date specified in the Academic Calendar or has not met other specifications. The admission of a student can also be cancelled by the Senate at any time during the programme, if it is found that the student has submitted wrong/forged document(s) or has given a false declaration.

CHAPTER – 2

BRANCH CHANGE RULES

Change of the branch is a **privilege and not a right**. Only those students admitted to B. Tech. program through JEE (Advance) are eligible to be considered for a change of branch after the 2nd semester as per the following rules. However, if any branch specific mandatory core course(s) is/are floated within first two semesters (1st semester and 2nd semester) then change of branch option will not be entertained. To be eligible for consideration for a change of branch the following conditions must be fulfilled.

2.1. He/she must have completed all the credits prescribed in the first two semesters of the course, in his/her first attempt, without having had to pass any course requirement in the re-examination, supplementary examination and/or summer quarter.

2.2. He/she must have obtained a Cumulative Grade Point Average (CGPA) not lower than 8.5 at the end of the Second (Spring) Semester.

2.3. He/she must not have been punished for any offence by the Institute Disciplinary Committee or the Committee on Prevention of Examination Malpractices at any time prior to the notification for the change of branch.

2.4. He/she must not have been punished for any examination Malpractices.

2.5. Change of branch shall be made strictly on the basis of inter-se-merit of the applicants. For this purpose, the CGPA obtained at the end of the Second (Spring) Semester shall be considered.

2.6. In making the change of branch, those applicants shall be first considered who have secured a rank within top **1%** (one percent), rounded to the nearest integer, amongst all the first year students in terms of the CGPA scored at the end of the Second (Spring) Semester.

2.7. The remaining applicants may be allowed a change of branch, strictly in order of inter se merit, subject to the limitation that the actual number of students in the Third (Autumn) Semester, in the branch to which the transfer is to be made, does not exceed **110%** of the sanctioned yearly intake for that branch. The minimum number of students in a branch/programme does not deplete below 80% of the sanctioned strength in that branch/programme. *However, branch toppers (two places of decimal) of each branch/programme will be eligible for branch change irrespective of the department strength requirement.* The sanctioned yearly intake of a particular branch shall be the number sanctioned by the Senate as the intake for that branch for the particular year of entry of the applicants. To compute the total number of students in the first year, sum of the sanctioned yearly intake of all the branches will be taken. For the purpose of calculating the actual number of students in a particular branch, the number of students joining the branch is to be considered.

2.8. All changes of branch will be final and binding on the applicants. No student will be permitted, under any circumstances, to refuse the change of branch offered.

2.9. The academic section will notify the students and display on the notice boards about the changes of the branch at least 7 (seven) days before the assigned date(s) of the registration of the third (Autumn) semester. However, all changes of branch made in accordance with the above rules will be effective from the Third (Autumn) Semester of the applicants concerned. No changes of branch shall be permitted thereafter.

2.10. Application for a change of branch must be made by facilitating the eligible students, when the notification is made, during the Spring Semester of the Academic Year. The students have accordingly to (i) apply online/offline (as notified) and (ii) submit a signed copy to academic section (and / or Exam cell) by the specific date notified for verification and consideration.

2.11. A student who has foreign nationality and has been either sponsored by her/his Government and/or by the Government of India, under any bilateral or other programme, to pursue a course of study in a particular branch/programme, will NOT be allowed branch/programme change.

CHAPTER – 3

CURRICULUM

3.1. Components of the Curriculum

a) *Institute Core*: Courses which are compulsory for all UG students.

b) *Department Core*: Courses which are compulsory for students in their parent discipline/department.

c) *Institute Elective*: An Institute Elective course is any course offered in their parent discipline/department or by the Institute.

d) *Humanities and Social Sciences/Management Studies (HSS/MS) Elective*: These are elective courses from a basket of courses offered by the Department of Humanities and Social Sciences/ Management Studies. Students are given an option to clear the mandatory MS/HSS course in any semester during the entire period of their academic program.

3.2. Course code

The course code is aligned in the following;

Institute course: IC

Department course: CH, PE, ME, etc.

Institute Elective course: IE

- The course code contains four digits number

1st digit represents year (1, 2, 3, & 4)

2nd digit represents semester (1 & 2)

3rd and 4th digit represent subject serial (e.g. 01, 02, 03, etc.)

E.g., an Institute Course in fourth semester: IC 2401

Similarly, a Chemical Engineering course in sixth semester: CH 3602

3.3. Modular Course

A modular course will run exactly for half a semester and will have only one examination at the end with at least one quiz in addition to this examination. Modular courses will either be offered before mid-semester examination or after mid-semester examination. The examination period for a modular course will coincide with the mid-semester examination /end-semester examination.

All the courses will be reviewed and updated regularly by the Departmental Academic Committee and Institute Academic Committee/Senate.

Students, in general, cannot take two similar courses floated either by the parent or any other department. The details of courses of the UG programmes, being offered by various departments, are contained in the "COURSE STRUCTURE and SYLLABUS" document, published periodically by the Institute, and available at the office of the Dean (Academic).

CHAPTER – 4

RULES, REGULATIONS AND PROCEDURES RELATING TO THE UG PROGRAMMES INCLUDING THE ELIGIBILITY CONDITIONS OR CRITERIA FOR AWARDING THE DEGREES, ETC.

4.1. Credit System

4.1.1. Introduction

The prominent features of the credit system involve:

(a) The process of continuous evaluation of a student's performance.
(b) Flexibility to allow the students to progress at a pace suited to individual ability /talent and convenience.
(c) Subject to the regulations of credit requirements and pre-requisite of courses.

Each course has a certain number of credits assigned. This depends on lecture, tutorial and laboratory contact hours in a week, plus the time expected to be spent by the student outside the formal contact hours in a week. Each course is coordinated by a faculty member, called the 'Course Instructor (or Teacher)' (also called 'Instructor-in-charge'). She/He has the full responsibility for conducting the course, coordinating with the work of the other members of the faculty involved in that course, holding the tests and awarding the grades. In case of any difficulty the student is expected to approach the course instructor for advice and clarification. Sometimes, more than one faculty member may be jointly responsible for the course, in this case they are jointly shared by the 'Course Instructors'.

A letter grade, with a specified number of grade points, is awarded in each course for which a student is registered.

4.1.2. Number of Credits in a Course

For each course L-T-P-C are designated as shown below:

L (Lectures) : Number of lecture hours per week.

T (Tutorials) : Number of tutorial hours per week.

P (Practical/Laboratory) : Number of laboratory hours per week.

C (Credits) : Credits for the course.

Credits reflect the number of hours a student has to work per week, inclusive of contact hours. A certain number of Credits are assigned as follows:

The Academic Load, **AL**, of a given course is calculated using the number of contact hours per week as:

AL = 3.0 X L + 1.0 X T + 1.5 X P

Depending on the academic load of a course, its credits, C, are assigned as follows:

Academic Load (AL) =	5-6	7-8	9-12	13-15
Credits (C) =	2	3	4	5

The majority of courses have 4 credits, i.e. C = 4. For a course with 4 credits, generally a student would have to put in approximately 12 to 14 hours of work per week. Of course it would vary with the individual's ability.

4.1.4. Teaching load: Teaching hour per week represents no. of credits per week. For example, a course with 2 credits will have 2 hours of teaching per week. Similarly, for lab, each credit will have 1.5 hours of teaching per week.

4.1.3. Course Curricula

The detailed approved curricula for various disciplines along with the syllabus for each subject for all the programs are made available on the Institute website: http://iipe.ac.in.

4.1.3.1. General course structure

The general course structure for all programs of **B. Tech** comprises of the following components:

(a) Common Curricula for First Year.
(b) Theory and Laboratory/Design/Sessional subjects with regular class room contact.
(c) Four non-credit components of Extra Academic Activity (EAA) from 1st to 4th semester.
(d) Industrial/summer training.
(e) Viva-voce.
(f) Projects in two parts.

4.1.3.2. Subjects:

All subjects prescribed in curricula except EAA have credits assigned to them. Subjects are broadly classified into two categories:

(a) Theory, Laboratory, Sessional and Design based course have a regular class room/laboratory contact. These subjects have a lecture-tutorial-Experiment /design component (L-T-P) to indicate the contact hours per week. Their L-T-P pattern may be (L-T-0, L-0-0, 0-0-P and in some cases L-T-P).
(b) Comprehensive Viva-voce, project, field trips and Industrial training/summer training which do not have regular class room contact.
(c) Teaching of subjects would be reckoned in terms of credits

4.1.3.3. Subject pre-requisites:

A course subject may have one or more subject-topics listed as its pre-requisite. A student who has qualified in all the subject-topics in the pre-requisite would be allowed to register in the subject. The instructor concerned would have the prerogative to waive the pre-requisites for a student if he/she is satisfied through a test or if he is satisfied that the student has otherwise gained sufficient proficiency to take up the subject.

4.1.3.4. Extra Academic Activity (EAA):

Every student must register and complete the EAA requirements as laid down in the curriculum.

- EAA is classified into four main groups such as National Credit Corps (NCC), National Service Scheme (NSS), National Sports Organization (NSO) and Health and Fitness (HNF).
- Further NCC is classified into Electrical & Mechanical Engineering (EME) Wing and Air Wing (ARW).
- NSS classified into 15 units.
- NSO classified into different sports such as athletics, badminton, basketball, football, hockey, swimming, tennis, table tennis, volleyball, cricket
- HF classified into 10 units.
- All the above EAA is being coordinated by Program Coordinator and the individual modules designed and planned by Program officers.
- Students exercise their choice of EAA component at the time of admission.
- Allocation of EAA component is made centrally based on their choice and availability.
- Clearing EAA is mandatory for the award of degree.
- The normal duration of the program leading to the award of the B Tech degree under these Regulations is 4 years.

4.1.3.5. Co-ordinated course

A co-ordination committee would be constituted for each subject taught by more than one instructor of one or more Departments/Centers. Each committee would consist of all the instructors who are involved in the teaching of the subject during the semester. One of its members would be nominated by the Head of the Department (HoD), under whose name the subject is being offered, to serve as its chairperson.

Tenure: The semester in which the subject is being offered.

Function:

(a) To lay down the course plan of the subject.
(b) To coordinate instructions and progress of teaching in the subject and to ensure that the full syllabus is covered.
(c) To review periodically the performance of students who have registered in the subject.
(d) To forward the results of the examinations and the final grade obtained by each student taking the subject to the concerned HoD.
(e) To moderate the question papers on the subject and ensure that the syllabus is being covered by the question paper.

Frequency of meeting:

Each co-ordination committee shall meet at least four times during the semester.

4.1.3.6. Summer training and field work.

The curricula for all B. Tech programs would include compulsory **summer** training for 8 weeks carrying 2 credits, to be carried out in the summer vacation at the end of the 6^{th} semester.

(a) The allotment of training programs of all the students by Career Development Centre (CDC) will be frozen by a suitable and fixed deadline each year. No further change will be entertained under any circumstances.
(b) A student after being selected in an organization by CDC cannot opt out of his training from the organization under any circumstances.
(c) Any arrangement of training in industry or academia (within or outside the country) has to be routed though CDC via the Professor-in-Charge of training of the respective departments.
(d) Evaluation: The performance of the student in the summer training will be evaluated based on submission of a certificate received from the organization of his training followed by a combined viva voce/presentation and report examination.

4.1.4. Degree Requirements

The degree requirements for undergraduates are specified in terms of

(a) Minimum total credits to be earned. These will be fixed by each department and will generally be between 165 and 180.
(b) These requirements make the programme flexible, as the students can choose courses depending on their varying interests, as long as they satisfy the minimum requirement.

4.2. Grading System

4.2.1. Award of Grades

As a measure of students' performance a 7-scale grading system using the following letter grades and corresponding grade points per credit, as shown in **Table 4.2.1** will be followed.

Table 4.2.1

Performance	Letter Grade	Points per credit
Excellent	Ex	10
Very good	A	9
Good	B	8
Fair	C	7
Average	D	6
Pass	P	5
Fail	F	0
Debarred	X	-

A '**Semester Grade Point Average' (SGPA)** will be computed for each semester. The SGPA will be calculated as follows:

$$SPGA = \frac{\sum_{i=1}^{n} C_i g_i}{\sum_{i=1}^{n} C_i}$$

where n is the number of subjects registered and cleared for the semester, C_i is the number of Credits allotted to a particular subject, and g_i is the grade points carried by the grade awarded (Table 4.2.1) to the student for the subject. SGPA will be rounded off to the second place of decimal and recorded as such. The SGPA would indicate the performance of the student in the semester to which it refers.

Starting from the second semester at the end of each semester S, a 'Cumulative Grade Point Average (CGPA)' will be computed for every student as follows:

$$CPGA = \frac{\sum_{i=1}^{m} C_i g_i}{\sum_{i=1}^{m} C_i}$$

Where, m is the total number of subjects the student has **registered and cleared** from the first semester onwards up to and including the semester S. C_i is the number of Credits allotted to a particular subject S_i and g_i is the grade-point carried by the grade awarded (Table 4.2.1) to the student for the subject S_i. **CGPA** will be rounded off to the second place of decimal and recorded as such.

The **CGPA** would indicate the cumulative performance of the student from the first semester up to the end of the semester 'S' to which it refers. The **CGPA, SGPA** and the grades obtained in all the subjects in a semester will be communicated to every student at the end of every semester. For determining the inter-se-merit ranking of a group of students, only the rounded off values of the **CGPAs** will be used.

When a student gets the grade **F** in any subject during a semester, the **SGPA** and the **CGPA** from that semester onwards will be tentatively calculated, taking only **zero point** for each such **F** grade. After the **F** grade(s) has/have been substituted by better grades during any subsequent semester examination, the **SGPA** and the **CGPA** of all the semesters, starting from the earliest semester in which the **F** grade has been updated, will be recomputed and recorded to take this change of grade into account.

4.2.2. Conversion of CGPA into percentage Marks:
In case of a specific query by students/employers regarding conversion of **CGPA** into percentage marks, the following formula will be used for notional conversion of **CGPA** into percentage marks.

$$\textbf{\textit{Formula: \% Marks}} = \textbf{\textit{CGPA}} \times \mathbf{10}$$

4.2.3. Assessment of Performance
There will be continuous assessment of a student's performance throughout the semester and grades will be awarded by the subject instructor/co-ordination committee formed for this purpose.

4.2.3.1. In general there shall be no rigid of marks-to-grade linkage. Difficulty Levels of the examinations, tests, assignments, viva-voce and other factors that contribute to the final marks are to be considered by the instructor/coordination committee of a subject while converting marks into letter grades.

4.2.3.2.

(a) The grades **F** and **Ex** are to be considered as bench-mark grades.

(b) The range of cut-off marks below which a student would be assigned an **F** grade is 30-35 for the theory component and 35-40 for the laboratory component, the exact cut-off marks is to be decided by the instructor/coordination committee.

(c) The exceptionally brilliant performance is to be assigned an **Ex grade** Even the best student of any class needs to be good enough to be awarded the **Ex** grade.

(d) For subjects which have a laboratory component (P-component) along with the theory, to secure any grade higher than **F** a student has to achieve individually more than the cut-off marks in both the theory component and the laboratory component. Separate marks, each out of 100 (hundred), in the theory component (L- & T-components) and the laboratory component are to be ascertained first. A composite mark for the subject out of 100 is then to be computed by taking appropriate contribution of laboratory component (Table: 4.2.3.2a) and only theory component and only laboratory component (Table: 4.2.3.2b) as shown in Tables:

Table: 4.2.3.2 a

L-T-P	Credit	Theory (L-T component)	Laboratory (P component)
4-0-6	8	50	50
3-0-6	7	40	60
4-0-3	6	70	30
3-1-3	6	70	30
1-0-8	6	20	80
3-1-2	5	80	20
3-0-3	5	60	40
3-0-2	4	75	25
2-0-3	4	50	50
1-0-5	4	25	75
2-0-2	3	70	30
1-0-3	3	30	70
1-0-2	2	50	50

Table 4.2.3.2b			
Only Theory		**Only Laboratory**	
Marks Range (m)	**Grade**	**Marks Range**	**Grade**
$m \geq 90$	Ex	$m \geq 90$	Ex
$80 \leq m < 90$	A	$80 \leq m < 90$	A
$70 < m < 80$	B	$70 \leq m < 80$	B
$60 \leq m < 70$	C	$60 \leq m < 70$	C
$50 \leq m < 60$	D	$50 \leq m < 60$	D
$35 \leq m < 50$	P	$40 \leq m < 50$	P
$m < 35$	F	$m < 40$	F

4.2.4. Large Class Assessment:
In the case of a relatively large class and/or classes where the performance level depicts more or less a normal distribution:

(a) The average performance (around mean value of marks) is to be assigned C grade. However, if by Instructor/co-ordination committee's opinion / perception the general level of the class is considered to be appreciably high, the average performance may be assigned B grade.

(b) All other marks to grade conversion are to be done relatively with respect to the average performance in between (but excluding) the F and Ex grades, which have already been assigned, by choosing appropriate boundary marks between grades.

(c) Normally, in a reasonably large class of students, distribution of grades is expected to be as follows:

Table: 4.2.4	
Grade	**Distribution**
Ex	$\leq 10\%$
A	10-25%
B, C, D	20-35%
P	10-25%
F	$\leq 5\%$

4.2.4.1. In the case where a student appears in the summer examination or attends summer quarter, the conversion from '**marks to grade**' would be done applying the same norm as was framed for the original class.

4.2.4.2. For classes where excessive bunching occurs resulting in almost all the marks tending to cluster into same category, conversion from '**marks to grade**' may be done using the Table 4.2.3.2b where ***m*** stands for the marks obtained. However, the instructor may, on his/her perception of the difficulty level of assessment process undertaken, alter the boundary (cut-off) marks by marks.

4.2.4.3. For subject in which the theory component is greater than 1 (one), the subcomponents and the respective weights assigned to these are given below

Table:4.2.4.3	
Subcomponent	**Weight**
Teacher's Assessment	20%
Mid-Semester Examination	30%
End-Semester Examination	50%

4.2.4.4. For assigning marks in Instructor's Assessment (T.A.) performance in home assignments, class-tests, tutorials, viva-voce, attendance etc., are to be considered. At least two

class tests are to be conducted for a given subject. The weights of different sub-components of T.A. are to be announced by the instructor at the beginning of the Semester.

4.2.4.5. For subjects in which the theory component is 1 (one), there would be no Mid-Semester or End-Semester Examination. The marks of the theory component would be decided by performance in class-tests, home assignments, tutorials (if any), viva-voce, attendance etc. At least two class tests are to be conducted for the theory component of such a subject. The weights of different sub-components are to be announced by the instructor at the beginning of the Semester.

4.2.5. Summer training: The eight-week summer training undergone by the students in the summer vacation after the sixth semester would be assessed within five weeks after the commencement of the seventh semester. The students are required to submit a written report on the training received and give a seminar, on the basis of which a grade would be awarded. The students are also required to submit to the Head of the Department a completion certificate in the prescribed form from the competent authority of the organization where the training was received, without which he/she would not be assessed.

4.2.6. Assessment of Project work

4.2.6.1. Performance in the various activities involved in the project would be assessed individually at the end of each semester in which it is being carried out as per the curriculum. The student is required to submit a written report at the end of the semester. The Head of the Department would appoint a 'project evaluation board' for purpose of assessment. The different components of evaluation and the weights assigned to these components are given in the Table (4.2.6.1) below:

Table: 4.2.6.1

Subcomponent	Weight
Supervisor's Assessment	40%
Project Report/Thesis (to be assessed by the board)	20%
Evaluation Board's assessment	40%

The student is required to give a seminar on the project work done. The evaluation board would conduct the viva voce. Dates for conducting the seminar and the viva-voce, to be held within ten days after the end-semester (7^{th}/8^{th}) examination, would be announced in the academic calendar.

4.2.6.2. The grades for projects of 7th, 8th semesters for B.Tech. have to be submitted within the respective deadline of grade submission as per Academic Calendar. If a student cannot complete the project for any reason, by deadline, he/she will get an 'F' grade. The extension of project in a semester can be made with the prior approval by Dean (Academic affairs) on the requisition, the application submitted by the student through his/her Project Supervisor and Departmental Head. The deadline for submission of the grades for the extension availed in projects allotted in Autumn Semester (7^{th} Semesters) will be three days before the registration of the next Spring Semester, while the deadline for submission of the grades for the extension availed in the projects allotted in the Spring Semester (8^{th} Semesters) will be June 30 of the concurrent year. In case of project extension, a student will be awarded one grade less than that actually obtained by him/her.

If a student cannot clear the project for the 7th semester, he/she can register the same along with 8^{th} semester project. In such case, he/she will get one grade less than that actually obtained in the evaluation of project part I (7^{th} semester component).

4.2.6.3. The Head of the Department would constitute the Viva-Voce Board(s) for conducting the comprehensive viva-voce examination as per the requirement of the curriculum. The Board would decide the relative weights of the different aspects of the viva-voce and decide the grades to be awarded to the students. The dates of the viva-voce, to be conducted within ten days after the end-semester examination, would be announced in the academic calendar.

4.2.7. Examinations

4.2.7.1. Mid-Semester and the End-Semester Examinations in respect of the theory component of the subjects will be conducted on the dates specified as per academic calendar.

4.2.7.2. Examination for some subjects will be held centrally while for the others it will be held in the respective Departments. A student will be issued an Admit Card for appearing in an examination, only if he/she has:

- Paid all Institute and 'Hall of Residence' dues of the semester.
- Not been debarred from appearing in the examination as a result of disciplinary proceedings.
- Submission of feedback

4.2.7.3. A student may be debarred from appearing at the Mid-Semester or End-Semester Examination on the report of an Instructor/Chairman, coordination committee, if his/her:

- Attendance at lecture/ tutorial/ laboratory classes has not been satisfactory during the period, and/or,
- Performance in the assignment works during the semester has not been satisfactory.

4.2.8. Attendance in class tests, Mid-semester and End-Semester examination:

4.2.8.1. Class tests, mid-semester examinations, assignments, tutorials, viva-voce, laboratory assignments, etc., are the constituent components of continuous assessment process, and a student must fulfil all these requirements as prescribed by the Instructor/Co-ordination committee of the subject. If due to any compelling reason (such as his/her illness, calamity in the family, etc.) a student fails to meet any of the requirements within / on the scheduled date and time, the instructor/Coordination committee in consultation with the concerned Head of the Department may take such steps (including conduct of compensatory tests / examinations) as are deemed fit. However, such student(s) should submit / give his / her reasons for not attending examination(s) to the concerned HoD through instructor within 3 days of the scheduled date mentioned above with proper documentation failing which his / her request will not be obliged.

4.2.8.2. Attendance in end-semester examination: Appearing in the End-semester examination in the theory component of a subject is compulsory for a student. If a student fails to appear in the End-semester examination, he /she will be assigned an **F** grade in the subject and will not be permitted to register in the summer examination for the subject as stipulated.

However, if a student misses the End-semester examination due to a compelling reason like serious illness of himself / herself or a calamity in the family, he / she may appeal to the Dean, Students' Affair, through his / her Head of the Department for permitting himself / herself to register in the summer examination(s), as the case may apply.

A subcommittee of the Undergraduate Program & Evaluation Committee (UGPEC) consisting of the following members may, after examining the documents and being convinced about the merit of the case, recommend him / her to register in the summer quarter and / or to appear in the supplementary examination(s) with full credit, condoning his/her absence:

Undergraduate Program & Evaluation Committee (UGPEC)

- The Dean (Academics) - Chairman.
- Dean of Students' Affairs - Convener.
- HoD
- One Medical Officer.
- The Section-In-Charge/Deputy Registrar/ Registrar – Secretary.

Students will be permitted to appear the examinations in only those subjects for which they have registered at the beginning of the semester and have not been debarred.

The final grades awarded to the students in a subject must be submitted by the Instructor /chairman, co-ordination committee, within seven days from the date of holding the examination to the concerned Head of the Department for onward transmission to the Assistant Registrar (Under Graduate Studies).

The evaluation of performance in the '**Extra Academic Activities (EAA)**' will be done by the respective program officers.

For the benefit of and as a process of learning by the students, the scripts of all class tests, Mid-semester examinations, assignments etc., after correction would be shown to the students within 5 days from the date of tests/examinations. The scripts of the End-semester examinations are to be shown within 5 days from the last date of examination.

With a view to assist the students, who failed in one or more subjects in the autumn and/or spring semester in a year, a Summer Quarter will be conducted immediately following summer vacation for making-up their deficiency and improve their performance.

The regulations for running the Summer Quarter are separately notified. In order to provide an additional opportunity to the students who failed (obtained 'F' grade) in one or more subjects, due to not being able to score higher than the cut-off marks in the theory components, in either the autumn and/or the spring semester in a year, Supplementary Examinations equivalent to the End-semester examinations will be conducted centrally by the Academic Section, in the month of July (before commencement of the next session) every year. Regulations relating to the Supplementary Examinations are notified/given separately.

4.2.8.3. Academic Registration for Summer Semester

The rules for summer semester are given below:

(a) The student may register for the summer semester as per the Academic Calendar.
(b) Normally, a minimum of five students is required to run a summer course.
(c) The maximum number of courses that can be registered in the summer semester will be limited to **two full courses. One modular course will be half of a full course.**
(d) Number of classes has to be the same as in the regular semester.
(e) Classes will be conducted regularly irrespective of the number of registered students.
(f) The attendance requirement will be the same as that of regular semesters.
(g) The tuition fee and semester fee for summer semester will be **50% of the tuition fee** and semester fee of a regular semester.
(h) One thesis unit **of 9 credits is equivalent** to one course.

4.2.9. Supplementary Examinations:

4.2.9.1. A student is eligible to appear in the supplementary examination in a subject if he/she actually has appeared at the End-semester examination in that subject and obtained the grade **F**.

4.2.9.2. However if a student has been absent for the End-Semester examination (a) due to medical reasons, that are duly certified by the authorized Medical Officer or (b) due to a calamity in the family. Under these circumstances his / her case will be considered for appearing the supplementary examination with full credit (capping rule for awarding grade will be relaxed). In such cases the student must apply in writing to the Dean (Undergraduate Studies) through the Head of the Department.

4.2.9.3. All medical cases will be put up for consideration to the Medical Board. Only on certification by the Medical Board, the student will be granted full credit.

4.2.9.4. A student will not be allowed to appear for more than 20 credits in the supplementary examinations in a year irrespective of number of subjects.

4.2.9.5. Those students desirous to appear in the supplementary examinations must submit their application, countersigned by the instructor (s) of the subject(s) or the Head of the Department concerned, along with the necessary fees to the Academic Section by the date as notified by the concerned section.

4.2.9.6. The supplementary examinations shall be held on such dates as laid down in the Academic Calendar for the year or as notified separately.

4.2.9.7. The grade in the subject scored by the student appearing in the supplementary examination will be recomputed by substituting the marks of the end-semester in the total marks scored by that student in the supplementary examination. Unless granted, full credit by virtue of clause **4.2.9.2** a student is entitled only to one grade lower than the actual grade thus scored, except that the performance grade P remains unaltered, as elucidated in the table below:

Table: 4.2.9.7.

Grade obtained	Grade to be awarded
Ex	A
A	B
B	C
C	D
D	P
P	P
F	F

4.2.9.8. The final grades awarded to the students must be sent to the Academic section as per date specified in the academic calendar.

4.2.9.9. A consolidated department wise list shall be prepared by the Academic Section from ERP and communicated to the Department. The Department shall be responsible for conducting re-examination and/or supplementary examination at the Departmental level. However, the central time table will be drawn by the Institute for this purpose. Moreover,

supplementary / summer quarter examinations for the first year students shall be conducted centrally.

4.2.9.10. Special classes for three weeks (during summer vacation) will be organized (only for theory component of the subjects) with the consent of respective faculty with due registration to make-up deficiencies of the students appearing for supplementary examinations.

4.2.10. Declaration of Results

4.2.10.1. Grade Submission:

The grade submission has to be made within the due date mentioned in the academic calendar. Beyond that date, permission has to be taken from the competent authority for the grade submission and accordingly the Academic Section will allow for late submission of the grade.

4.2.10.2. The grade submission will be made online. A print out of the submitted grade has to be taken and signed by the instructor concerned. The signed copy of the grade must be submitted to the academic section within the due date. Apart from the online grade submissions, the details of the Mid - Semester, End – Semester Examination and TA marks have to be entered online for those students who have obtained F grade.

The Institute will notify the failures' list to the concerned student (s) once the hard copy of the failed students with all these details signed by the concerned instructor (s) and approved by the UG Programme Evaluation Committee of the Institute is received by the Academic Section through the HoD.

4.2.10.3. The display of performance records/showing the evaluated answer scripts of the end-semester examination of a subject has to be made within a maximum period of 5 (five) days from the last date of the semester examination specified in the Academic Calendar. The mid-semester answer scripts, however, must be shown within 5 (five) days from the date of the mid-semester examination. For supplementary examination, the display of performance records / showing evaluated answer scripts of a subject has to be made within a maximum period of 3 (three) days after the completion of supplementary examination.

4.2.11. Grade Revision:

A letter grade (A, B, C, D…) once awarded shall not be changed unless the request made, upon detection of genuine error of omission and / or commission by the Instructor/Coordinators with all relevant records and justification and recommended by the Departmental UG committee and Head of the Department and approved by the Chairman, Senate/Dean (Academic affairs) within due date as provided in **sub section 4.2.10.1**.

4.2.11.1. For the subjects of 2nd semester, no change will be permitted in the grade submitted. For the subjects of supplementary examination of both 1st and 2nd semesters, the change of grade has to be made within a maximum period of 3 (three) days after the **IAC** meeting considering the supplementary examination results.

4.2.11.2. For the subjects of 8th semester (for 4year B.Tech. students), the change of grade has to be made within a maximum period of 3 (three) days after the Senate meeting considering the results. No change will be permitted for re-examination, and supplementary examination grades. However, in the extraordinary circumstances, the grade change will be allowed only after approval of the Chairman, Senate within a maximum period of 1 (one) day after the DAC meeting considering the re-examination and supplementary results.

4.2.11.3. Normally a student should complete all the requirements consecutively in eight semesters for B.Tech. Degree. However, academically deficient students can complete their requirements within the maximum time limits specified.

4.2.11.4. A student, whose academic records at the end of any semester clearly indicate that he/she will not be able to quality for the degree for which he/she had been admitted within the limits of time specified, shall have to discontinue studies and leave the Institute when asked to do so.

4.2.12. Withholding of Grades:
The Grade Sheet of a student may be withheld for the reasons: proven case of indiscipline pending against a student or the student fails to clear the dues pending against him/her. Reasons for withholding the grades will be conveyed in writing.

4.2.13. Promotion to next year and discontinuation of study
4.2.13.1. A student has to clear 2/3rd of the registered credits in 1st year (after supplementary examinations) to enable him/her to register for the 2nd year, failing which a student repeats the 1st year by registering for the subjects with grades **F**. The student may also register for some subjects with grade **P** to improve CGPA.
4.2.13.2. If after repeating the 1st year, the student fails to clear the required credits (after the supplementary examinations), the student shall be asked to leave the Institute.

4.2.13.3. At the end of 2nd year, a student will have to clear all the 1st year subjects and in addition 2/3rd of the credits of the 2nd year level registered subjects, failing which the student repeats the 2nd year by registering for the subjects with grade F. The student may also register for some subjects with grade **P** to improve upon his CGPA.

4.2.13.4. The same rule under section 4.2.13.3 applies for promotion from 2nd year onwards.

4.2.13.5. EAA shall be de-linked from the year repeating policy. The students, however, must complete the EAA component before graduation. EAA shall be, however, treated as par with any other subject as far as Scholarships / Prizes/ Awards/ Dual Degree Assistantships/Registration (and continuation) of Minor/Micro - specialization/ Registration of Additional Subjects are concerned.

4.2.13.6. As per the current promotion policy, the student has to repeat a complete Academic Year even if he/she is eligible for promotion at the end of Autumn Semester by clearing the constraining (backlog) subject. Thus, if the student has cleared the constraining (backlog) subject/subjects in the Autumn Semester, he/she must be treated as promoted and should be allowed to register for all the eligible academic components of the next year in the Spring Semester. However, if there are other Backlog subjects of the Spring Semester then the student must first register for these.

4.2.14. Graduation Requirements:
In order to qualify for a B. Tech degree a student must:

4.2.14.1. Complete all the credit requirements for the degree as laid down in the prescribed curriculum of the discipline.

4.2.14.2. Obtain CGPA of 5.0 or higher at the end of the semester in which he/she completes all the requirements for the degree.

4.2.14.3. Have cleared all dues to Institute, the Hall of residence (Hostel), the library and the Departments.

4.2.14.4. Normally a student should complete all the requirements consecutively in eight semesters for a B. Tech degree. However, academically deficient students can complete their requirements within the **maximum time limit of 8- years**.

4.2.15. Withdrawal from the Institute:

4.2.15.1. A student who has been admitted to an undergraduate degree program of the Institute may be permitted to withdraw temporarily for a period of one semester or more from the Institute on grounds of prolonged illness or acute problem in the family which compelled him/ her to stay at home, provided:

(a) he/she applies to the Institute within 15 days of the commencement of the semester or from the date he / she last attended his / her classes whichever is later, stating fully the reasons for such withdrawal together with supporting documents and endorsement of the father / guardian.

(b) the Institute is satisfied that, inclusive of the period of withdrawal, the student is likely to complete his requirements for the degree within the time limits specified and that there are no outstanding dues or demands from him / her by the Institute / Hall / Department / Library / Gymkhana / NCC, may grant permission.

4.2.15.2. A student who has been granted temporary withdrawal from the Institute under the provisions will be required to pay the tuition fee and other essential fees / charges for the intervening period till such time as his / her name is borne on the Roll List.

4.4.15.3. A student will be granted only one such temporary withdrawal during his / her tenure as a student of the Institute.

4.4.15.4. A student who has been granted a temporary withdrawal on medical grounds will be allowed to re-join and resume his/her studies only after being declared medically fit by the authorized Medical Officer.

4.2.16. Striking-off the name from the Institute Roll List

If a student does not register for 3 (three) consecutive semesters, without the approval of the competent authority his /her name will be struck off from the Institute Roll List.

4.2.17. Relaxation

The Senate may, under exceptional circumstances, consider any case of a student having a minor deficiency in respect of any of the requirements stated in these Regulations and relax the relevant provision of these Regulations based on the merit of the case. The grounds on which such relaxation is granted shall invariably be recorded and cannot be cited as precedence.

4.3. Registration Procedure

4.3.1. Pre-registration requirement

From the 2nd semester onwards, only those students will be permitted to register who have,

(a) Cleared all Institute and Hostel dues of the previous semester

(b) Paid all required prescribed fees for the current semester, and

(c) Not been debarred from registering for a specified period on disciplinary and other ground.

(d) For student(s) repeating a year, the entire amount for the respective semester as tuition fee has to be paid at the time of registration.

4.3.2. Dates and Venue of Registration

Eligible students will be presented with a broad time window, as specified in the Academic calendar to pay necessary fees and finalize his/ her subject registration by suitable choice of Elective/ Additional/Unregistered/ Backlog etc. subjects for each semester. The date, time and venue of registration will be announced in advance. Since registration is a very important procedural part of the credit system, it is absolutely essential that all students present themselves on the specified time frame. No late registration is allowed. However, late registration is permitted only if a student has taken prior permission or has medical reason/calamity in the family or under any exceptional / emergency circumstances. If the student could not take prior permission for late registration, because of exigencies such as accident, illness, bereavement in the family, the Chairman (Senate) may waive-off the late registration fee. Such waive-off shall not be a general rule, but will be invoked on a case-to-case basis. If a student does not complete registration within the deadline intentionally, he / she has to pay penalty as prescribed to complete his / her registration process.

4.3.3 Clearance of Dues

At the time of admission, the student must pay the fees and make other specified payments before he/she can be registered for courses. In subsequent semesters, the student should obtain two 'No Dues Certificate', before he / she can be registered for the courses of a semester, one from the 'Hostel Warden' and the other from the 'Institute Accounts Officer'. These should be produced at the time of registration. The Warden gives the `No Dues Certificate' when the student has no mess arrears in the previous semester and has paid the mess advance for the current semester. The second clearance is for 'Institute dues' that should be paid at the 'Accounts Desk' in the registration hall, by cash, or by bank drafts or online transfer (whichever is acceptable at the time of payment). The 'Institute dues' will include the current semester's tuition fees, other dues as well as the previous semester's arrears, if any. The drafts should be drawn in the name of IIPE, Visakhapatnam.

4.3.4. Advice on Courses

All students have to consult their Faculty Advisors/Academic Coordinators and get their registration slips signed by them. One Faculty Adviser is normally appointed for a batch of students in a particular discipline, who will chalk out the complete programme of study of each student, and advise him/her on the courses to be taken.

4.3.5. Guidelines for registration of UG students (except 1st year-1st semester).

4.3.5.1. A student who has cleared all curricular requirement upto the previous semester will register for all subjects of current semester in accordance with the curriculum.

4.3.5.2. Students cleared all subjects (including through supplementary examination) of (S-2)th semester with CGPA less than 6.00 (CGPA <6.00) may take subjects of P-graded (for improvement) along with all subjects of S^{th} semester upto a maximum credit limit of 28.

4.3.5.3. All backlog-subjects of the corresponding semester [i.e. of $(S-2)^{th}$ semester] have to be register first in the S^{th} semester.

4.3.5.4. Students having only one backlog-subject in $(S-2)^{th}$ semester with CGPA greater than or equal to 6.00 (CGPA $\geq$ 6.00) may register for the prescribed credits of the S^{th} semester in addition to that backlog-subject.

4.3.5.5. For students having more than one backlog-subjects in $(S-2)^{th}$ semester, the registered credit in the S^{th} semester inclusive of backlog-subjects must not exceed 28.

4.3.5.6. For students repeating a (academic) year, the registered credit in a semester must not exceed 16. He/She may register for subjects of P-graded (for improvement) along with backlog-subjects with total registered credit not exceeding 16.

4.3.5.7. The credits of industrial/summer training, Field trips, comprehensive Viva-voce and EAA should be excluded while calculating 28 or 16 credit limits per semester for backlog / year repeating students.

4.3.5.8. To register for a subject, prerequisite must be taken care of. Students may be allowed to take Departmental elective subjects instead of professional breadth electives. Registration in the subjects of same slots will not be allowed.

4.3.5.9. A student who has been debarred from appearing an examination either

(i) as per recommendation of the subject instructor for unsatisfactory attendance or
(ii) as a measure of disciplinary action by the Institute or
(iii) for adopting malpractice at an examination and consequently awarded an X-grade, may re-register for the subject(s) after the term of the debarment expires, provided that other provisions of this regulation do not prevent him/her from registration.

4.3.5.10. Eligible students opting for improvement of subjects must forward their application through faculty advisor to HoD to the Academic Section (and / or Exam Cell). The approval of registration of those subjects will be completed after the recommendation of HoD and faculty advisor.

4.3.6. De-registration

4.3.6.1. The student can be de-registered in a subject of a semester by the concerned instructor on the ground of poor attendance. If a student does not have a minimum of 80% attendance in a subject, he/she can be deregistered from the subject at the discretion of the subject instructor. Only one-time deregistration of a subject is permissible and no revocation of the deregistered subject is admissible, except on medical grounds.

4.3.6.2. Email warning should be given to the students by the subject instructor (cc to faculty advisor, HoD) prior to deregistration.

4.3.6.3. The deregistration process shall commence after Mid-Semester Examination.

4.3.6.4. The deregistration process should be completed and informed (through a letter) to Academic Section (and / or Exam Cell) one week before the commencement of the End - Semester Examination.

4.3.7. Academically weak students

Such students will be divided into two categories based on their CGPA (calculated on the basis of Total Credit Taken)

(a) Category A: Students with CGPA less than 6.00 (CGPA < 6.00).
(b) Category B: Students having more than two backlogs / unregistered subjects (regardless of CGPA).

4.3.7.1. The faculty advisor will announce a meeting date every month and it will be mandatory on the part of the students to attend these meetings. During the meeting the problems of the student will be discussed and measures to improve their academic performance suggested. A report of these meetings must be prepared by the counsellor and be recorded for future verification.

CHAPTER – 5

SCHOLARSHIPS AND ASSISTANTSHIPS

5.1. The Board may Institute from time to time Fellowships, Scholarships, Assistantships, Medals and Prizes for awarding them to its students at undergraduate, postgraduate, research and post-doctoral and other levels.

5.2. The Institute shall decide the value, number and conditions of award for each of them from time to time.

5.3. In addition to the funds of the Institute for the above mentioned purposes, funds received from donations may also be utilised.

5.4. The Director shall decide in consultation with the Senate, the eligibility and guidelines for administering the Merit-cum-Means assistance to the meritorious students.

5.5. The Institute shall allow students to avail scholarships awarded by external Government / non-Government organizations (such as central sector scholarship schemes, scholarships from state Government, scholarships from private trusts etc.), provided they do not come into conflict with any ordinance or rules of the Institute.

5.6. The Institute shall accept donations from individuals and organizations to set up scholarships according to prescribed procedures if it is felt that they will promote academic activities in the Institute and will lead to general growth of the Institute. The norms and conditions for the institution of such scholarships shall require approval of the Board of Governors.

CHAPTER – 6

CONDITIONS AND MANNER OF APPOINTMENT AND DUTIES OF EXAMINATION BODIES, EXAMINER, MODERATORS AND CONDUCT OF EXAMINATION

6.1. Institute currently follows one Mid - semester and one End - semester examination pattern for evaluation and grading purposes of all the courses along with quizzes, home assignment and term papers etc. The weightage of each of the examination and tests vary from course to course and is at the discretion of the instructor. Typically, the mid - semester examinations are conducted after four to five weeks of deliberating the lecture sessions from the beginning of the semester. The Institute or the academic office generally doesn't moderate the question paper set by the instructor for various examinations. The instructor of the course is the examiner of various examinations and tests are conducted throughout the semester. Occasionally he or she may seek the help of teaching assistants for the conduct and evaluation of the examination papers. Typically, a fixed grading pattern is followed for different courses, though the grading pattern purely depends on the instructor. If necessary, the academic office may do the grade moderation after receiving the grades form the instructor.

6.2. Duties of Examiner

The examiner is responsible for setting the question paper, invigilation during the examination, evaluating the answer book, discussing the mode and way of answering the questions, discussing the key / solutions for the problems posed in the Question paper, the right and wrong answers in the evaluated answer book - all these are dealt with the students as a means of advice and guidance and finally awarding the grades to the students based on their performance.

CHAPTER – 7

MAINTENANCE OF DISCIPLINE AMONG THE STUDENTS OF THE INSTITUTE

7.1. Each student shall conduct himself, both within and outside the campus of the Institute, in a manner befitting as a student of an Institute of National Importance. No student is expected to indulge in any activity which tends to bring down the dignity, prestige and honour of the Institute. Each student shall show due respect and courtesy to the instructors, administrators, officers and employees of the Institute and, good neighbourly behavior with their fellow students. They should also pay due attention and courtesy to the visitors, dignitaries visiting the campus and residents of the campus.

7.2. Lack of courtesy and decorum; unbecoming conduct (both within and outside the Institute); wilful damage or removal of Institute property or stealing the belongings of a fellow student; disturbing fellow students in their studies; adopting unfair means during examinations; breach of rules and regulations of the Institute; noisy and unseemly, unruly behaviour and similar other undesirable activities shall constitute violation of the Code of Conduct of students.

7.3. Violation of the Code of Conduct of students by any student, shall invite disciplinary action and may merit punishment, such as reprimand, disciplinary probation, fine, debarring from the examination, debarring from the use of placement services, withholding of grades, withholding of degree, cancellation of registration and even dismissal from the Institute.

7.4. The Warden of the concerned Hall of Residence (Hostel) shall have power to reprimand or impose fine or take any other such suitable measure against any resident of the Hall, who violates either the rules and regulations or the Code of Conduct pertaining to the concerned Hall of Residence.

7.5. The Instructor-in-Charge of a course shall have the power to debar a student from the examination in which the student is detected to be using unfair means. The Instructor/Tutor shall have the power to take appropriate action against a student who attempts to misbehave in the class room, Laboratory etc.

7.6. Ragging, in any form, is strictly prohibited and any violation shall be considered as a serious offence, leading even to dismissal from the Institute or even may lead to the extent of filing a criminal case against the one who committed such an offense.

7.7. The Senate shall constitute a Standing Committee to investigate the alleged misdemeanour reported and recommend a suitable course of action. The Senate shall also prescribe the procedure for dealing with the recommendations of the Committee.

7.8. Violation of the Code of Conduct of students, by a student or a group of students can be referred to this Committee by any student or an instructor and the Director or any other functionary of the Institute.

7.9. Under exceptional circumstances, the Chairman, Senate may appoint a Special team to investigate.

7.10. Disciplinary Committee to investigate and/or recommend the action to be taken in case of any act of gross indiscipline involving a large number of students which may tarnish, mar or demean the image of the Institute.

7.11. The case of a defaulting student recommended for dismissal from the Institute shall ordinarily be referred to the Senate for its final decision.

7.12. A defaulting student who feels aggrieved with the punishment awarded may submit an appeal to the Chairman, Senate stating clearly the reasons why the punishment should not be awarded. The Senate shall prescribe the procedure to process such an appeal.

7.13. A student who is found guilty of some major offence may not be recommended by the Senate to the Board of Governors for the award of a degree even if all the academic requirements have been satisfactorily completed by the student concerned.

CHAPTER – 8

CONDITIONS OF RESIDENCE OF STUDENTS OF THE INSTITUTE

8.1. IIPE Visakhapatnam is a residential Institute and, therefore, every registered student shall reside in a room assigned to him in one of the Halls of Residence / Hostel. In exceptional cases, the Director may permit a student to reside with his or her parent/local guardian. As IIPE currently running in a temporary campus, the Hostel facility is made now optional till IIPE move to the permanent campus.

8.2. For each Hall of Residence / Hostel there shall be a Warden and the Competent Authority may nominate or appoint the Wardens and other staff from time to time, as approved by the Board of Governors. The members of the academic staff of the Institute shall hold the office of the Warden-in-Charge and the Wardens of respective Halls of Residence. The Director shall make these appointments. The Warden of a Hall shall be responsible for managing the residential status of the students effectively and efficiently.

8.3. Every student residing in a Hall shall join the Mess provided in that Hall. However, the Warden may exempt an individual student from the Hall Mess on medical grounds for a specified period.

8.4. Each Hall of Residence shall have a Hall Executive Committee (HEC). The constitution of the HEC and its functions shall be as decided by the Competent authority and approved by Senate.

8.5. Every resident shall be personally responsible for the safe up-keep of the furniture and other items supplied to the resident and will be charged for any damage or loss caused or his/ her negligence/ indifferent conduct during his stay or occupancy of the room allotted to him/her

8.6. Every resident must pay the mess bill by the due date, announced by the Warden.

8.7. Failure to deposit the dues in time may result in fine or such other penalty as the Warden may deem fit. Even the registration of a student may be cancelled in case of failure to clear the mess dues within 30 days of the due date.

8.8. Besides the payment of mess dues, every resident shall also pay establishment charges every month at the rate prescribed from time to time by the Warden-in-charge. This is in addition to the mess establishment charges payable to the Institute.

8.9. Residents shall respect the right of each individual to express his/her ideas, pursue his/her interests and follow the style of life most meaningful to him/her. However, party – based political campaigning is prohibited within the campus or even outside campus by the residents.

8.10. Visitors of the opposite gender are strictly prohibited to enter the residential blocks of the Halls at any time.

8.11. Use of liquor, drugs, or any other intoxicants in the Hall premises is strictly prohibited.

8.12. Every resident shall comply with all the rules and regulations of the Halls of Residence as may be in force from time to time. The Warden shall take necessary action against the defaulters.

Note: Presently, the Institute is running under leased accommodation and Hostels are run under rented buildings which are being monitored by the Wardens of the Hostels who are the faculty of the Institute. As and when, the construction activities of the Institute are completed, the Hostels will be shifted to the Permanent residential campus of the Institute. The rules and regulations promulgated by the Institute, approved by BoG of IIPE shall be inforce until the campus is shifted to its own premises.

CHAPTER 9

DEFICIENT ACADEMIC PERFORMANCE

The Department Academic Committee (DAC) shall review the academic performance of students at the end of each regular semester. A deficient student may be placed on Warning or Academic Probation or Termination. A student on Academic Probation is required to adhere to the following conditions:

(i) That the student shall register with higher priority for those courses (or their substitute) in which grade F/X is obtained. The student under academic probation shall register for one theory course less than the normal load or as specified by the Senate.

(ii) That the student shall not hold any post/position in the hostel, Students Gymkhana or any other organizational body of the Institute.

(iii) That the student will abide by such conditions as laid down by the Institute Academic Committee (IAC)/Senate.

(iv) A student under warning will adhere to the conditions given in (ii) and (iii).

The parent/guardian of the student will be informed in writing about the academic warning/probation status of the student. The criteria for placing students on Warning / Academic Probation / Termination depends on SGPA / CGPA and is described in the following sub-sections:

9.1. Criteria for Warning

Students will be placed on warning if

SGPA/CGPA < 6.0

9.2. Criteria for Academic Probation

Students will be placed on probation if

SGPA/CGPA≤ 4.0

9.3. Criteria for Termination

Academic termination is applicable to those students who are placed under academic probation for three consecutive semesters.

9.4. Appeal against Termination

A student may appeal to the Chairman, Senate for reversing the termination order and reinstating her/him in the programme. In the case of termination due to inadequate and unsatisfactory academic performance, the student must clearly explain the reasons for the poor performance, including how those reasons will not adversely affect her/his performance in the future. The Senate shall take a final decision after considering the inputs from **DAC and IAC**. A student may re-appeal, if her/his previous appeal was rejected. However, the re-appeal will be considered by the Senate only if it is admitted by the Chairman, Senate.

CHAPTER 10

TEACHING AND EVALUATION

10.1. Medium of Instruction and Duration of Classes

The medium of instruction in the Institute is generally in **English but not limited**. Duration of a class is normally Sixty (60) minutes. However, depending on the need, the duration of the class may be of 75 minutes.

10.2. Offering a New Course

A new course (IC/DC/Institute elective) can be introduced by a faculty member by submitting a proposal to the Chairperson, DAC in the prescribed format. The proposal shall be considered by the DAC at the earliest possible. The proposal should be circulated to all faculty members for their comments at least seven days before the DAC meeting. If the DAC accepts the proposal or suggests some changes/modification to the course, and the proposer of the course resubmits the modified proposal by addressing the suggestion, then the modified proposal shall be submitted to the Institute Academic Committee (IAC) for its consideration. The new course can be offered only when it has been recommended by the IAC and approved by the Senate.

10.3. Courses to be Offered in a given Semester

The list of courses to be offered by a department under an academic programme in the subsequent academic year is to be finalized before the pre-registration period in the **Spring semester** of current academic year by the Head of the Department through the Departmental **Academic Committee (DAC)**. All the requirements of the programme templates are considered before deciding the courses to be offered in a regular semester.

10.4. Conduct of Courses

Each course is preferably conducted by a single instructor with the assistance of Teaching Assistants (TAs). The instructor is responsible for instruction, giving home assignments, holding quizzes and examinations, evaluating the performance of the students, and awarding and submitting the grades.

In certain cases, faculty from other departments may have to provide tutors for tutorial, laboratory work, grading etc.

Course Coordinators who are conducting courses with a large number of students in multiple sections will be assisted by Instructors and TAs. The Coordinator is responsible for planning the course instructions, giving home assignments, holding quizzes and examinations, evaluating the performance of the students, and awarding and submitting the grades.

10.5. Minimum Number of Students in an Elective Course

Normally, a minimum of **five students** is required to run an elective course. The approval of the Chairman, Senate should be taken for running courses with less **than five students**. The maximum numbers of students in an elective course may be one hundred or more depending on the need.

10.6. Examinations

The arrangement for mid-semester and end-semester examinations are made by the Academic Section during the period as specified in the Academic Calendar. No deviation is allowed in

the examination schedule and location, without the specific written permission of Dean (Academics).

10.6.1. Guidelines for Setting of Question Papers

a. The question paper may comprise of different difficulty levels, such as 50% of average level, 30% of moderate level and remaining 20% of high difficulty level. At least 30-40% numerical problems may be given in Engineering, Science and Management courses, wherever possible.
b. The questions of mid-semester and end-semester examinations normally cover the syllabus proportionately, i.e. the end semester question paper must include at least 60 percentage covered after mid semester and the remaining 40% equally divided between the portions before and after mid semester examination.

10.6.2. Results of Examinations and Quizzes

The final grades of all the students in a course must be submitted within the dates mentioned in the Academic Calendar as notified by the Dean (Academic) from time to time. Answer books for mid-semester and end-semester examinations must be shown to the students at a mutually convenient time, within the specified period as mentioned in academic calendar. Answer books for quizzes must be shown to the students within seven working days from the date of the quiz. Students are responsible to be present to see the answer books, assignments, etc. at the time specified by the Course Coordinator/Instructor.

10.6.3. Absence in End-semester Examination

To clear a course, a student must appear in the end-semester examination. If a student is absent in the end-semester examination and does not appear for the supplementary examination, s/he will be awarded "F" grade in the course irrespective of her/his performance in mid-semester examination and other internal evaluation.

10.6.4. Supplementary Examination

10.6.4.1. Supplementary End-semester Examination

If a student, for reasons such as medical reasons/family calamity or any other valid reasons fails to appear in the end-semester examination in one or more course(s), then s/he may submit an application to the Dean (Academic) for a Supplementary examination. The application must be submitted within the deadline specified in the academic calendar, stating the reasons for failure to appear in the examination along with the supporting documents. In case of an illness, a certificate from the Medical Officer of the Institute's Health Centre must be submitted. Dean (Academic) may consider the application and take a decision on a case-to-case basis.

10.6.4.2. Make-up options for Mid-semester Examination

In case of absence during mid-semester examination due to medical reasons/family calamity or any other valid reasons, one of the following two options can be exercised by the Course Coordinator/Instructor after the approval of Dean (Academic):

(a) The mid-semester marks may be allotted based on the performance in the end-semester examination proportionately. In such cases, the weightage for end-semester examination may be the combined weightage of mid-semester and end-semester examinations.

(b) Conduct a make-up of mid-semester examination within two weeks from the date of completion of the mid-semester examination period.

10.6.4.3. Withholding of Grades

The grades of a student may be withheld, if s/he has not paid the dues, or if there is a case of misconduct / unfair means / non-submission of semester feedback / disciplinary action pending against her / him, or for any other appropriate reason as per the directives of the Senate.

10.6.4.4. Change of an already Awarded Grade

A grade once awarded shall be final. However, upon a request from the Course Instructor/Student routed through the **Chairperson, DAC**, the Chairman, Senate in consultation with the Dean (Academic) may allow the revision of grades with proper justification. No request for a change of grade(s) shall be considered, if the request is made after two weeks of the declaration of the result.

10.7. Course Feedback

At the end of each semester, students will give feedback about the course and the instructor.

CHAPTER 11

VACATION & LEAVE OF ABSENCE

11.1. Vacation

Undergraduate students are entitled to avail **autumn and summer** vacations as specified in the Academic Calendar without seeking any permission.

11.2. Temporary withdrawal/ Semester leave/Semester drop

(a) A student may be allowed the leave of absence for a whole semester (temporary withdrawal) for bona-fide reasons. Such leave of absence shall ordinarily not exceed two semesters with or without break during the entire period of the academic programme.

(b) An application for temporary withdrawal should be made before the date of registration for the semester as mentioned in the Academic Calendar. However, under exceptional circumstances, a student may apply for withdrawal at any time during the semester.

(c) Application for temporary withdrawal should be addressed to the Dean (Academic) and routed through the Chairperson, DAC. The application must be supported with all documents such as medical certificate (in original) in case of an illness.

(d) A student who remains on an authorized leave of absence due to ill-health shall be required to submit a certificate from a Registered Medical Practitioner to the effect that s/he is sufficiently cured and is fit to resume her/ his studies. The Institute may constitute a Medical Board to determine the fitness of the student before registration. The registration of the student shall be provisional till the Medical Board at IIPE Visakhapatnam certifies the fitness. If the Board recommends that the student is not yet fit to resume studies, then the registration may be cancelled.

CHAPTER 12

PERMISSION TO PROCEED FOR ACADEMIC WORK

12.1. Permission to proceed to Other Institutions as a Non-degree Student

A student may be permitted by the Chairman, Senate to proceed to other academic institutions in India or abroad as a non-degree student so as to broaden her/his horizons and gain course-work experience. The following guidelines and procedures shall apply for this purpose:

(a) A student, who satisfies the minimum eligibility conditions given below, may spend up to two regular semesters in any academic institution of repute in India or abroad with prior permission of the Chairman, Senate in consultation with the Dean (Academic).

(b) The semester spent as a non-degree student will be counted as a part of the time spent in the pursuit of the degree.

12.1.1. Eligibility

(a) Completion of **100 credits** of course work.

(b) A minimum **CGPA of 8.0**.

(c) There should not be any disciplinary action against the student.

12.1.2. Application Procedure

(a) The student shall apply to the Dean (Academic) through the **DAC**, giving details of the proposed programme and shall submit a statement of purpose with sufficient information about the Institution where s/he has chosen to spend time as a non-degree student.

(b) The **DAC** shall examine the student's proposal to determine whether the proposed programme is of a similar nature as the programme at **IIPE Visakhapatnam**, and that the student will benefit from the exposure and the performance at the outside organization / Institute.

(c) On the recommendation of the **DAC**, the Dean (Academic) may recommend the proposal to the Chairman, Senate for approval, with leave of absence to the student to proceed as a non-degree student to the selected Institution.

(d) Any application for waiver of credits at **IIPE Visakhapatnam** or transfer of credits from the other Institution shall be decided in accordance with the procedure given in **section 10.1.3**.

12.1.3. Transfer of Credits and Waiver in-lieu thereof

(a) The permission to proceed to another institution as a non-degree student does not imply that the student will automatically get a waiver from the academic and other requirements of her/his ongoing UG programme at the Institute.

(b) On return, the student may apply for a waiver of courses from her/his program template which s/he thinks are equivalent to the courses successfully completed at the outside Institute as a non-degree student. The student must submit an official transcript of the grades obtained by her/him at the outside Institute as a non-degree student and other documents/material that the concerned **DAC** may require for evaluation. The **DAC** will consider and determine, in a manner it deems fit, the equivalent courses (credits) and/or requirements for which the student may be given a waiver in her/his **UG** programme at **IIPE Visakhapatnam**.

(c) On the recommendation of the **DAC and Dean (Academic),** the Chairman, Senate may allow a student a waiver for a maximum of **28 credits** against the course work

completed elsewhere as a non-degree student, subject to relevant mapping of the courses.

(d) The grades earned at any other Institution will not be used for calculating **SGPA/CGPA**. However, in such cases, the name of course, credits earned and name of the Institution must be mentioned in the grade sheet.

Those students who are selected by the Institute, using prescribed rules and procedures, to proceed to any Institutional exchange programme will also be governed by the above clauses for the transfer of academic credits, waiver, etc.

12.2. Permission to proceed for Internship at other Institutions/Industry

In order to help students, broaden their horizons and enrich their cultural and academic experience, provision to proceed to other academic/research institutions/industry in India or abroad is available. Modalities and procedures to be followed for availing this provision are as follows:

12.2.1. Modalities for Internship at other Academic Institution / R&D Organization / Industry

(a) Internship will be facilitated from CDC for the pre-final year students of all UG programs.

(b) UG students are free to undergo internships on their own during vacation period (i.e., end of first/second/third year). HOD may give NOC or letter of introduction (if any required).

(c) Institute fellowship, if any, will be stopped for the duration of paid internship.

12.2.2. Procedure to be followed by all Interns before start of Internship

(a) Submit the completely filled **Form** (available in CDC/DOAA office) along with all relevant documents, to the HOD.

(b) HOD will make a decision (Approval/Rejection). HOD may take the help of DAC to review the academic performance of the students before taking final decision.

(c) HOD may issue NOC, as required.

(d) Approval of Dean (Academic) is required in case of Internship in the country other than India.

(e) On approval of the Research Internship request, the HOD will forward a copy of entire documents (along with NOC, if issued) to Dean (Academics) for the record purpose and to issue office memorandum (if required).

12.3. Out-station Leave

Permission for station leave should be obtained from DAC Chairman, followed by the respective hostel wardens. Students doing project i.e. Final Year B. Tech. must take approval from their project guides before submitting the application to the DAC Chairman. However, for special cases as stated below, the final approval should be taken from Dean (Academic) before availing the leave.

Special conditions:

(i) Leave during examination period (mid-Sem/end sem)

(ii) Leave exceeding 7 days at a stretch (except vacation period)

(iii) Representing Institute at other places/ Institute/ organization for academic/ sports/ other purposes with prior approval.

(iv) Leave exceeding the maximum leave period of 30 days per academic calendar for students drawing fellowship from the Institute.

CHAPTER 13

CONDUCT AND DISCIPLINE

Students of IIPE Visakhapatnam are selected from a pool of best talents available in the country. They come from different parts of the country and, therefore, their conduct and behaviour within and outside the Institute campus should be exemplary and cosmopolitan in character.

13.1. Each student is expected to behave according to the following CCS:

(a) Conduct yourself, at all times, in a manner befitting your association with an Institute of National Importance;
(b) Show due respect and courtesy to the instructors, administrators, officers and employees of the Institute;
(c) Pay due attention and courtesy to the visitors of the Institute and residents of the campus;
(d) Show good neighbourly behaviour to fellow students;
(e) Be logical and lucid in expressing your own opinions;
(f) Show due respect to the opinion of others even if it differs from your own opinion;
(g) Do not make any attempt to breach the rules and regulations of the Institute;
(h) Do not use unfair means during examinations if any student caught first time in practicing unfair means (UFM), then he/she will have to repeat all the courses of that particular semester and If any student caught second time in practicing UFM, then he/she will be terminated from IIPE and no mercy appeal in this regard will be accepted;
(i) Do not pinch or damage the Institute property, or belongings of fellow students;
(j) Do not disturb other fellow students while they are studying;
(k) Do not exhibit noisy and unseemly behavior;
(l) Do not indulge in ragging in any form, whatsoever;
(m) Do not indulge in any activity which can possibly tarnish the image of the Institute;
(n) Any other similar undesirable activity must be avoided.

- Any violation of the CCS shall invite disciplinary action, which includes even expulsion from the Institute.
- The Instructor/Tutor is authorized take appropriate action against a student who misbehaves in the class. The details of the incident will immediately be communicated to the Academic Coordinator (AC) by the instructor concerned.
- The Chief Warden has the authority to reprimand, impose fine or take any other suitable measure against a resident who violates either the CCS or rules and regulations pertaining to the Halls of Residences.

13.1.1. Students must always carry their Identity Cards with them, especially when they move out of their hostels.

13.1.2. No student shall disobey any order issued by the Institute, Head of Department, Deans, Associate Deans, Chief Warden /Warden of hostels and other functionaries of the Institute. The students must behave with due decorum with their instructors and fellow students. Girl students must be shown due consideration in this respect.

13.1.3. Students should not indulge in any type of unkind, indecent behaviour towards new entrants in hostels, messes, clubs or any other place in the campus and outside.
13.1.4. Students have no right to deny mess, club and other facilities to other students. The use of any such facility can be withdrawn only by the appropriate authorities.

13.1.5. Students should not indulge in violence of any kind with fellow students, employees including teaching staff of the Institute, and outsiders within or outside the Institute campus. Students must not take the law in their own hands but must report any grievance to the instructors, Head of Department, Chief Wardens, Dean of Student Affair, Dean (Academic) or other Officers, as the case may be.

13.1.6. Students are not allowed to become members of outside societies or allowed to join discussions of a political nature or to take part in any political activity without prior permission of the competent authority of the Institute.

13.1.7. Students are not permitted to consume or take alcoholic drinks and harmful drugs within the Institute campus including their hostels or during outside official visits such as training/tour/camp/field work, etc.

13.1.8. Students must not incur any debt or commit any irregularity in financial matters. The Institute, however, will in no way be responsible for such debts or irregularities.

13.1.9. No meeting of the students, other than those organized under the aegis of the various recognized student's activities, shall be called and held without the prior permission in writing from the Dean of Student Affair.

13.1.10. No meeting/function within the Institute campus at Visakhapatnam, to which any outsider is invited, shall be organized nor shall any outsider be allowed to address the students without the prior permission in writing from the Dean of Student Affairs/Head of Department.

13.1.11. No theatrical performance, dance or show of any kind shall be allowed either within or outside the Institute Campus in the name of any society of the students except with the prior permission in writing from the Dean of Student Affairs/or any authorized functionary of the Institute, who may prescribe the terms and conditions for such performance.

13.1.12. Students must take care of and protect all Institute property. Any damage to Institute property due to improper use or negligence will have to be made good by the students concerned. Students must use the Institute furniture and fittings with due care and must not deface buildings, roads, furniture, fittings, etc. in any manner.

13.1.13. Chairman (senate) can take call case to case basis.

13.1.14. No student shall

(i) by words spoken or written or by sign or visible representation or through internet or website or social media platforms, or SMS, WhatsApp, etc., offend or insult a fellow student or any instructor of the Institute or any employee or officer/functionary of the Institute. (Any form of ragging will also constitute an act of insult or offence on the person who is ragged).

(ii) misappropriate, prefer false claim for financial assistance of any kind (indulge in financial irregularity of any kind), mutilate, disfigure or otherwise destroy or damage

any property of the Institute including furniture, books, equipment, apparatus, building etc.

(iii) use unfair means before, during or after any of the examinations and/or tests, quizzes, etc. or attempt to threaten the staff to get undue advantage or lift someone else's work(s) and insert it in her/his class work submissions, projects, dissertations, reports, etc. without proper acknowledgement, credit and reference.

(iv) indulge in plagiarism or misconduct in use of printed/audio-video/video material of any kind in the Project, Dissertation, Class Work submission, reports, etc.

(v) Keep and/or drive engine driven vehicle (car, motor-cycle, scooter, etc.) for commuting inside the IIPE Campus during her/his stay at IIPE. However, married students may be allowed to keep and use an engine driven vehicle with the specific approval of the Dean of Student Affairs /or any other authorized functionary of the Institute.

13.2. Disciplinary Action and Related matters

13.2.1. Any violation of the Code of Conduct shall invite disciplinary action which may include punishments such as reprimand, disciplinary probation, fine, debarring from examinations, withdrawal of scholarship and/or placement services, withholding of grades and/or degrees, cancellation of registration and even expulsion from the Institute. In certain cases, the student may be barred from applying for a change of branch/programme.

13.2.2. Students found involved in any form of ragging are liable to severe disciplinary action including their expulsion from the Institute, and besides, they shall be punishable under the provisions of the Indian Penal Code or any other law in force. Involvement of a student indulging in any unseemly behaviour towards new entrants will render themselves liable to strict disciplinary action.

13.2.3. Indulgence in violence by any student or group of students will render them liable to strict disciplinary action, including expulsion from the Institute.

13.2.4. In case of damage to the property of the Institute (Department / hostel or any other place), not only the cost of the damaged Institute property will be recovered from the student(s) concerned, but disciplinary action shall also be taken against the students involved in the damage.

13.2.5. If students feel victimized by the conduct, academic or personal, of any other member of the Institute, they may register a complaint to the Head of Department or Dean of Student Affairs /Dean (Academic) or any other concerned functionary of the Institute.

13.2.6. In case of any complaint related to sexual harassment, the matter must be reported to Head of Department, Dean of Student Affairs or any other functionary of the Institute without any delay, who will take appropriate action in the matter through the Chairperson of the Internal Complaints Committee (ICC) of the institute.

13.2.7. The Course Coordinator/instructor of a course may debar a student from the examination in which s/he is found to be using unfair means. Besides, the Institute may take any other disciplinary action. The Course Coordinator/ instructor may take appropriate action against a student who misbehaves in her/his class. In all such cases, the Course Coordinator/ instructor shall inform the Dean (Academic) about the matter with all the relevant details.

13.2.8. The Dean of Student Affairs/Chief Warden/Warden of a hostel may reprimand, impose fine or take any other suitable measure against a student residing in the hostel, who violates either the Code of Conduct or the regulations pertaining to the concerned hostel. The Chief Warden/Warden shall take prior approval of **Dean of Student Affairs before imposing** any fine.

13.2.9. In major cases of indiscipline, the **Dean of Student Affairs shall** constitute an enquiry committee and forward the recommendation of the committee to Chairman, Senate for his approval.

13.3. Standing Disciplinary Rules for Students

The following Standing Disciplinary Action may be applicable depending on the gravity of misconduct

(i) Warning Letter
(ii) Letter indicating Disciplinary action will be communicated to parents/concerned supervisor/HODs.
(iii) Enhanced Attendance requirement up to 90%.
(iv) Engaged in Community/Academic Support /Administrative support service for two hours per day up to forty hours per month.
(v) Restriction in participation in activities of Students clubs/ Gymkhana / Festival etc
(vi) Restriction in Campus Placement activities.
(vii) Disciplinary Probation for 6 months to entire period of stay at IIPE.
(viii) Suspended Sentence (Disciplinary action is awarded, however, the action will be enforced only after any other incident of indiscipline is reported)
(ix) De-registered from a number of course ranging from one to full semester load.
(x) Deduction of Fellowship based on report of indiscipline.
(xi) Expulsion from the institute.

Any other action not covered above may be taken with the approval of the Chairman, Senate.

Note: Ragging/Teasing/Molestation/Consumption of Alcohol/Violence/Demeaning Institute's Reputation would be taken very seriously and strict disciplinary action would be taken which may even lead to expulsion from the Institute. ***The orders of the Hon'ble Supreme Court of India in this regard will be duly followed.***

DECLARATION

Notwithstanding anything contained in this manual, the Senate reserves the right to modify/amend the curricula, procedures, requirements, and rules pertaining to its undergraduate programmes without notice.

Date: 1st July 2022

INDIAN INSTITUTE OF PETROLEUM AND ENERGY
2nd Floor, Main Building, A.U. College of Engineering (A),
Andhra University, Visakhapatnam-530 003.

1st SEMESTER

Sl. No.	Course Name	L	T	P	Credits	Remarks
1	Engineering Mathematics – I (Calculus)	3	1	0	4	
2	General Chemistry	3	1	0	4	
3	Engineering Mechanics	3	1	0	4	
4	Introduction to Materials	3	0	0	3	
5	Engineering Graphics	1	0	3	3	
6	English for Communication	1	0	2	2	
7	Electrical Technology	2	0	0	2	Modular
8	Basic Electronics	2	0	0	2	
9	Chemistry Lab	0	0	3	3	
10	EAA I	0	0	0	P/F	
	Total	**18**	**3**	**8**	**27**	

2nd SEMESTER

Sl. No.	Course Name	L	T	P	Credits	Remarks
1	Engineering Mathematics – II	3	1	0	4	
2	Strength of Materials	3	1	0	4	
3	Physics	3	1	0	4	
4	Programming and Data Structure	3	0	3	5	
5	Earth Energy and Environment	2	0	0	2	Modular
6	Fundamentals of Biological System	2	0	0	2	
7	Electrical and Electronics Lab	0	0	3	2	
8	Workshop	0	0	3	2	
9	EAA II	0	0	0	P/F	
	Total	**16**	**3**	**9**	**25**	

SEMESTER - I

Engineering Mathematics – I (Calculus)						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
Core	**IC1101**	**Engineering Mathematics – I (Calculus)**	**3**	**1**	**0**	**4**

Objectives:

1. To introduce the notions of limits, continuity, differentiation and integration of real-valued functions of single variable and multivariable and the integration of vector-valued functions on curves and surfaces.
2. To learn the polynomial approximation of n-times differentiable functions and consequently to understand the behavior of the functions.

Learning Outcomes

At the end of the course, the student will be able to:

1. Analyze the properties such as continuity, differentiability, and Integration of single and multivariable functions
2. Evaluate the maxima and minima of a function by various methods such as Lagrange's multiplier method.
3. Understand polynomial approximation of a single and multivariable function by Taylor series.
4. Know the convergent properties of sequence, series and Beta and Gamma functions.
5. Evaluate the area, volume, surface area, double and triple integrals
6. Know the connection between single, double, and triple integrals by Green's, Gauss, and Stoke's theorem.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1.	**Functions of single variable:** Sequences in real numbers, limits and continuity of real-valued functions on intervals, extreme values of functions in interval, Intermediate value property and differentiation, Mean Value Theorems, Indeterminate forms, Taylor's formula, convergence of series, root test, ratio test, Cauchy condensation test, alternating series, Leibnitz's test, absolute and conditional convergence, power series, radius of convergence, Taylor series,	The student will be able to, analyze the properties such as continuity, differentiability, maxima, minima, polynomial approximation, the convergence of sequence and series, and integration of single-variable functions	IIT Kharagpur & IIT Tirupati

2.	Riemann integration, Riemann integrable functions, Mean value theorems of Integrals, Improper integrals, Beta and Gamma functions and their convergence, comparison test, absolute convergence.	The student will be able to, evaluate and study the convergent properties of definite integrals and indefinite integrals such as Beta and Gamma functions.	IIT Kharagpur &IIT Tirupati
3.	**Functions of several variables:** Continuity, partial derivatives, directional derivatives and gradient, differentiability, chain rule, tangent plane and normal line, Euler's theorem on homogeneous functions, Taylor's theorem, extreme values, Lagrange multipliers,	The student will be able to, analyze the properties such as continuity, differentiability, maxima, minima, polynomial approximation and Integration of multivariable functions	IIT Kharagpur & IIT Tirupati
4.	Double and triple integrals, volume and area, change of variables, surface area, surface integrals, line integrals, Green's theorem, vector fields, divergence and curl of a vector field, Stoke's theorem, Divergence theorem	The student will be able to, evaluate the area, volume, surface area, double and triple integrals, relations among lines, surface and volume integrals	IIT Kharagpur &IIT Tirupati

Text Book:

1. G. B. Thomas Jr, M. D. Weir, and J. R. Hass, Calculus, Pearson Education (2009).
2. Hughes-Hallett et al., Calculus - Single and Multivariable (3rd Edition), John-Wiley and Sons (2003).
3. James Stewart, Calculus, Thomson (2003).
4. N. Piskunov, Differential and Integral Calculus Vol.1-2, Mir publishers, (1974).
5. Tom M. Apostol, Calculus Vol. 1-2, Wiley, (2007).

Reference:

1. S.R. Ghorpade, B.V.Limaye, A course in Calculus and Real Analysis, Springer (2017)
2. S.R. Ghorpade, B.V.Limaye, A course in Multivariable Calculus and Analysis, Springer (2017)

General Chemistry						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
Core	**IC1102**	**General Chemistry**	**3**	**1**	**0**	**4**

Objectives:

This course is designed to provide good foundation on the fundamental concepts of Physical and Inorganic chemistry, viz: Thermodynamics, Chemical Equilibrium, Kinetics, Physical properties of matter, Electrochemistry, Basic spectroscopy, Alkane-alkene chemistry.

Learning Outcomes

At the end of the course completion, the student will be able to:

1. identify directionality and/or the tendency of physical/chemical change through thermodynamic properties/laws
2. identify the directionality of chemical equilibrium after perturbation in the system.
3. identify and determine the rate constant and related properties of a chemical reaction.
4. utilize the basic spectroscopic concept to identify basic organic/inorganic molecules.
5. measure and determine EMF of a cell and thereby solubility product (in water) of sparingly soluble salt.
6. understand and improvise the concept of primary and secondary battery.
7. utilize the concept of hydrocarbon chemistry in the synthesis and characterization of Alkane/Alkene/Alkyne.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1.	Concept of entropy, Chemical potential, Equilibrium conditions for closed systems, Phase and reaction equilibria, Maxwell relations, Real gas and real solution. Electrochemical Systems: Electrochemical cells and EMF, Applications of EMF measurements: Thermodynamic data, activity coefficients, solubility product and pH, corrosion.	Identification of directionality and/or the tendency of physical/chemical change through thermodynamic properties/laws	IIT KGP
2.	Reversible, consecutive and parallel reactions, Steady state approximation, Chain reactions, Photochemical kinetics.	Identification and determination of rate constant and related properties of a chemical reaction.	IIT KGP
3.	Alkane, Alkene, Alkyne: structure, stereochemistry, physical and chemical properties, chemical reactivity, separation.	Utilization of the concept of hydrocarbon chemistry in the synthesis and characterization of Alkane/Alkene/Alkyne.	IIT KGP

4.	Basic concepts of spectroscopy, Selection rule, Determination of molecular structure.	Utilization of the basic spectroscopic concept to identify basic organic/inorganic molecules	IIT KGP

Text Book (2 to 3):

1. Physical Chemistry by G.W. Castellan (Addison Wesley Publishing Company).
2. ATKINS' Physical Chemistry by Peter Atkins, Julio de Paula (Oxford press).
3. Organic Chemistry (Volume 1) by I. L. Finar (Richard Clay and Company Ltd.)

Reference (1 to 2) :

1. Physical Chemistry by Robert J. Silbey, RobertA. Alberty, Moungi G.Bawendi (John Wiley&Sons, Inc.).
2. Principle of Physical Chemistry by Puri, Sharma, Pathania (Vishal Publication)

Engineering Mechanics						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
Core	**IC1103**	**Engineering Mechanics**	**3**	**1**	**0**	**4**

Objectives:

1. To provide students fundamental understanding of various principles of statics and Dynamics and to expand this knowledge into the vast area of "rigid body Mechanics".
2. To enhance students' ability to design by requiring the solution of open-ended problems.
3. To prepare the students for higher level courses such as courses in Mechanics of Solids, Fluid Mechanics and other Design and Structural Analysis subject

Learning Outcomes

Upon successful completion of this course student should be able to:

1. Use scalar and vector analytical techniques for analysing forces in statically determinate structures.
2. Apply fundamental concepts of statics to analyse stability of any structure.
3. Use principle of Kinematics and kinetics of particles to the analysis of simple, practical problems.
4. Apply basic knowledge of mathematics and physics to solve real-world problems (LO4)

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1	Introduction to Engineering Mechanics	Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.	IIT Kharagpur
1	Introduction to force system		
1	Problems on Resolution of Forces		
1	Review of Vectors		
1	Problems on Vectors		
1	Moment of force about a point and about an axis		
1	Problem on Moment		
1	couple moment		
1	Reduction of force system with a force and		
1	Problems		
1	Free body diagram	Apply fundamental concepts of statics to	
1	Equilibrium and its equation		

1	Problems in two and three dimensions	analyse stability of any structure.	
1	Sample problems for practice		
1	Trusses Introduction	Learn about application of friction in designing screws, belt, Bearing	
1	Sample problems for practice		
2	Laws of Coulomb friction, problems involving large and small contact surfaces		
2	Square threaded screws		
2	Belt friction		
2	Friction in Bearing, Rolling resistance		
3	Properties of area Introduction	Apply basic knowledge of mathematics and physics to find center of gravity and MOI of objects	
3	moment of inertia and product of inertia		
3	Polar moment of inertia and related problems		
3	Principal moment of inertia		
3	Sample problems for practice	Use the principle of Kinematics and kinetics of particles to the analysis of simple, practical problems.	
4	Particle dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables		
4	Central force motion		

Text Book :

1. Vector Mechanics for Engineers: Statics and Dynamics, 12th Edition
   By Ferdinand Beer and E. Johnston and David Mazurek and Phillip Cornwell and Brian Self
2. Engineering mechanics. Volume 1, Statics : SI version, James L Meriam; L Glenn Kraige; Jeff N Bolton
3. Engineering mechanics : statics and dynamics, Author:R C Hibbeler, Publisher:Upper Saddle River, NJ : Pearson Prentice Hall, ©2010.

Reference:

1. Engineering mechanics. Dynamics, Author:Irving Herman Shames; Ian Cole
   Publisher:Prentice Hall International, ©1998.

Introduction to Materials						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1104	**Introduction to Materials**	**3**	**0**	**0**	**3**

Course Objective

To familiarize the students with fundamentals of materials science such as crystallography, principles of alloy formation, plastic deformation, mechanical properties, various types of heat treatment processes, isothermal transformation and continuous cooling transformation diagrams. Further to introduce Ceramic, Composite and Polymeric Materials

Learning Outcomes

At the end of the course, the student will be able to:
LO1: Understand classification of materials and crystal structures.
LO2: Understand imperfections and defects and mechanical properties of materials
LO3: Understand phase rule and phase diagrams of engineering materials
LO4: Understand various types of ceramics and composite.
LO5: Understand different types of polymers, characterization techniques

Unit No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1	Introduction, Classifications of materials, Atomic Structure & Interatomic Bonding, The Structure of Crystalline Solids, Imperfections (Defects) in Solids	LO1	IIT Kharagapur /University of Illinious
2	Mechanical Properties of Metals, Dislocations & Strengthening Mechanisms, Failure	LO2	
3	Phase Diagrams, Development of Microstructure and Control of Mechanical Properties in Metals, Applications of Metal Alloys	LO3	
4	Structures and Properties of Ceramics and Applications	LO4	
5	Polymer Structures, Characteristics, Applications of Polymers and Composites	LO5	

Text Books:

1. W. D. Callister, Jr: Materials Science and Engineering- An Introduction, John Wiley and Sons, N.Y.
2. Callister W D, Materials Science and Engineering, 2nd Edition, Wiley India (P) Ltd. (2014).

References:

1. J. F. Shackelford: Introduction to Materials Science for Engineers, Mc-Millan Publishing Co., N.Y. 1992
2. Askeland D R, The Science and Engineering of Materials, 5th Edition, Thomson (2005).
3. Avner S H, Introduction to Physical Metallurgy, 2nd Edition, McGraw Hill Education (2017).
4. Kodgire V D, Material Science and Metallurgy for Engineers, 31st Edition, Everest Publishing House (2011).
5. Raghavan V, Materials Science and engineering - A first Course, 6th Edition, Prentice Hall India Learning (P) Ltd. (2015).

Engineering Graphics						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
Core	**IC1105**	**Engineering Graphics**	**1**	**0**	**3**	**3**

Objectives:

1. Enables students to learn the concepts of drawing as graphic communication, their role in engineering design
2. Make familiar with different drawing equipment, technical standards, and procedures for the construction of different views.
3. Equipped with the skill that enables them to convert pictorial to orthogonal representations.
4. To enable the student to learn about computer graphics using solid-works tool

Learning Outcomes

Upon successful completion of this course student should be able to:

1. Use EG as a tool of communication between engineers.
2. To represent design data as per the BIS standards
3. To visualize and represent the object in orthographic and isometric view
4. To draw various engineering application devices using computer graphics techniques.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1	Engineering Drawing Introduction	Students will get to know about the uses of drawing and its importance.	IIT Kharagpur
2	Projection of point	Students will get to know about the orthographic projection of points, lines, planes, and solids	
3	projection of line		
4	projection of planes		
5	Projection of solid		
6	Engineering Curve	Students will get to know about various profile generation	
7	Introduction to solid works	Students will get to know about modelling using solid	
8	Section of Solids	Students will get to know about generation of solids and its sections	

9	Isometric projection	Students will get to know about various views such as isometric, diametric and trimetric.	
10	Modelling of different type of solids, pressure vessel, heat exchanger, etc	Students will get to draw various engineering application devices using computer graphics technique	

Text Book:
1.Bhatt, N.D., Engineering Drawing,

Reference:
2.Shah, M.B. and Rana, B.C., 2009. Engineering Drawing. Pearson Education India.

English for Communication						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1106	**English for Communication**	1	0	2	2

Objectives:

This course has been designed to provide a foundation in effective communication in English. The focus of the course is to improve the language proficiency of the students by emphasizing on the LSRW (Listening, Speaking, Reading, and Writing) skills.

Learning Outcomes

At the end of the course the students will be able to:

1. Use the English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in formal and informal contexts

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1	**English Grammar:** A Revisiting Articles; Prepositions Modal verbs; Subject-verb agreement; Tense; Types of sentences; Phrases and Clauses **Exercises:** On articles, prepositions (fill in the blanks) Correction of sentences (error analysis) Joining of sentences & Parsing of sentences On modal verbs	To help students to refresh and revise the grammar	
2	**Importance of vocabulary building & Lexical aspects** Word- Form- Meaning Synonyms & Antonyms Word formation Idioms and phrases/ Phrasal verbs Collocations Words as metaphors and images **Exercises:** Exercises on word formation & Word games: Hangman; building words with cards; memory game, etc. Reading of Maya Angelou's **"Caged Bird"** Robert Frost's **"After Apple-picking"**	To help students to build their vocabulary	

3	**Pronunciation/ Phonetics** Articulation of sounds (consonants& vowels) Syllable and consonant cluster Stress and Intonation Indian English pronunciation Received Pronunciation **Exercises:** practice sessions on pronunciation (fricatives) Reading of Charles Dickens's Oliver Twist (Chapter 2: **Please Sir, I want more**…); Julian Barnes's The Sense of an Ending (**Introduction**); Emma Donoghue's "**The Tale of the Rose"**	To help the students to improve their pronunciation	
4	**Developing Listening Skills** Types of listening: active, passive, interpretive & critical Role of listening in communication **Exercises:** Martin Luther King, Jr.'s I have a Dream… & Michelle Obama's New Hampshire Speech on Women Empowerment Snippets from movie: Troy (to re-narrate the Greek myth) &Games like Chinese whisper etc.	To develop students' listening comprehension skills	
5	**Reading Comprehension (literary text s)** Types of reading: close reading, reading between the lines, skimming & scanning Summarising & paraphrasing analysis and interpretation textual reading contextual reading (underpinning ideas on history/politics/economic condition/ knowledge/power structure etc. **Exercises:** Reading of short stories: - Ruskin Bond's **'Time Stops at Shamli'** - Mahasweta Devi's **Bitter Soil & Imaginary Maps** William Somerset Maugham's **"The Luncheon"**	To develop students' reading comprehension of literary texts	
6	**Reading non-literary texts** Difference between scientific and literary discourses Objective vs. subjective; Fact vs fiction Brevity in expression& Linearity in discourse **Exercises:** Cuttings from The Hindu's Science and Technology section Samples from science textbooks and journals	To develop students' reading comprehension of non -literary and general texts	

7	**Oral Communication** Communication, the two way process Channels of communication Importance of listening in verbal discourses Importance of intonation in verbal discourses Sensitivity/ Aptness of words in articulating one's thought; Barriers to Communication **Exercises:** On oral communication in the form of role plays; situational conversations for negotiation, persuasion, assertion etc. Making a Sales Presentation	To develop students' speaking skills	
8	**Oral Presentation** India and the World with Shashi Tharoor, Conversations with History (youtube uploaded by univ of California, 2015) **Exercises**: Individual/ team presentations, impromptu presentations, chalk - talks, etc	To develop students' oral presentation skills	
9	**Group Discussions** The Argumentation and Debate Process Body language **Exercises:** GDs/ reporting of group activities.	To develop students' discussion skills	
10	**Developing Writing Skills** Different elements of the writing process (pre - writing, drafting, revising and editing) Types of writing (expository, descriptive & persuasive) Preparing an outline Sentence structure/ clusters, coherence & Sense of paragraph Use of Linking devices; grammatical device **Exercises**: On paragraph writing Preparing an outline Summarizing a text Paraphrasing a text **Assignments**: letter Writing & Writing SoPs	To develop students' Written Communication skills	
11	**Punctuation** Capitalization; apostrophe; colon; semi-colon; comma; hyphen; parentheses; Dash; Ellipses; quotation marks & inverted commas **Exercises:** Short passages to punctuate Quizzes	To help students develop their skills to use punctuation marks effectively	

12	**Rhetorical Functions in Academic Writing** Intro: For whom one is writing and the purpose for which one is writing to Argue, Inform, Persuade, Explain, Convince etc. Laboratory Reports, Book Reviews, Research Proposals, etc. Description; reporting; narration; comparison & contrast; explanation	To develop students' academic writing skills	
	Exercises: On description, reporting, narration, comparison and contrast, explanation Assignments: to prepare and present oral and visual laboratory reports		
13	**Writing & Rhetoric** Writing about sports; food; fashion; film (in the form of review) **Exercises:** Related exercises on Writing: sports/ food/ fashion/ film review	To develop students' writing skills for different purposes	

SUGGESTED READING:

1. Bailey, Stephen. Academic Writing: A Handbook for International Students. Routledge. 2011.
2. Doron, L. & Soffos,C. Teaching for Deep Comprehension. Portland, 2005.
3. Frey, N. & Fisher, D. Rigorous Reading: Five Access Points for Comprehending Complex Texts. Thousand Oaks, CA: Corwin. 2013.
4. Garner, Bryan A. Modern English Usage. OUP, 2016.
5. Gerson S J & Gerson S M (2002). Technical Writing, 3/e Pearson Education Asia.
6. Green, David. Contemporary English Grammar–Structures and Composition. MacMillan India. 2014.
7. Huckin T. N. & Olesan. Technical Writing and Professional Communication, McGraw-Hill, Inc.
8. Kortepeter, Paul. Writing & Rhetoric Series
9. Laminack, L. & Wadsworth, R. Learning under the influence of Language and Literature: Making the Most of Read-alouds Across the Day. Portsmouth, NH: Heinemann. 2006.
10. Lebauer, R. S. Learn to listen, listen to learn: Academic listening and note-taking. (2nd edn.). White Plains: NY: Pearson Education. 2000.
11. Lewis, Norman. Word Power Made Easy. Penguin India. 2015 (Print)
12. Pease, Allen & Barbara Pease. The Definitive Book of Body Language. Read Books, 2004.
13. Rost, M. Introducing Listening. London: Penguin books. 1994.
14. Solomon, Philip Sunil. Word Power: Vocabulary Builder. Oxford University Press. 2017 (Print)
15. Trimble, Louis. English for Science and Technology: A Discourse Approach. CUP. 1985.

Electrical Technology						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1107	**Electrical Technology**	2	0	0	2

Objectives:

To develop knowledge on electrical circuits analysis methods, understanding/calculation of various parameters in single phase and three phases alternating current (AC) circuits/distribution network.

Learning Outcomes

Analysis of Direct Current (DC) circuits, Alternating Current circuits (both Single phase and Three phase) under steady state and calculate various parameters (like voltage, current, power etc).

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1.	**Electrical Technology** • DC Networks: Ohms Law, Voltage and Current Laws, Nodal and Mesh analysis Kirchhoff's laws, node voltage and mesh current methods, Superposition principle, Thevenin's, Norton's theorems. • Single phase AC Circuits: Single phase EMF generation, average and effective values of sinusoids, solution of R, L, C series circuits, the j operator, complex representation of impedances, phasor diagram, power factor, power in complex notation, solution of parallel and series – parallel circuits. • Three phase AC Circuits: Three phase EMF generation, delta and Y – connections, line and phase quantities, solution of three phase circuits, balanced supply voltage and balanced load, phasor diagram, measurement of power in three phase circuits.	Knowledge on analysis of Direct Current (DC) circuits, Alternating Current circuits (both Single phase and Three phase) under steady state and calculate various parameters (like voltage, current, power) within the circuit.	IIT Bhubaneswar

Text Book:

1. "Engineering Circuit Analysis" by William H. Hayt, Jack E. Kemmerly.
2. "Electronic Circuits, Analysis and Design" by Donald A. Neamen.

References:

1. "Electronic Devices and Circuits; An Introduction" by Allen Mottershead (Goodyear Publishing).
2. "Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N. O. Sadiku.
3. "Electronic Devices and Circuit Theory" by Robert L. Boylestad and Louis Nashelsky.
4. "Digital Logic and Computer Design" by Morris Mano.

Basic Electronics						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1108	**Basic Electronics**	2	0	0	2

Objectives:

To develop knowledge on basic Operational amplifier circuits, semiconductor devices, digital logic gates and their application aspects in some electronic circuits.

Learning Outcomes

Understanding operation/functioning of basic electronic devices (diode, bipolar junction transistor, operational amplifier) and their application in some electronic circuits. Knowledge on Boolean function implementation using logic gates and their application in digital logic circuits.

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1.	**Basic Electronics** • Operational amplifier: Differential mode of operation, common mode rejection, typical op-amp specifications, inverting amplifier, non-inverting amplifier, integrator, differentiator, summing amplifier etc., concept of active filters; • Semiconductor devices: Diode, half wave and full wave rectification, filtering, regulation with zener diode, BJT, structure and principle of operation; Small-Signal Model of BJT and BJT Amplifier. • Digital electronics: Review of Boolean algebra and signed number representation schemes in binary, implementation of Boolean functions using various logic gates, concept of combinatorial and sequential circuits, registers and counters from functional viewpoint.	Understanding operation/functioning of basic electronic devices (diode, bipolar junction transistor, operational amplifier) and their application in some electronic circuits. Knowledge on Boolean function implementation using logic gates and their application in digital logic circuits.	IIT Bhubaneswar

Text Book:

1. "Engineering Circuit Analysis" by William H. Hayt, Jack E. Kemmerly.
2. "Electronic Circuits, Analysis and Design" by Donald A. Neamen.

References:

1. "Electronic Devices and Circuits; An Introduction" by Allen Mottershead (Goodyear Publishing).
2. "Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N. O. Sadiku.
3. "Electronic Devices and Circuit Theory" by Robert L. Boylestad and Louis Nashelsky.
4. "Digital Logic and Computer Design" by Morris Mano.

Chemistry Lab						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1109	**Chemistry Lab**	0	0	3	3

Objectives:

This course is designed to provide the foundation on the lab experience of Physical Chemistry concepts

Learning Outcomes

At the end of the course, the student will be able to:
1. Experience in measuring several physical quantities
2. Learn how conductivity measurements help in the determination of the end-points of titrations
3. Measure various kinetic parameters of the chemical reactions
4. Perform volumetric titrations for quantitative analysis

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1.	Measurement of surface tension, CMC of a surfactant	Surface tension measurement with stalagmometer	
2.	Molecular weight of a polymer by viscometric method	Viscosity measurement with Ostwald viscometer	
3.	Conductometric titration	Strength of an acid can be determined using conductometer	
4.	pH-metric titration	Determination of strength/pKa of a weak acid	
5.	Acid-Base Volumetric titration	Determination of strength of a given acid.	
6.	Redox titration	Determination of amount of Fe(II) in Mohr's salt.	
7.	Determination of vander-Waals gas constant by using the P-V data.	Plotting using Excel package.	
8.	Kinetics of Ester hydrolysis	Determination of rate constant.	
9.	Phase diagram of a Binary system (Phenol-water)	Determination of critical solution temperature from phase diagram	

10.	Determination of heat of a solution	Application of the concepts of specific heat and temperature change in the determination of heat of solution of a water-soluble salt	
11.	Determination of concentration and molar extinction coefficient using UV-Visible spectroscopy	Handling of UV-Visible spectroscopy, validation of Lambert Beer's Law.	
12.	Identification of functional groups of a given polymer by FTIR spectroscopy	Handling of FTIR spectroscopy and characteristic vibrational frequency identification	

Text Book:

1. Advanced Physical Chemistry Experiments by Dr. J. N. Gurtu and Amit Gurtu
2. Laboratory manual for instructions

SEMESTER - II

Engineering Mathematics II						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1201	**Engineering Mathematics – II**	3	1	0	4

Objectives:

1. To introduce the fundamental concepts such as vector spaces, subspaces, basis, linear transformations and their matrix representation of linear algebra. To study various methods to find the solution of a system of equations and the consistency conditions of it. To study the conditions for a square matrix to be similar to a diagonal matrix.
2. To expose students to understand the ordinary differential equations and their solvability in a variety of applications, behavior of complex valued functions and its singularities

Learning Outcomes

At the end of the course, the student will be able to:

1. Generate the new vector spaces from existing ones and find the basis for a vector space
2. Understand the relationship between linear transformations and matrices
3. Solve the linear system of equations by using various methods and understand their consistency conditions.
4. Understanding the variety of techniques to solve the ordinary differential equations arises in engineering applications.
5. Analyze the properties like continuity, differentiability and analyticity of complex functions. Evaluate the complex integrals, analytic functions and to classify the singularities of complex-valued functions.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1.	**Linear Algebra:** Algebra of matrices, Vector spaces, subspaces, linear dependence of vectors, basis and dimensions, linear transforms, matrix representation of a linear transform, rank-nullity theorem, rank and inverse of a matrix, solution of algebraic equations-consistency conditions, Gaussian elimination and Gauss-Jordon methods, Hermitian, skew Hermitian and unitary matrices, eigenvalues and eigenvectors, Cayley-Hamilton theorem, diagonalizability, bilinear forms.	The student will be able to: Understand the relationship between linear transformations and matrices. Generate the new vector spaces from existing ones and find the basis for a vector space. Solve the linear system of equations by using various methods and understand their consistent conditions.	

2.	**Differential equations:** First order differential equations: Exact Equations, integrating factors, Reducible to exact differential equations, linear and Bernoulli's form, Orthogonal trajectories, Lipschitz condition, Picard's theorem, Examples of non-uniqueness. Homogeneous and non-homogeneous second order ODE's with constant coefficients, Characteristic equation, Linear dependence and Independence, Existence of solutions, Wronskian, method of variation of parameters, general linear differential equations with constant coefficients, Method of undetermined coefficients, Cauchy-Euler equations, System of differential equations.	The student will be able to, understanding the variety of techniques to solve the ordinary differential equations arises in engineering applications.	
3.	**Complex Variables:** Limit, continuity, differentiability and analyticity of functions, Cauchy-Riemann equations, line integrals in complex plane, Cauchy's integral theorem, independence of path, existence of indefinite integral, Cauchy's integral formula, derivatives of analytic functions, Taylor s series, Laurent s series, Zeros and singularities, Residue theorem, evaluation of real integrals	The student will be able to: Analyze the properties like continuity, differentiability, and analyticity of complex functions. Evaluate the complex integrals, analytic functions, and to classify the singularities of complex valued functions.	

Text Book (2 to 3):

1. K. Hoffman and R. Kunze, Linear Algebra, Pearson publisher
2. E. Kreyszig, Advanced engineering mathematics (8th Edition), John Wiley (1999).
3. S.L. Ross, Differential Equations, Third Edition, Wiley-India (2004).
4. R. V. Churchill, J. W. Brown, Complex Variables and Applications, Mc-GrawHill, (1990).

Reference (1 to 2) :

1. G. Strang, Linear Algebra and its applications.
2. S. Ponnusamy, H. Silverman, Complex Variables with Applications, Birkhauser, (2006).

Strength of Materials						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1202	**Strength of Materials**	3	1	0	4

Objectives:

1. To understand fundamental concepts of stress and strain under various types of loading conditions.
2. To understand various concepts tension, compression, shear, bending and torsion.
3. To learn about location of maximum stress and strain under loading and calculate shear force, bending moment and deflection of beams.

Learning Outcomes

1. Understand concept of stress and strain
2. Predict deformation under axial loading, compressive loading, bending, shear and torsion Understand and solve statically determinate and indeterminate problems on members subjected to torsion
3. Understand the concept of principal stresses and Mohr's circle, stress estimation in pressure vessels
4. Understand the failure loads for columns for various end conditions

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1	External vs. Internal loadings, Axial loading vs. transverse loading – Theory + Problems Normal stress and Shear Stress– Theory + Problems Bearing stress – Theory + Problems Stresses in axially loaded members– Theory + Problems Normal strain, Hooke's law Stress-strain diagram and strain energy concept Poisson's ratio– Theory + Problems Generalized Hooke's law– Theory + Problems Homogeneous and Composite members under axial loading– Theory + Problems	Students will get to know the concept of stress and strain	IIT Kharagapur
2	Shear stress, strain and angle of twist concept in solid and hollow circularshaft subjected to torque– Theory + Shear stress, strain and angle of twist concept in circular composite shaft subjected to torque – Theory +	Learn to predict deformation under axial loading, compressive loading, bending, shear and torsion Understand and solve statically	

	Shear stress, strain and angle of twistin both ends fixed circular shaft subjected to torque – Theory + Problems	determinate and indeterminate problems on members subjected to torsion.	
	Shear stress, strain and angle of twist geared circular shaft subjected to torque – Theory + Problems		
3	Concept of bending, neutral axis, pure flexural stress derivation, radius of curvature estimation	Students will learn to draw shear force and bending moment diagram for beams	
	Stresses in homogeneous beam subjected to pure bending – Theory + Problems		
	Stresses in composite beam subjected to pure bending– Theory + Problems		
	Concept of shear force, Bending moment and shear force diagram for beams subjected to various loads–Theory + Problems		
4	General state of stress	Understand the concept of principal stresses and Mohr's circle, stress estimation in pressure vessels	
	Stress estimation in members subjected to eccentric loading (axial + bending) – Theory + Problems		
	Stress estimation in members subjected to loading (axial + torsion) – Theory + Problems		
	Stress estimation in members subjected to loading (axial + torsion + bending) – Theory + Problems		
5	Principal stress and strain		
	Estimation of principal stress, maximum shear stress from Mohr's circle– Theory + Problems		
	Stresses in pressure vessels – cylindrical and spherical – Theory + Problems		
6	Buckling of slender column – Theory + Problems	Understand the failure loads for columns for various end conditions	
	Euler's buckling load for different end conditions – Theory + Problems		

Text Books:

1. Mechanics of Materials by Beer Johnson et al. McGraw-Hill Education; 7th edition

Reference Books

1. Elements of Strength of Material by Timoshenko and Young (East West Press)
2. Mechanics of Materials by R.C. Hibbler. Pearson; 10th edition (5 January 2016)

Physics						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1204	**Physics**	3	1	0	4

Objectives:

1. This course is prepared to understand the basic principles and fundamentals of Physics for macroscopic, microscopic, and systems of particles.
2. The 1st part of the course is devoted to the understanding of different systems, coordinates, and reference frames.
3. The second part of the syllabus is devoted to thermal physics based on the connection of microscopic motion to macroscopic observation and basic concepts of heat transfer
4. The concept of electromagnetic waves -particle duality and electromagnetic theory forms the basis for conceptualizing the signal communication techniques and also forms the basis of electric signal

Learning Outcomes

1. This course is designed in such a way that the students learn the fundamentals of Classical Physics, which will build the base for the study of Engineering and Technology. Upon completion of this course, the students will be able to have a basic understanding of the motion of a system of particles, the statistical behavior of molecules, and their correlation with gross properties such as temperature, heat conduction, and convections, Radiation.
2. The course will also help students in understanding wave motion, and the propagation characteristics of electromagnetic waves in a vacuum as well as in materials systems.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1	Co-ordinate systems, plane polar, cylindrical and spherical polar coordinate systems, frame of reference, rotational frame, Coriolis forces. The motion of a system of particles, Conservation laws, Constraints and degrees of freedom, Generalized coordinates, Lagrange's and Hamilton's formulations.		IIT Kharagpur
2	Concepts of distribution of molecular velocities; distribution laws and statistics-MB, FD and BE; mean free path; Transport phenomena – viscosity, diffusion; thermal conductivity, measurement of thermal conductivity; the periodic and aperiodic flow of heat, Wiedemann-Franz law. Heat radiation, black body and black body radiation, Planck's distribution law and its application to classical distribution (Rayleigh-Jeans and Wiens) and total radiation (Stefan-Boltzmann) laws, Basic concept of conduction, and convection		

3	Overview of vibrations with emphasis on damped and forced oscillations, resonance, coupled oscillations, and normal modes. Wave Motion: longitudinal and transverse waves, wave equation, plane waves, phase velocity, superposition wave packets and group velocity, two and three-dimensional waves, polarization. Electromagnetic Waves: Maxwell's equations, wave equation, plane electromagnetic waves, energy-momentum, Poynting's theorem, electromagnetic boundary conditions, reflection and refraction, interference, Young's experiment, interferometers, diffraction, Fraunhofer diffraction (single slit), dispersion, radiation. Wave Mechanics: failure of classical physics, qualitative review of relevant experiments, de Broglie waves, uncertainty principle, wave function and Schrodinger equation		

Text Book:

1. Classical Mechanics, H Goldstein, Reading Mass Adison-Wesley Press, Inc.
2. Physics for Scientists and Engineers Raymond A. Serway and John W. Jewett
3. Concepts of Modern Physics, A. Beiser
4. Introduction to Electrodynamics, Griffiths D.J. (2012) PHI Learning Pvt. Ltd. 4.2

Reference books:

1. An Introduction to Mechanics, D. Kleppner and R. J. Kolenkow, Tata McGraw-Hill,
2. Classical Dynamics, D T Greenwood, Prentice Hall of India, Pvt. Ltd., New Delhi
3. Physics: Principles with Applications Douglas C. Giancoli
4. Introduction to special relativity, Robert Resnick.
5. Introduction to Electricity & Magnetism Liao, Dourmashkin, and Belcher
6. Introduction to Electromagnetics, Griffith D.J. PHI Learning, 4th edition

Programming and Data Structure						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1205	Programming and Data Structure	3	0	3	5

Objectives:

Introduce students to digital computers, basics of programming, different constructs in C-programming language. Introduce fundamental data structures: arrays, linked list, stack, queue, trees and graphs and standard algorithms (Sorting and Searching).

Learning Outcomes

At the end of the course, the student will be able to improve his/her problem-solving skills and will be able to use: C-Programming constructs, standard data structures, and sorting and searching algorithms.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1.	Introduction to digital computers; Introduction to programming variables, assignments; expressions; input/output; Conditionals and branching; Iteration; Functions; Recursion; Arrays;	Able to use the basic C-constructs like conditional statements, loops, functions, and arrays.	IIT-KGP
2.	Introduction to pointers; Character strings; Structures; Introduction to data-procedure encapsulation; Dynamic allocation	Able to use advanced C-constructs like Structures, pointers, dynamic allocation	IIT-KGP
3.	Time and space requirements; Searching and sorting algorithms	Able to understand search and sorting methods and their complexity	IIT-KGP
4.	Introduction to data structures Linked structures. stacks and queues, Trees and Graphs	Able to select and use right data structures for a given problem.	IIT-KGP

Text Books:

1. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein (MIT Press)
2. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India.

References:

1. Schaum's Outline of Programming with C, Byron Gottfried, Tata McGraw-Hill
2. Data Structures, Schaum's Outline Series, Seymour Lipschutz, Tata McGraw-Hill
3. Fundamentals of Data Strcutures in C , Ellis Horowitz, Satraj Sahni and Susan Anderson-Freed, W. H. Freemn and Company

4. Classic Data Structures, Debasis. Samanta, Prentice Hall of India

Earth Energy and Environment

Course Type	Course Code	Name of Course	L	T	P	Credit
	IC 1206	**Earth Energy and Environment**	2	0	0	2

Objectives:

1. This course aims to train students to understand environmental issues, policies and regulations.
2. It imparts understanding on the linkages between the human-environment-economy.

Learning Outcomes

1. Students will understand the major environmental problems and it will create awareness on their role as an individual.
2. Students will understand the role of conservation of natural resources and biodiversity to achieve sustainable development.

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which University
Unit 1.	• Introduction • Geological Timescale and Geological Processes • Global Environmental crisis • UN conferences on Environment and Sustainable Development • Sustainable Development Goals	• Students will be acquainted with the Environmental crisis and the importance of its management. • Sustainable energy goals will be introduced.	IIT Kharagpur
Unit 2	• Ecosystems: Basic concepts • Cycles in Ecosystem • Changes in various Ecosystems • Renewable natural resources • Non-renewable natural resources	• Anthropogenic and natural changes in ecosystem, non-renewable and natural resources will be discussed.	
Unit 3	• Greenhouse gases and climate change • Species extinction • Human population growth and resource usage. • Water and Soil Pollution • Air pollution • Solid Waste Management	• The role of various pollutants and greenhouse gases in breaking down the ecological harmony will be discussed.	

Unit 4	• Environmental Policies • UNFCC, Kyoto Protocol and Paris Agreement • Human-environment relationship • DPSIR model • Biodiversity • Biodiversity conservation • MINAS Standards	• The relationship of human-environment, the importance of biodiversity conservation will be discussed.	
	• Changes in fuel quality specification		

Text Book:

1. Environmental Studies: From Crisis to Cure, R. Rajagopalan, OUP India, 3rd Edition
2. Textbook of Environmental Studies for Undergraduate Courses of all branches of higher education By Erach Bharucha

Reference Book:

1. Environmental Science: A Study of Interrelationships, 12th Edition, Eldon D. Enger and Bradley F. Smith, McGraw-Hill

Fundamentals of Biological Systems						
Course	**Course**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1207	**Fundamentals of Biological Systems**	2	0	0	2

Objectives:

1. This course aims to provide thorough understanding of the basic concepts in biochemistry, cell and molecular biology.
2. It imparts understanding of the structure and functional roles of biological macromolecules.

Learning Outcomes

1. Students will understand how the biological processes are interconnected and regulated.
2. It will introduce all the fundamentals and prepare students for advanced courses in biology.

S. No.	Topics to be Covered	Learning Outcome	Content compared
1.	• Introduction • Prokaryotic cell • Eukaryotic cell • Cell cycle and Division • Cellular Respiration and ATP synthesis	• Students will gain knowledge on the basic fundamentals of cell biology and different biochemical processes.	IIT Kharagpur
2.	• Proteins: structure and sequencing • Enzymes: mechanism, kinetics and inhibition • DNA: structure • DNA: replication and recombination • RNA synthesis • Genetic code and protein biosynthesis • Recombinant DNA technology	• Students will gain knowledge on the important macromolecules, their structure and synthesis	
3.	• Noncovalent interactions • Free energy changes in biological processes • Transport Phenomena in biological systems • Blood Rheology	• Students will be familiarized to the mechanistic insights of biological processes.	
	• Fluid mechanical aspects of some diseases and organs • Bio-Micro devices • Crop management and Disease control	• Students can understand Implication Biosafety & Ethical protocols in biology.	

Text Book:

1. Lehninger Principles of Biochemistry, David L. Nelson and Michael Cox, WH Freeman publishers.
2. Molecular Cell Biology by Lodish et al., WH Freeman publishers.

Reference:

1. Biochemistry by Donald Voet & Judith Voet, John Wiley & Sons.

Electrical and Electronics Lab						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1208	**Electrical and Electronics Lab**	0	0	1	2

Objectives:

1. To familiarize on operation or function of various electrical and electronic measuring instruments or meters (voltmeter, ammeter, wattmeter, CSO, multimeter, Function generator etc).
2. Aims to develop the experimental setup for verifying/understanding the theoretical concepts related to some electrical and electronics circuits or theorems in the laboratory.

Learning Outcomes

1. Knowledge of the functioning or uses of various electrical and electronics measuring instruments (volt meter, ammeter, wattmeter, CSO, multimeter, Function generator etc) and ability to connect them in the circuit for measuring various parameters.
2. Ability to build the laboratory experimental setup consisting of electrical source, measuring instruments, load as per the theoretical concept or schematic diagram and verifying the same in laboratory.

S. No.	Topics to be Covered	Learning Outcome	Content compared with which University
1	Verification of Kirchhoff's Laws	1. Knowledge on the functioning or uses of various electrical and electronics measuring instruments (volt meter, ammeter, wattmeter, CSO, multimeter, Function generator etc) and ability to connect them in the circuit for measuring various parameters.	IIT Kharagpur
2	Verification of Ohm's Law and Measurement of Filament Lamp Resistance		IIT Kharagpur
3	Verification of Superposition Theorem		IIT Kharagpur
4	To measure the single phase power by using three voltmeter method.		
5	Measurement of Power in 3-Φ Circuit by Two Wattmeter Method		IIT Kharagpur
6	Familiarization with electronic components, Oscilloscope, Signal Generator and usage of Multimeters		IIT Kharagpur

7	Frequency response and Square wave testing of R-C, and C-R Networks.	2. Ability to build the laboratory experimental setup consisting of electrical source, measuring instruments, load as per the theoretical concept or schematic diagram and verifying the same in laboratory.	IIT Kharagpur
8	Voltage Rectifiers-Half Wave, Full Wave Rectifier with and without Filters.		IIT Kharagpur
9	Characteristics of P-N Diode and Bipolar Junction Transistor.		IIT Kharagpur
10	Studies on Logic Gates-Verification of Logic Gates, Adders and Flip-flops.		IIT Kharagpur

Text Book:

1. "Engineering Circuit Analysis" by William H. Hayt, Jack E. Kemmerly.
2. "Electronic Circuits, Analysis and Design" by Donald A. Neamen.

References:

1. "Electronic Devices and Circuits; An Introduction" by Allen Mottershead (Goodyear Publishing).
2. "Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N. O. Sadiku.
3. "Electronic Devices and Circuit Theory" by Robert L. Boylestad and Louis Nashelsky.
4. "Digital Logic and Computer Design" by Morris Mano.

Workshop						
Course Type	**Course Code**	**Name of Course**	**L**	**T**	**P**	**Credit**
	IC 1209	**WORKSHOP**	0	0	3	2

Objectives:

1. To study the basics of workshop engineering practice
2. To identify the hand tools and instruments and acquire measuring skills.
3. To acquire practical skills by performing the experiments in different shops of workshop.

Learning Outcomes

1. The student will be able to use different manufacturing (machining, welding, foundry, sheetmetal working, etc) processes required to manufacture a product from the raw materials.
2. Learn to use different measuring, marking, cutting tools used in workshop.
3. Get to know about various safety precautions while working in workshop

S. No.	Topics to be Covered	Learning Outcome	Content compared with Which
1	**Safety Precautions in workshop** **Welding Shop** 1. To study about various welding processes and the tools and equipment's use in welding shop. 2. To prepare a joint (lap/ butt/ T) using gas welding.	Students will get to know about various safety precautions while working in workshop. Students will learn about welding methodology and metal joining processing by using welding	IIT Kharagpur
2	**Foundry Shop** 3. To study about tools and equipments use in foundry shop and how to make a mould. 4. To prepare an aluminium sand casting using the mould prepared by the students.	Students will get to know about mould making and foundry process	

3	**Machine Shop** 5. To study about various machine tools (lathe, milling, shaper, drilling, grinding and EDM drill) available in machine shop. 6. To study about various machining process performed on lathe machine tool in detail and to study the cutting tools used for various machining processes in lathe. 7. To perform facing, step turning, taper turning and knurling on a given work-piece material.	Students will get to know about using various machine such as Lathe, milling, grinding. In lathe machine they will perform various turning operations	
4	**To study about the carpentry, fitting and sheet-metal shop.** 8. To study about the job holding devices, machine tools 9. To study about the measuring, marking, cutting and plain tools	Learn to use different measuring, marking, cutting tools used in workshop.	

TEXT BOOKS:

1. Hajra S. K. and Chaudhary, Workshop Technology I & II, Khanna Publisher.
2. Raghuvansi B. S., Workshop Technology I & II,

REFERENCES:

1. Chapman W. A. J., Workshop Technology Vol. 1, 2, 3 & 4, Butterworth-Heinemann.
2. Gupta I. C., Engineering Metrology, Dhanpat Rai & Sons.
3. Beckwith Thomas G., Mechanical Measurements, Narosa Publishing House.
4. Gupta K. M., Material Science and Engineering, Umesh Publication
5. Callister W. D., Material Science & Engineering, John Wiley & Sons.

Admission guidelines (UG, PG and Ph.D. programmes) For FOREIGN STUDENTS (International Students) at Indian Institute of Petroleum & Energy

1. Introduction

The category of students from abroad viz Foreign Nationals, Non-Resident Indian (NRI) and Persons of Indian Origin (PIO) will be admitted to Indian Institute of Petroleum and Energy (IIPE), Visakhapatnam, India subject to the fulfilment of requirements under different **UG, PG and Ph.D**. programmes.

2. Eligibility and Academic Qualifications

Sl. No.	Name of the programme	Minimum qualification required
1	B.Tech and 2 year Msc.	International students interested in B.Tech have to appear for the Joint Entrance Examination (JEE Advanced) conducted by the IITs. International students interested in pursuing MSc. need to appear for Joint Admission Test from MSc. Conducted by IITs.
2	M.Tech	Bachelor's degree in Engineering /Technology or a Master's degree in appropriate Sciences with a good academic record along with SOP, letters of reference and work experience as the case may be. For international students with UG degree from India a valid GATE score or online interview is also required. The Department/ School/ Centre may put additional requirements for admission.
3	Ph.D.	B.Tech / M.Sc / M.Sc.Tech / M.Tech / ME / or equivalent with 60% marks/6.0 CGPA on 10 point scale or equivalent. Applicants with excellent UG and graduate acdemic credentials are asked to appear for a

		online (video) interview. The Department/ School/ Centre may put additional requirements for admission.

3. Admission procedure and application deadline

Interested international students should send their complete curricula vitae, academic credentials, and relevant certificates indicating following details with all supporting documents wherever applicable to Registrar, IIPE, Visakhaptnam-53003, A.P., India:

i) Birth certificate for age proof
ii) Class XII pass certificate
iii) Citizenship certificate/Foreign Passport/PIO card wherever applicable
iv) Duration of the completed undergraduate programme/qualifying examination
v) Cumulative CGPA and class obtained/percentage of marks
vi) Transcripts of all the courses cleared in the undergraduate /qualifying examination with explanation of assigned grades (certified English translation is required, if document is in other language)
vii) Proof of English proficiency (or proof of IELTS score)
viii) Proof of clearance from MOE/MOEA/MoPNG where ever applicable
ix) Three recommendation letters from previous faculty,/employer etc
x) Scanned copy of passport pages showing nationality and person details
xi) Statement of purpose for Ph.D programme
xii) Medical Fitness certificate
xiii) 3 passport size photographs (colour)

Application Deadlines (tentative)*

- Undergraduate: June
- Masters: April/May for July/August session
- Ph.D : End of March for July/August session; End of September for January session

*Applicants are advised to visit www.iipe.ac.in to see exact application deadlines

Application Fee: Nil

4. Admission Offer

Offer will be made based on recommendations received from the department/Centre. The selected student will be informed by email. Students applying through Indian Council for Cultural Relations (ICCR) will be intimated through ICCR.

5. Joint PhD and short term visit program

IIPE offers Joint Doctoral Programs (JDP) and student exchange with its partner institutions as per the terms and conditions mentioned in the MoU. Under JDP (wherever applicable) students will get an opportunity to live and study in both countries during their candidature and earn their doctoral degree jointly awarded by the partner institutes. The thesis is evaluated by each Institute as per its guidelines and the joint nature of the work is acknowledged in the degree certificate(s).

International student enrolled in a degree program abroad can carry our course work or project work at IIPE Visakhapatnam for a period of not more than two semesters subject to approval and guidelines by the institute prevailing at that time. Students from the Univeristy/Institute having MoU with IIPE will be considered accordingly as per the terms and conditions mentioned in the MoU.

Full time registered student in home institute can be considered for financial support for the short term visit depending upon the availability of the funds or scholarships on reciprocal basis (between IIPE and foreign Institutes/Universities).

6. Modes of admissions:

6.1. Self-sponsored International Students

The International students under this category are required to submit their applications and required documents/certificates to the Academic Section at IIPE. The submitted applications will be scrutinized by respective department/centre of IIPE and will be processed further accordingly if found suitable for admission.

6.2. *ICCR Scholarship (GoI)*

Interested candidates seeking admission at IIPE under this fellowship programme must apply through Indian High Commissions/Embassy or the Indian Council for Cultural Relations (ICCR) as the case may be. Applications received from ICCR at IIPE will be considered for admission and suitable candidates will be intimated about the same through ICCR. (http://iccr.gov.in).

6.4 *Study in India (GoI)*

Candidates desirous of admission under this programme are required to apply through study in India portal and also at IIPE portal (as applicable). The applications will be processed further as per Institute (IIPE) guidelines. For more details, please refer: https://studyinindia.gov.in/

6.5 *ASEAN Scholarships*

The Association of South-East Asian Nations (ASEAN) comprises of Indonesia, Singapore, Philippines, Malaysia, Brunei, Thailand, Cambodia, Lao PDR, Myanmar and Vietnam. Interested candidates can apply online under this scheme as applicable and selected students will be considered as per Institute guidelines. Candidates need to apply on ASEAN portal and also at IIPE (as applicable). For more information, please refer: https://www.moe.gov.sg/financial-matters/awards-scholarships/asean-scholarships

6.6 *German Academic Exchange Service (DAAD) In-Region Scholarship Programme*

The DAAD Regional Office in New Delhi office promotes academic exchange between Germany and India, Bangladesh, Bhutan, Nepal and Sri Lanka. Students can apply accordingly and their application will be processed as per Institute guidelines. For more detail please refer https://www.daad.in/en/

6.7 *Foreign Government Sponsorships*

The application should be submitted to the Academic Section at IIPE either by sponsoring authority or by the candidate through concerned Ministry for admission. The received applications will be scrutinized as per institute guidelines for admission and suitable candidates will be intimated accordingly either directly or through sponsoring authority.

6.8. Students under Memorandum of Understanding

Admission (M.Tech and PhD) of foreign nationals/international students will be considered as per the terms and conditions mentioned in the MOU between IIPE and the country / University /Institution concerned.

In all the above-mentioned modes of admission, IIPE will examine each application in accordance with its prescribed eligibility criteria and documentation as mentioned in section 3. If the applicant is found eligible by the concerned Department/Centre, he/she will be admitted to the desired programme, as per the rules and guidelines of the Institute, which will be binding

on him/her. The institute reserves the right to amend the guidelines for admission from time to time.

6. VISA and No Objection Certificate

Only persons with the purpose of studying in India and entering the country on Student Visa and Research Visa shall be eligible to apply for admission to a particular course. Foreign students seeking admission to Ph.D. programmes must obtain RESEARCH VISA from Government of India, Ministry of Home Affairs. A copy of their Passports, Visa and No Objection Certificate (from MOEA) need to be submitted to the Institute at the time of joining the Institute.

Please refer following link/website for foreign students information and extension of visa related information: https://indianvisaonline.gov.in/

7. Medium of Instruction

The medium of instruction at IIPE Visakhapatnam is ENGLISH only. Those candidates who have studied the subjects in the English Language medium will only be considered for admission to the programmes and need to submit a valid document proof in this regard as applicable.

8. Payment of Tuition Fees

8.1. The proposed fee structure is given below:

Program	Degree	Tuition fees per year in INR	
		For SAARC nationals	For non-SAARC nationals
Undergraduate Programs	B.Tech	2,00,000	6,00,000
Master's Program	M.Tech and 2 yr MSc	10,000	50,000
Doctoral	PhD Program	5,000	25,000
Non-degree candidates for research only	NA	NIL	NIL

Note: Thesis submission fee and convocations charge will be collected at the time of thesis submission

Other Fees

In addition to tuition fee, other few includes:

Description	Amount in INR	Frequency
Registration related	15,000	At the time of admission
Miscellaneous fees (includes library fee, sports fee, student medical insurance etc)	10,000	Per semester
Accommodation fee* (Double occupancy)	30,000 – 40,000	Per semester

*** Hostel and Mess fees depend on the accommodation provided and choice of menu.**
***Mess fee will be extra as per actuals (Approx. INR 5500/- per month)**

2. The candidate will be required to pay the fees (Non-refundable) at the time of registration via cheque/draft/online mode. The Cheque/Draft should be drawn in favour of **Registrar, Indian Institute of Petroleum and Energy (IIPE), Visakhapatnam, India**. The candidate must ensure his/her eligibility, medical fitness, and required documentation support for admission to avoid any future inconvenience.

Important Note:

Mess Fee and Hostel Fee may be revised from time to time as per Institute Guidelines.

In case of any query, applicant can write to doaa@iipe.ac.in or doira@iipe.ac.in

Number of Seats: Total seats allotted to the foreign national candidates (International Candidates) will be supernumerary with a cap of 10% of total number of seats in every course.

Acknowledgement

The draft for admission of foreign (International) students at Indian Institute of Petroleum and Energy (IIPE), Visakhapatnam was prepared by referring guidelines of few IITs.

Annexure - V

Course Type	Course Code	Name of Course	L	T	P	Credit
Elective (II)	-	Waste to Energy Conversion	3	0	0	3

Pre-Requisites:

Basic of heat, thermodynamics, and chemical reaction engineering; Biochemical processes

Objectives:

1. The course provides a thorough understanding of waste to energy resources, technologies and systems to convert the waste into energy (e.g., anaerobic digestion, fermentation, pyrolysis, gasification, incineration, etc.).
2. It also provides a basic understanding of the principles underlying the modern design and operation of systems based on recent research.

Learning Outcomes

1. Understand and learn the fundamental aspects involved during the conversion of waste into energy (e.g., anaerobic digestion, fermentation, pyrolysis, gasification, incineration, etc.)
2. Familiar with the current research scenario associated with biochemical and thermal treatment of wastes & biomass.
3. Acquired skills will be useful in the preparation, planning, and implementation of energy projects

Unit No.	Topics to be Covered	Learning Outcome	Content compared with Which University
1.	Introduction to energy from waste: Characterizations and classification of waste as fuel- agro-based, forest residues, industrial waste, municipal solid waste, & E-waste.	Understand energy, energy balance, and acquainted with various source and characterization of wastes	University of Sheffield, IIT Bombay, & IIT Kanpur
2.	Global and Indian scenario: Environmental aspects, Waste Management; 3R Principle of Reduce, Reuse and Recycle.	Familiar with the Global and Indian scenario and 3R principle	
3.	Waste to energy options: Biochemical and Thermochemical routes; Biochemical Options – Anaerobic Digestion, Fermentation; Thermochemical Options – Pyrolysis, Gasification, and Incineration; Other options – Biodiesel synthesis, Briquetting, Torrefaction, and Hazardous waste management.	Learn the energy options and fundamental aspects involved during the conversion of waste into energy	
4.	Properties of fuels derived from waste to energy technology: Producer gas, Biogas, Ethanol, and Briquettes, Comparison of properties with conventional fuels.	Understand the properties of fuels derived from waste	
5.	Energy production from waste plastics and E-waste, Cultivation of algal biomass from wastewater and its application in energy production. Calculations: heat & mass balances.	Familiar with the Energy production from plastics wastes & algal biomass with Heat & Mass balance	

6.	Landfills: Gas generation and collection in landfills, Introduction to transfer stations, Case studies related to waste to energy conversion.	Learn the collection and transportation of fuel and case studies	

Books:

1. D.O. Hall and R.P. Overeed, Biomass-Renewable Energy, John Willy and Sons, New York. 1987.
2. M.M. EL-Halwagi, Biogas Technology, transfer and diffusion, Elsevier Applied science Publisher, New York, 1984.

References:

1. M. J. Rogoff and F. Screve, Waste-to-energy: technologies and project implementation. Academic Press., 2019
2. N. B. Klinghoffer and M. J. Castaldi, Waste to energy conversion technology. Elsevier., 2013
3. J.H. Harker, and J.R. Backhusrt, Fuel and Energy, Academic Press Inc

Course Type	Course Code	Name of Course	L	T	P	Credit
Elective		Principles of Energy Conversion	3	0	0	3

Pre-requisite courses

Basic understanding of laws of Thermodynamics

Course Objective

1. compare competing energy conversion technologies on an economic and efficiency basis;
2. be familiar with basic principles of thermal, mechanical, chemical, nuclear, and solar energy conversion;
3. be familiar with thermodynamic processes and power cycles (thermal and mechanical energy);
4. be familiar with basic principles of energy storage;

Learning Outcomes

1. At the end of the course students will learn and understand the basic principle involved in energy conversion.
2. Students will get to know about energy conversion efficiency.
3. Students will learn about thermodynamic processes and power cycles
4. Students will get to know about Thermal, chemical, nuclear, wind energy conversion principles
5. Students will get to know about the basic principles of energy storage.

Unit No.	Topics to be Covered	Learning Outcome	Content comparedwith Which University
1	Energy, Growth Rate & Energy Economics energy, energy classification, units, energy conversion, conversion efficiency · energy information and perspectives	students will learn and understand the basic principle involved in energy conversion.	
2	Thermal-to-Mechanical Conversion · Early engines & efficiency · Thermodynamics & power cycles & efficiency · Rankine Cycle · Brayton Cycle	students will learn about thermodynamic processes and power cycles	
3	Chemical-to-Thermal Conversion · principles of combustion, fuels: coal, petroleum, gas.	students will be familiar with basic principles of thermal, mechanical, chemical, nuclear, and solar energy	Michigan Technological University
4	Electromagnetic-to-Thermal Conversion principles of solar insolation · solar collectors · thermal energy storage		

5	Electromagnetic-to-Electrical Conversion principles of photovoltaics	conversion;	
6	Nuclear-to-Thermal Conversion · principles of nuclear energy · pressurized water reactors · boiling water reactors · boiling water, graphite-moderated reactors · Gen-IV reactors		
7	Mechanical-to-Mechanical Conversion · principles of wind energy,		
8	Chemical-to-Electrical Conversion · principles of fuel cells		
9	Introduction to Energy Storage · hydrogen · flow batteries · compressed gas, flywheel	Students will be familiar with basic principles of energy storage	

Text Books:

1. Energy Conversions by Kenneth Weston.
2. Principles of Energy Conversion by Culp, McGraw-Hill Companies
3. Lecture notes

Reference Books

1. BEI International, Hambling, P., (Ed.), Modern Power Station Practice: Nuclear Turbines, and Associated Plant, Pergamon Press, 1992.
2. Drbal, L. F., Boston, P. G., Westra, K. L., Black and Veatch, Power Plant Engineering, Kluwer Academic, 1995.
3. Elliott, T. C., Chen, K., and Swanekamp, R., Standard Handbook of Power Plant Engineering, McGraw-Hill Professional, 2nd ed., 1997 El-Wakil, M. M.,
4. Power Plant Technology, McGraw-Hill, 1984. Jog, M., Hydro-electric and Pumped Storage Plants, John Wiley, 1989. Fritz, J. J., Small and Mini Hydropower Systems, McGraw-Hill, 1984. Central Board for Irrigation and Power (CPIB), India, Design and Construction Features of Selected Dams in India, 1983. Borbely, Anne-Marie, and Kreider, Jan J., (Eds.), Distributed Generation: The Paradigm for the New Millennium, CRC Press, 2003. Larminie, J., and Dicks, A., Fuel Cell Systems Explained, John Wiley, 2003. Vielstich, W., Lamm, A., and Gasteiger, H., Handbook of Fuel Cells: Fundamentals, Technology, Applications, John Wiley, 2003 Appleby, A. J., and Foulkes, F. R. Fuel Cell Handbook, van Nostrand Reinhold, 1996. Harrison, R., Hau, E., and Snel, H., Large Wind Turbines: Design and Economics, John Wiley, 2001.)

Indian Institute of Petroleum and Energy (IIPE)
Visakhapatnam - 530003

Date: 07th September 2022

To
The Members of the
Board of Governors and Senate

Sir/Madam,

On behalf of the PRESIDENT, Senate, I extend my cordial welcome to you to participate in the 2nd **Convocation 2022** to be held at **VMRDA Children's Arena from 10:30 AM on 7th September 2022.** The Time Schedule of the Convocation is given in Annexure 1.

I enclose a copy of the detailed procedure to be followed in the Convocation and request you to cooperate by following the time schedule and the procedure.

The Academic Procession will enter the Convocation Venue in the order mentioned in Appendix-II. On declaration of the Convocation closed, the members on the dais shall form the procession and move out in the same order in which they entered the convocation venue. **The rehearsal for convocation will beheld on 6th September 2022 at 5.30 PM** at **VMRDA Children's Arena. All the members are requested to kindly participate in the Convocation rehearsal.** The stoles will be provided at the convocation venue.

All are requested to assemble and get robed for the Convocation Photograph at the scheduled time.

Yours faithfully,

(Dr. B. Murali Krishna)
REGISTRAR (I/C)

Encl:
Convocation Procedure with Appendix I, II & III

Indian Institute of Petroleum and Energy (IIPE)
Visakhapatnam - 530003

PROCEDURE FOR THE 2nd CONVOCATION 2022

Date – 7th September 2022
Time – 10:30 to 12:30

1.1 The time schedule of the Convocation is given in Annexure 1

1.2 The Academic Procession will consist of the following:

i) Chief Guest
ii) President, Board of Governors
iii) Director
iv) Registrar
v) Members of Board of Governors
vi) Members of Senate

The order of Academic Procession is given in Appendix II. The serial numbers mentioned in Annexure 2 indicate the seats to be occupied by the Members of the Academic procession.

2.1 Members forming the Academic Procession shall assemble **at 10.00 AM** in the Robing Room (adjacent to the Convocation Venue). The members are requested to kindly wear the convocation dress and stole and get ready by **10.15** AM. The convocation dress and stole will be provided by the Institute to the members of the Academic Procession.

The members shall be ready for the Convocation Photograph and occupy their seats for the convocation photograph. As soon as convocation photograph is over, the members of the Academic Procession shall stand according to their position in the order of Academic Procession (Annexure 3).

The Academic Procession shall then proceed (in two columns) to the Dais in the Convocation Venue.

2.2 Announcement (Prof. .....): "ACADEMIC PROCESSION IS ENTERING THE CONVOCATION VENUE, ALL ARE REQUESTED TO PLEASE STAND AND REMAIN STANDING TILL THE MEMBERS OF ACADEMIC PROCESSION TAKE THEIR SEATS."

2.3 On entering the Hall, the members on the right side of the procession shall turn to the right and occupy the specific seats allotted to them and members on the left side of the procession shall turn to the left and occupy the specific seats allotted to them.

2.4 Vande Mataram song

2.5. **PRESIDENT**, BOG, shall say from ROSTRUM "B":

"I DECLARE THE 2ND CONVOCATION OPEN"

3.0

3.1 The DIRECTOR shall say to the Degree Recipients (from Rostrum "A")

"RECIPIENTS OF DEGREES FOR B. TECH PROGRAMMES PRESENT IN THIS HALL PLEASE STAND"

3.2 Instruction for all Degree Recipients:

All Degree recipients shall stand at their position.

3.3 The **DIRECTOR** shall say ***DURING THIS CONVOCATION 87 B.Tech. DEGREES, 42 IN CHEMICAL ENGINEERING AND 45 IN PETROLEUM ENGINEERING ARE BEING AWARDED IN PERSON AND IN ABSENTIA.***

3.4 Thereafter, the DIRECTOR shall say to the Degree Recipients (from Rostrum "A")

"RECIPIENTS OF DEGREES"

"I CHARGE YOU THAT, IN THOUGHT, WORD AND DEED, YOU WILL EVER MAINTAIN THE PURITY, DIGNITY, AND INTEGRITY OF YOUR PROFESSION AND THE HONOUR OF THE INSTITUTE"

"PLEASE TAKE THE PLEDGE"

3.5. Instruction to Recipients:

All recipients shall take the pledge in a standing posture.

3.6 The following pledge then shall be taken from the **Rostrum "C" (in Sanskrit and English).** The leader will lead and others shall follow:

दीक्षान्तः प्रतिज्ञा

भारतीय पेट्रोलियम एवं ऊर्जा संस्थान – विशाखापत्तनात् स्नातक अहं एतत् शपथ सम्मान कर्तृ प्रतिज्ञा करोमि।

यत् अहं नूतनज्ञानस्य प्राप्त्यर्थं, प्रसारणार्थं, जननार्थं च कार्यं निरन्तरं करिष्यामि; यत् विचारेण, वचनेन, कर्मणा च अहं स्वव्यापारस्य नैतिकमूल्यानां अन्तःकरणपूर्वकं पालनम् कृत्वा मानवकल्याणार्थं योगदानं दातुं प्रयतस्ये;

यत् अहं समावेशीसमाजस्य, सततविकासाय च कार्यं करिष्यामि।

I, a Graduate of the Indian Institute of Petroleum and Energy – Visakhapatnam, pledge today to honor this oath;

That I shall continue to work to acquire, disseminate and generate new knowledge; That in thought, word, and deed, I shall endeavor to contribute to human welfare by conscientiously adhering to the ethical values of my profession;

That I shall work for an inclusive society and sustainable development.

3.7 Director shall say from Rostrum A

a. *"ALL DEGREE RECIPIENTS PLEASE RESUME YOUR SEATS."*

b. "REGISTRAR, PLEASE PRESENT THE SCROLL OF DEGREES FOR SIGNATURE OF THE PRESIDENT."

3.8 The PRESIDENT BOG shall sign the SCROLL of DEGREES presented to him by the Registrar.

3.9. The **DIRECTOR** shall deliver his address (from Rostrum "A")

3.10 The **PRESIDENT** shall deliver his address (from Rostrum "B")

3.11 The **Associate Dean (Academics)** will read the brief introduction of Chief Guest and request for his ConvocationAddress

3.12 The **CHIEF GUEST** shall deliver the **CONVOCATION ADDRESS** (from Rostrum "A")

4.01 PRESENTATION OF IIPE MEDALS

4.02 The **DIRECTOR** shall address the DEAN (ACADEMIC) (from Rostrum "A")

"ASSOCIATE DEAN (ACADEMICS), PLEASE PRESENT THE WINNERS OF INSTITUTE GOLD MEDALS AND PRESIDENT GOLD MEDAL FOR RECEIVING THEM FROM THE CHIEF GUEST"

4.03 The DEAN (ACADEMICS) shall read out (from Rostrum "B") the names of the winners of GoldMedals AND of all courses and President's Gold Medal as listed in .....

Recipients of all institute Gold and President Gold Medal will receive medals from theChief Guest after announcement of their names.

Instruction for Recipients

Every recipient shall, as his/her name is called out, go up the Dais from his/her left, receive the medal from the **CHIEF GUEST**, move across and go down the Dais from his/her right side and resume his/her seat.

5.01 **PRESIDENT** (addressing the Director from Rostrum "B")

"DIRECTOR, PLEASE AWARD THE DEGREES OF THE INSTITUTE TO ALL ELIGIBLE CANDIDATES"

5.02 The DIRECTOR shall say from Rostrum "A"

"HEADS OF DEPARTMENTS, PLEASE PROPOSE THE CANDIDATES WHO HAVE BECOME ELIGIBLE FOR THE AWARD OF B.Tech. DEGREE OF THE INDIAN INSTITUTE OF PETROLEUM AND ENERGY IN THIS CONVOCATION AND ARE PRESENT TO RECEIVE THEM"

5.03 The **HEADS OF DEPARTMENTS** shall go to Rostrum "B" for this purpose in the following order:

Appendix

1. HOD (Chemical Engineering)
2. HOD (Petroleum Engineering)

5.04 The concerned **HEAD OF DEPARTMENT** (in the order mentioned above) shall address the Director saying (From Rostrum "B") -

"DIRECTOR, I PROPOSE THAT THE FOLLOWING CANDIDATES BE ADMITTED TO THE DEGREE OF B.Tech. OF THE INDIAN INSTITUTE OF PETROLEUM AND ENERGY IN PERSON"

He shall then read out the names of candidates for respective degrees to be awarded in person as listed in therespective Appendix as indicated above.

Instruction for Recipients:

The candidate shall, as soon as his/her name is called, proceed to the Dais to receive the degree from the Director. (Thereafter candidates shall resume their respective seats)

[Note: The above order is subject to candidates being present]

5.10 After they have stood up, the **DIRECTOR** shall declare –

"BY VIRTUE OF THE AUTHORITY VESTED IN ME AS THE DIRECTOR OF INDIAN INSTITUTE OF PETROLEUM AND ENERGY IN PERSON, I ADMIT THE CANDIDATES PROPOSED AND PRESENTED BY THE HEADS OF DEPARTMENTS TO THE RESPECTIVE DEGREES FOR WHICHTHEY HAVE BEEN PROPOSED AND PRESENTED"

(Thereafter the candidates shall resume their seats)

6.01 Felicitation of Chief Guest

6.02 The **DIRECTOR** shall announce the presentation of memento by the PRESIDENT BOG to the Chief Guest.

DIRECTOR SHALL SAY FROM ROSTRUM 'A' ***"PRESIDENT, I REQUEST YOU TO FELICITATE OUR CHIEF GUEST Ms. HEMALATHA ANAMALAI, Founder and Vice Chair, Green Collar Agritech Solutions Pvt Ltd & Founder and former CEO, Ampere Vehicles Pvt Ltd"***

6.03 After felicitation of Chief Guest, the **PRESIDENT** shall say (from Rostrum "B")–

"THE 2ND CONVOCATION IS CLOSED"

6.04 **Announcement (Prof. .....): *"PLEASE STAND FOR THE NATIONAL ANTHEM AND REMAIN STANDING TILL THE ACADEMIC PROCESSION LEAVES THE CONVOCATION VENUE"***

6.05 The **NATIONAL ANTHEM** shall be sung (Rostrum "C")

6.06 Members on the Dais shall move down the stairs in the same order in which they entered and return to theRobing Room.

6.07 Announcement to be made (Prof. .....): All Degree Recipients are requested to proceed for Lunch at .....

APPENDIX - I

Indian Institute of Petroleum and Energy (IIPE)

TIME SCHEDULE OF 2ND CONVOCATION 2022

Saturday, 07th September 2022

10.30 AM	*The Chief Guest arrives in the Robing Area*
10.35 AM	*Convocation Photograph and interaction of Chief Guest with Senators*
10.50 AM	*Academic Procession starts*
10.55 AM	*Academic Procession reaches the Dais*
10.57 AM	*Vande Mataram*
11.00 AM	*Convocation declared open by the President, BoG, IIPE*
11:05 AM	*Convocation Pledge taking by Degree recipients*
11:07 AM	*President signs the Register*
11:10 AM	*Address by the Director*
11:20 AM	*Address by the President*
11:30 AM	*Introduction of Chief Guest by the Associate Dean (Academics)*
11:35 AM	*Convocation Address by the Chief Guest*
11:55 AM	*Presentation of Institute Medals to Students by the Chief Guest*
11:57 AM	*Award of Degrees by the Director*
12:15 PM	*Felicitation of Chief Guest*
12:20 PM	*Convocation Closure announcement by the President, BoG IIPE*
12:22 PM	*National Anthem*
12:25 PM	*Academic procession leaves the Dais*

APPENDIX - II

ORDER OF ACADEMIC PROCESSION FOR ENTERING AND LEAVING CONVOCATION VENUE

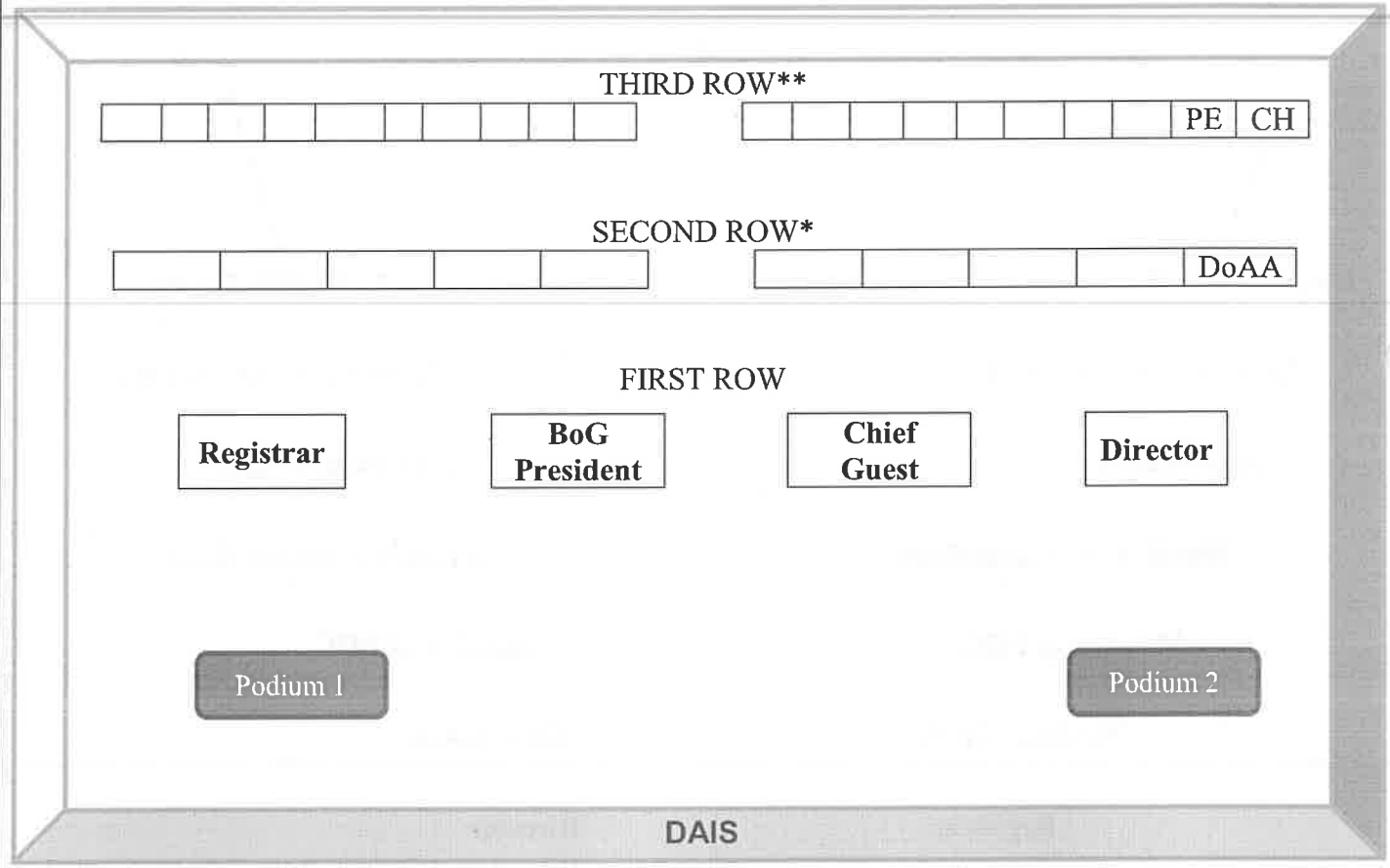
D A I S

HoDs (ME & HS)	**HoDs (PE & CH)**
Members of Senate (Int)	**Members of Senate (Int)**
Dean (R&D)	**Dean (Academics)**
Members of Senate (Ext)	**Members of Senate (Ext)**
Member of BOG	**Member of BOG**
President, BOG	**Chief Guest**
Registrar	**Director**

APPENDIX - III

INDIAN INSTITUTE OF PETROLEUM AND ENERGY IN PERSON

DAIS SITTING PLAN



* BOG Members, Members of Senate (External), Dean R& D, DoAA
** All senators

List of Gold Medalists

Sir, I present the names of the students who on fulfillment of the prescribed conditions have been found eligible for the award of gold medals:

S. No.	Category	Student name
1	Institute Gold Medal for best academic performance in Chemical Engineering	Mr. Ch Hruthik (18CH10037)
2	Institute Gold Medal for best academic performance in Petroleum Engineering	Ms. Kumari Agrani (18PE10043)
3	Presidents Gold Medal for best all-round performance	Ms. Kumari Agrani (18PE10043)

List of Degree Recipients Chemical Engineering

Director, I propose that the following candidates be admitted to the degree of B.Tech. in Chemical Engineering of the Indian Institute of Petroleum and Energy in person"

1	16CH10049	YEDDU PREETHAM
2	17CH10026	KAKANI SAI VARADEEP
3	18CH10001	AVIK ROY
4	18CH10002	KARTHIK RAJ S
5	18CH10003	G DINNESH
6	18CH10004	NAGINENI NAVEEN KUMAR
7	18CH10005	KOLLI SRINIVASA KIREETI
8	18CH10006	SUDHANSHU UPADHYAY
9	18CH10007	S F CHANT ADORAT
10	18CH10008	SAYAN CHATTERJEE
11	18CH10009	POTHEDAR CHANDRA KIRAN
12	18CH10011	KRUPA VINAY MEDIDI
13	18CH10012	TARLADA SAI DEEPAK
14	18CH10013	REKAPALLI V S K SAI SIDDHARTH
15	18CH10014	ANANEY KHANDELWAL
16	18CH10015	AKKANAPALLI LAXMA REDDY
17	18CH10016	K.THULASIMANI
18	18CH10017	ABHISHEK ANAND
19	18CH10018	SAI ROHITH MUVVA
20	18CH10019	ANKIT RAWAL
21	18CH10020	KANNA BALAJI
22	18CH10021	POTTA SAI CHAITANYA
23	18CH10022	GOWDU KARTHIK
24	18CH10023	MAHESH NALLAMOTHU
25	18CH10024	PRAGATI RAJ
26	18CH10025	NISTALA VENKATA SUBRAHMANYAM
27	18CH10026	K SHANMUKH SAI
28	18CH10027	M JAYADEEKSHITHA
29	18CH10028	SUNKARI SATYA PRASANTH
30	18CH10029	K MUKESH KUMAR
31	18CH10030	VINDHYA VASINI DEVI KOMMARAJU
32	18CH10031	RAHUL BAJAJ
33	18CH10032	SANJEET SHRIVASTVA
34	18CH10033	APURVA SUMAN
35	18CH10034	SOURAV GHOSH
36	18CH10035	PRASANNA GOPALRAO SHINDE
37	18CH10037	CHIDURALA HRUTHIK
38	18CH10038	A V SRIDHAR
39	18CH10039	GAURAV SINGH
40	18CH10040	AGNISHEKHAR CHAKRABORTY
41	18CH10042	MOHD ANAS
42	18CH10043	BURIGALA DINESH

List of Degree Recipients Petroleum Engineering

Director, I propose that the following candidates be admitted to the degree of B.Tech. in Petroleum Engineering of the Indian Institute of Petroleum and Energy in person"

1	17PE10002	ABDUL KIBERIYA
2	18PE10001	UJJWAL DUBEY
3	18PE10002	S S SASI KIRAN YOGI
4	18PE10003	DASARI SUBASH CHOUDARY
5	18PE10004	GUMMA SRI RANGA NAGA SAI GOHITH
6	18PE10005	VIKRAM SINGH LAKHAWAT
7	18PE10006	MANISH KUMAR
8	18PE10007	PRIYANSHU AGRAWAL
9	18PE10008	M. SUDHARSHAN BHAT
10	18PE10009	SHAKSHAM GUPTA
11	18PE10010	SHASHWAT HARSH
12	18PE10011	RAHUL PANDEY
13	18PE10012	PRANAY SINHA
14	18PE10013	RITIK SINGH JADOUN
15	18PE10014	PALADI VENKATA VARUN
16	18PE10015	PRASHANT KUMAR
17	18PE10016	RISHABH BHARADWAJ
18	18PE10017	ABHIJITH GANESH
19	18PE10019	SUBHAM SAHA
20	18PE10020	ADARSH GUPTA
21	18PE10021	KANIPELLI KARUN TEJ
22	18PE10022	SAURABH GOYAL
23	18PE10023	SHASHWAT SINGH
24	18PE10024	ABHISHEK KUMAR
25	18PE10025	PENTAPATI JAY TILAK
26	18PE10026	POTTA SAI KUMAR
27	18PE10027	RAVI SRI SAI AKHIL KUMAR
28	18PE10028	AKSHAI BABU
29	18PE10029	RAJDEEP B
30	18PE10031	DEEPILLI SATYA TEJA
31	18PE10032	ROHIT KUMAR BINDAL
32	18PE10033	GAURAV GUPTA
33	18PE10034	TIRUMALASETTI HEMDEEP
34	18PE10035	GOLUKONDA SOMESH KUMAR
35	18PE10036	AYUSH TYAGI
36	18PE10037	KISLAY KUMAR
37	18PE10038	VASU MUDGAL
38	18PE10039	A BALAJI
39	18PE10040	BHAVYA KUMARI
40	18PE10041	VANGAPANDU VENKATA VAMSI ROHITH
41	18PE10042	GANESH V
42	18PE10043	KUMARI AGRANI
43	18PE10044	GOLLAPALLI RAHUL SURYA
44	18PE10046	ASTHA PATEL
45	18PE10047	PALA MANIKANTA

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2.	N. S. Narayanaswamy Professor	Dept. of Computer Science and Engineering, IIT Madras	swamy@cse.iitm.ac.in Office : Phone : 044-22574369	Artificial Intelligence
3.	Narasimha Murty Professor	Dept. of Computer Science and Automation, IISC Bangalore	mnm@csa.iisc.ernet.in Dept. of CSA, IISc Bangalore-560 012, India Phone: 91-80-2293-2779	Artificial Intelligence
4.	Narendra S. Chaudhari Professor	Computer Science and Engineering Department, IIT Indore	nsc@iiti.ac.in Office (landline) 07324-306-865	Artificial Intelligence
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8.	Dharmendra Singh Professor	Department of CSE Indian Institute of Technology RoorkeeRoorkee-247667, Uttarakhand, India	e-mail: dharmfec@iitr.ac.in Phone: 01332-285695 (O), 01332-285351 (R)	Artificial Intelligence
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10.	Vinod Sharma Professor	Department of Electrical Communication Engineering Indian Institute of Science, Bangalore	vinod@iisc.ac.in (+91) 080-2293-2854 / 2360-8024 Mob:(+91)-9108519957 Fax: (+91) 080-2360-8024	Computer Network
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10.	Arnab Bhattacharya Professor	Dept. of CSE, IITKanpur	arnabb@cse.iitk.ac.in	Data Base Management Systems
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14	Prof. Seshadri Sekhar, A.	Professor	Mechanical Department IIT Madras **Office** Room No : 205, Machine Design Section **Email :** as_sekhar@iitm.ac.in **Tel**: (O) **:** +91 44 2257 4709	Machine Design
15	*Modak, S. V.*	Professor	Prof. Subodh V. Modak Professor Department of Mechanical Engineering Indian Institute of Technology Delhi Hauz Khas, New Delhi 110	Machine Design

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Specialization : Thermal Engineering				
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17.	Prof. Prasanta Kumar Das	Professor	Mechanical Engineering Indian Institute of Technology Kharagpur Contact Details: Email: E-mail: pkd@mech.iitkgp.ac.in Phone: +91-3222-282916	Thermal Engineering, Flow of granular material, Multiphase flow and complex flui Computational Fluid Dynamics
18.	Prof. Avinash Kumar Agarwal	Professor	302, Faculty Building, Indian Institute of Technology Kanpur Kanpur-208016, India E-mail: akag@iitk.ac.in Phone: +91-512-259 7982 (office)	Engine Combustion Investigations, Combustion Visualization, Alternative Fuels, Biodiesel Development, Utilization of Straight Vegetable Oils
19.	Prof. Sandipan Ghosh Moulic	Professor	Dept of Mechanical Engineering IIT Kharagpur W.B- 721302 E-mail:moulic@mech.iitkgp.ac.in Phone: 3222-282988	Computational Fluid Dynamics, Hydrodynamic and Thermal Instability, Spectral Methods in Fluid Dynamics, Perturbation Methods Fluid Dynamics, Convective Heat Transfer)
20	Prof. P. S. Ghoshdastidar	Professor	Dept of Mechanical Engineering IIT Kanpur, UP- 208016 E-mail: psg@iitk.ac.in Phone: 0512-259-7019	Computational Heat Transfer, Rotary Kiln modelling, Non-Newtonian Flow and Heat Transfer, Simulation of Boiling Heat Transfer,

				Cooling, Heat Transfe in Nanofluids)
21	Prof. C.Balaji	Professor	Dept of Mechanical Engineering IIT Madras Chennai-600036 E-mail: balaji@iitm.ac.in Phone: 44 2257 4689	Experimental Heat Transfer, Computational Heat Transfer, Optimization in Thermal Sciences, Inverse problems in thermal sciences)
22	Prof. K. Muralidhar	Professor	Dept of Mechanical Engineering IIT Kanpur, UP- 208016 E-mail: kmurli@iitk.ac.in Phone: 0512-259-7182	Thermal Engineering (Experiments and modelling in fluid and thermal sciences, Optical Techniques, Flow Control Hierarchical Porou Media)
23	Prof. Suman Chakrab orty	Professor	Dept of Mechanical Engineering IIT Kharagpur W.B- 721302 E-mail:suman@mech.iitkgp.ac.in Phone: 3222-282990	Microfluidics and Nanofluidics, Interfaci Phenomena and Phas Change)
24	Prof. Sreedhara Sheshadri	Professor	Dept of Mechanical Engg IIT Bomaby, Mumbai-400076 E-mail: sreedhara.s@iitb.ac.in Phone: 22-25767516	Computational Fluid Dynamics, Turbulent Combustion, Engine Combustion, LES/DNS of complex turbulent reacting flows, soot modelli
25	Prof. Amit Agrawal	Professor	Dept of Mechanical Engg IIT Bomaby, Mumbai-400076 E-mail: amit.agrawal@iitb.ac.in Phone: 22-25767516	Turbulence, PIV, Heat Transfer, Rarefied Gas Flows, Microfluidics)
26	Prof. Sanjeev Jain	Professor	Dept of Mechanical Engineering IIT Delhi New Delhi- 110016 E-mail: sanjeevj@mech.iitd.ac.in Phone: 11-2659 1060	Renewable energy - Solar thermal Cooling /polygeneration - Enhanced heat transf - Decentralised Energy Systems
				- Simulation and Optimization -Mind & Cognition

	Vinayak Eswaran		Mechanical Engg IIT Hyderabad Telangana- 502285 E-mail: eswar@iith.ac.in Phone no: (40) 2301 6009	Dynamics and heat transfer, Finite-volum methods for flow and heat transfer in complex geometries, Convection heat transfer, Turbulence modelling, Computation of turbulent combustion)
28	Prof. Chakravarthy Balaji	Professor	Prof. Chakravarthy Balaji Institute Chair Professor Office:Room No 205, Heat Transfer and Thermal Power Laboratory Tel: (O) : +91 44 2257 4689 Adayar Chennai-600036 Tamil Nadu, Tamil Nadu Email : balaji@iitm.ac.in	Thermal Engineering
29	Prof. Suman Chakraborty	Professor	Department of Mechanical Engineering, IIT Kharagpur 721 302, (WB), **suman@mech.iitkgp.ac.in**	Thermal Engineering
30	Prof. Sundararajan, T.	Professor	**Office**: Thermodynamics and Combustion Engineering Laboratory **Tel**: (O) **:** +91 44 2257 4683, (O) **:** +91 44 2257 4683 Adayar Chennai-600036 Tamil Nadu, **Email :** tsundar@iitm.ac.in	Thermal Engineering
31	*Prof. Premachandran, B.*	Professor	IIT Delhi Hauz Khas, New Delhi-110016, INDIA, Email *prem@mech.iitd.ac.in, Tel:+91-11-2659 1128 (O)*	Thermal Engineering

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Specialization : Manufacturing Engineering				
	Name of Experts	**Designation**	**Address of communication with contact details**	**Area of specializati**
33	Prof. P.V. Rao	Professor	Dept of Mechanical Engineering IIT Delhi Hauz Khas New Delhi-110016 E-mail: pvrao@mech.iitd.ac.in Phone: 11-2659 1443	Machining of difficult to machine materials, Grinding of Ceramics, Micro/Nano Manufacturing, Sustainable Machining.
34	Prof. Sudarshan Ghosh	Professor	Dept of Mechanical Engineering IIT Delhi Hauz Khas New Delhi-110016 E-mail: ghoshs@mech.iitd.ac.in 01126591089	Conventional machining, Surface Engineering, Sustainable Machining using nano-fluids and solid lubricants.
35	Prof. Amitava De	Professor	Dept of Mechanical Engineering IIT Bombay, Mumbai-400076 email: amit@iitb.ac.in	Welding, Joining, Additive Manufacturing, Numerical Modeling, Process simulation.
36	Prof J Ramkumar	Professor	Dept of Mechanical Engineering IIT Kanpur, UP- 208016 E-mail: jrkumar@iitk.ac.in Phone: 0512-259-7546 Mobile: +91 9451220918	Non-traditional Manufacturing processes, Micro/Nano manufacturing, tribology, manufacturing process modelling.
37	Prof. Partha Pratim Bandyopadhyay	Professor	Dept of Mechanical Engineering IIT Kharagpur-W.B-721302 Email:ppb@mech.iitkgp.ac.in Phone: 3222-282950	Surface engineering and coated materials, Thermally Sprayed coatings, Laser processing of material

	Mishra		Department of Mechanical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai, India-400076 022-25767391 sushil.mishra@iitb.ac.in	Formability and Microstructure analysis, Conventiona and incremental forming, Micro-forming, High temperature processing of Ti, Inconel, Aluminum alloy
39	Prof. Partha Saha	Professor	Dept of Mechanical Engineering IIT Kharagpur, W.B- 721302 Email: psaha@mech.iitkgp.ernet.in Phone: +91-3222-281926	Non-traditional Manufacturing, Additive Manufacturing, Laser Material Processing, Micro Manufacturing, Manufacturing Techniques for Bio-Implant
40	Prof. Shantanu Bhattacharya	Professor	Dept of Mechanical Engineering IIT Kanpur, UP- 208016 E-mail: bhattacs@iitk.ac.in Phone: 0512- 2596056	Bio MEMS, Lab on Ch Nano Technology, Microsystems Fabrication and Micro Fluids
41	Prof Ramesh Kumar Singh	Professor	Machine Tools Lab, Department of Mechanical Engineering IIT Bombay, Powai, Mumbai, 400076 ramesh@me.iitb.ac.in rsingh@iitb.ac.in Contact: 9930950219 / 022-25767507	High-speed micromachining, Flexible reconfigurabl fiber laser based materials processing, Systems integration and product development, Finite element modelling
42	Prof Sukhomay Pal	Professor	Room No. C-305, Academic Complex, Department of Mechanical Engineering, Indian Institute of Technology Guwahati, Guwahati - 781 039, Assam, India Phone: +91-361-258 2656; Email: spal@iitg.ernet.in	Welding Proce Monitoring and Contr Welding of Similar Dissimilar Materia Tool Conditi Monitc ng, Application Artificial Neu Network, Gene Algorithms and Fuz Logic in Manufacturing

	Ray		Industrial and Systems Engineering Indian Institute of Technology Kharagpur Kharagpur 721 302 India , pkr@vgsom.iitkgp.ernet.in pkr@hijli.iitkgp.ernet.in pkray2010@gmail.com pkray25@yahoo.co.in, Tel +91 3222 283742 (O) +91 3222 283743, 278181 (R) Fax +91 3222 255303/282700	Industrial Engineering
44	*Ravi Kumar, Digavalli*	Professor	IIT Delhi Hauz Khas, New Delhi-110016, INDIA, *dravi[at]mech.iitd.ac.in, Tel:+91-11-2659 1144 (O)*	Manufacturing ai production Engineerir
45	*Prof. Mamata Jenamani*	Professor	Professor Department of Industrial and Systems Engineering Indian Institute of Technology Kharagpur Kharagpur 721 302, mj@iem.iitkgp.ac.in, 91-3222-283740	Industrial engineering department
46	*Prof. Ramesh Babu, N.*	Professor	Office Room No: 106, Manufacturing Engineering Section, **Email: nrbabu@iitm.ac.in** **Tel: (O): +91 44 2257 4675**	Manufacturing and production engineering

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48	Prof. Rudra Pratap	Professor	Indian Institute of Science, Bangalore Bangalore- 560 012 E-mail: pratap@iisc.ac.in Phone 80 2293 3250	Inertial, acoustic and ultrasonic MEMS transducers, Piezo-MEMS and energy harvesting, Mechanobiology of mic and nanoscale natural (insect) transducers,

				patterning and materia transport using electromigration)
49	Dr. G K Ananthasuresh	Professor	Dr. G K Ananthasuresh Professor Department of Mechanical Engg Indian Institute of Science,	Biomechanics (Compliant mechanisms, Kinematics, Design optimization
			Bangalore Bangalore- 560 012 E-mail: suresh@iisc.ac.in Phone +91 8022932334	Microelectromechan ical systems, Biomedical devices Biomechanics, Inverse problems)
50	Dr. Sanjay Gupta	Professor	Dr. Sanjay Gupta Professor Department of Mechanical Engineering IIT Kharagpur, W.B- 721302 Email: sangupta@mech.iitkgp.ac.in Phone: +91-3222-282958	Biomechanics (Orthopaedic Biomechanics, bone remodelling, joint mechanics and replacement, customized implant design, osseointegration usin advanced numerical techniques and tissue engineering approach fracture healing prediction using in vitro and in vivo models)
51	Dr. Dhirendra S. Katti	Professor	Dr. Dhirendra S. Katti Professor, Dept of Biological Sciences and Bioengineering IIT Kanpur UP- 208016 E-mail: dsk@iitk.ac.in Phone: 0512-259-4028	Biological Sciences and Bioengineering (Tissue engineering; controlled drug delivery system; biomaterials, Manufacturing of Biodegradable polymers and scaffolds)
52	Dr. Biman B Mandal	Professor	Dr. Biman B Mandal Professor	Biosciences and Bioengineering

			Department of Biosciences and Bioengineering Biomaterial & Tissue Engineering Laboratory IIT Guwahati Guwahati - 781 039, Assam Email: biman.mandal@iitg.ac.in Phone: +91 361 258 2225	(Cell based tissue engineering and regeneration, Biomaterials, 3D Bioprinting of Human Tissues and Organs, Targeted drug delivery systems, 3D Disease Models for High Throughput Drug Screening)
53	Dr. Renu John	Professor	Dr. Renu John Professor Department of Biomedical Engg IIT Hyderabad Head and Board member Center for Health Entrepreneurship Telangana-502285 E-mail: renujohn@iith.ac.in Phone +91 8985156631	Biomedical Engineering (Novel non-invasive bio-imaging techniques, Coherence imaging and microscopy techniques, Quantitative phase Microscopy, Molecula contrast agents and Targeted molecular imaging, Biosensing and Point of care Devices, Nanoparticles, Targeted drug deliver and Biophotonics applications.)
54	Dr. Abhijit Guha	Professor	Dr. Abhijit Guha Professor Dept of Mechanical Engg, IIT Kharagpur, W.B- 721302 E-mail: a.guha@mech.iitkgp.ac.in Phone: 3222-281768	Thermal Engineering (Biological fluid dynamics, thermo-fluid-dynamics of two-phase flow, transport and deposition of particles, heat and mass transfer, gas turbine & energy, environment and computational fluid dynamics.)

55	Dr. S Ramakrishnan	Professor and Head	Dr. S Ramakrishnan Professor and Head Department of Biomedical Engineering IIT Madras Chennai-600036 Email: sramki@iitm.ac.in Phone: +914422575052	Biomedical Engineering (Application of soft computing techniques to enhance the diagnostic relevance of medical instruments and design and development of medical devices for the assessment of tissue and bone mechanics)
56	Dr. Asokan Thondiyath	Professor	Dr. Asokan Thondiyath Professor Department of Engineering Design IIT Madras Chennai-600036 Email: asok@iitm.ac.in Phone: +91 44 2257 4707	Engineering Design (Robotics (medical robots, underwater robots and mobile robots), Medical devices, Electro hydraulic Controls and Mechatronics)

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3.	Prof. T. Punniyamurthy	Professor	Department of Chemistry Indian Institute of Technology Guwahati Guwahati 781039 E-mail: tpunni@iitg.ernet.inTel. +91 361 258 2309	Organic Chemistry
4.	Prof. I N. N. Nambbothri	Professor	Department of Chemistry Indian Institute of Technology Bombay Mumbai 400 076 E-mail: irishi@chem.iitb.ac.in Mob. 9969960735	Organic Chemistry/Chemical Biology
5.	Prof. Michael Gromiha	Professor	Department of Biotechnology Indian Institute of Technology Madras Chennai-600036 E-mail: gromiha@iitm.ac.in Tel. + 91-44-2257-4138	Bioinformatics/Computational Biology
6	Prof. K. M. Muraleedharan	Professor	Department of Chemistry Indian Institute of TechnologyMadras Chennai 600036 E-mail: mkm@iitm.ac.in Mobile: 9840705203	Medicinal/Bio-Organic Chemistry
7	Dr. D. Srinivasa Reddy	Director	CSIR-Indian Institute of Integrative Medicine Jammu Canal Road Jammu-180001 E-mail: reddy.ds@iiim.res.inTel: 0191-2584999	Chemical Biology/Organic Chemistry

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8.	Prof. G. Mugesh	Professor	Inorganic & Physical Chemistry Indian Institute of ScienceBangalore 560012 Tel: +91-80-2360 2566 Email: mugesh@iisc.ac.in	Inorganic Chemistry/Chemical Biology
9.	Prof. Pradyut Ghosh	School Chair and Senior Professor	School of Chemical Sciences Indian Association for the Cultivation Of Science (IACS) E-mail: icpg@iacs.res.in Tel: +91 33 2473 4971	Inorganic/Materials Chemistry
10.	Prof. Sundargopal Ghosh	Professor	Department of Chemistry Indian Institute of Technology Madras Chennai-600036 sghosh@iitm.ac.in Tel. +91 44-22574230	Inorganic Chemistry
11.	Prof. Vibha Tandon	Professor	Special Centre for Molecular Medicine Jawaharlal Nehru University Mehrauli Road, New Delhi 110067 e-mail: vibhadelhi6@gmail.com Tel: 011-26738825	Chemical Biology/Medicinal Chemsitry
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13.	Prof. N. G. Ramesh	Professor	Department of Chemistry Indian Institute of Technology Delhi New Delhi-110016 E-mail: ramesh@chemistry.iitd.ac.in Tel: 91-11 26596584	Organic Chemistry
14.	Prof. Balaji R Jagirdar	Professor	Inorganic & Physical Chemistry Indian Institute of ScienceBangalore 560012 Tel: 91-80-2293-2825 Email: jagirdar@iisc.ac.in	Physical/Inorganic Chemistry
15	Prof. Anindya Dutta	Professor	Department of Chemistry Indian Institute of Technology Bombay Mumbai 400 076 E-mail: adutta@iitb.ac.in Tel: 22-25767149	Physical Chemistry

16	Prof. Santanu Dhara	Professor	School of Medical Science and Technology Indian Institute of Technology Kharagpur E-mail: sdhara@smst.iitkgp.ac.in Tel: 91-3222-282306	Physical Chemistry /Bio-Material
17	Prof. Pralay Maiti	Professor	School of Materials Science and Technology IIT (Bhu) Varanasi E-mail: pmaiti.mst@iitbhu.ac.in Mob. 9935141321	Physical /Materials Chemistry
18	Prof. Santanu Chattopadhyay	Professor	Rubber Technology Center, IIT Kharagpur E-mail: santanu@rtc.iitkgp.ac.in Tel: +91-3222-2821758	Physical Chemistry
19	Prof. B. Jayaram	Professor	Coordinator, School of Biological Sciences, IIT New Delhi E-mail: bjayaram@chemistry.iitd.ac.in Tel: 91-11-2659 1505	Computational and Biological Science
20	Prof. Pratik Sen	Professor	Department of Chemistry Indian Institute of Technology Kanpur Kanpur 208016 E-mail: psen@iitk.ac.in Tel. +91-512-2596312	Physical Chemistry
21	Prof. Anil J Elias	Professor	Department of Chemistry Indian Institute of Technology Delhi New Delhi-110016 E-mail: elias@chemistry.iitd.ac.in Tel: 91-11-26591504	Organometallic Chemistry
22	Prof D. Sundar	Professor	Department of Biochemical Engineering and Biotechnology Indian Institute of Technology Delhi New Delhi-110016 E-mail: sundar@dbeb.iitd.ac.in Tel: 91-11-2659 1066	Bioinformatics/System Biology
23	Prof. Prasad V Bharatam	Professor	Department of Medicinal Chemistry National Institute of Pharmaceutical Education and Research (NIPER) S.A.S. Nagar (Mohali)–160 062, Punjab e-mail: pvbharatam@niper.ac.in Tel: +91-172-2292018	Computational Biology/Molecular Modelling

24	Prof. Amitabha Das	Professor	Department of Chemical Sciences Indian Institute of Science Education and Research (IISER) Kolkata 741246 E-mail: amitava@iiserkol.ac.in Tel: +91-33-6136 0012	Inorganic/Analytical Chemistry
25	Dr. Sangita Mukhopadhyay	Staff Scientist - VII and Group Leader	Laboratory of Molecular Cell Biology (LMCB), Centre for DNA Fingerpriniting and Diagnostics, Inner Ring Road, Uppal, Hyderabad – 500039 e-mail: sangita@cdfd.org.in Tel: 91-40-27216134	Chemical Biology/Molecular Biology
26	Prof. C. Malla Reddy	Professor	Department of Chemical Sciences Indian Institute of Science Education and Research Kolkata Mohanpur 741246 E-mail: cmreddy@iiserkol.ac.in Tel:	Supramolecular /Pharmaceutical Chemistry
27	Prof. Surajit Ghosh	Professor	Department of BioScience and Bio Engineering Indian Institute of Technology Jodhpur E-mail: sghosh@iitj.ac.in Tel: 91-9903099747	Chemical Biology
28	Prof Ramakrishna Vijayacharya Hosur	Professor	Department of Chemical Sciences Tata Institute of Fundamental Research (TIFR) 1-Homi Bhabha Road, Mumbai 400 005 e-mail: hosur@tifr.res.in Tel: 91-22-2280-4545	Structural Biology and Biophysical Chemistry

29	Prof. Rajesh Gokhale	Director	National Institute of Immunology Aruna Asaf Ali Marg, New Delhi - 110067, Indiae-mail: rsg@nii.ac.in Tel: 11- 26717121	Chemical Biology/ Biological Chemistry
30	Prof Kana M. Sureshan	Professor	School of Chemistry Indian Institute of Science Education and Research (IISER) Thiruvananthapuram – 695551 E-mail: kms@iisertvm.ac.in Tel:471 – 2778064	Medicinal Chemistry/ Chemical Biology
31	Prof. Tushar Jana	Professor	School of Chemistry and University of Hyderabad Lab : S105 - S107, W110 Gurubaksh Singh Building, School of Chemistry, University of Hyderabad, Gachibowli(P.O.), Hyderabad, Telangana, 500 046. India. tusharjana@uohyd.ac.in tjscuoh@gmail.com +91 - 40 – 23134808	Polymer Chemistry
32	Prof. Sagar Pal	Professor	Department of Chemistry and Chemical Biology, IIT(ISM) Dhanbad Indian Institute of Technology (ISM) Dhanbad Jharkhand, India-826004 sagarpal@iitism.ac.in +91-326-2235769	Organic and Polymer Chemistry

33	Prof G Udaybhanu	Professor	Department of Chemistry and Chemical Biology, IIT(ISM) Dhanbad Indian Institute of Technology (ISM) Dhanbad Jharkhand, India-826004 udayabhanu@iitism.ac.in 9431124542	Physical Chemistry
34	Prof D D Pathak	Professor	Department of Chemistry and Chemical Biology, IIT(ISM) Dhanbad Indian Institute of Technology (ISM) Dhanbad Jharkhand, India-826004 ddpathak@iitism.ac.in 9431126250	Synthetic Inorganic/Organometallic Chemistry, Homo- And Hererogeneous Catalysis, Asymmetric Synthesis, Green Chemistry
35	Prof. G. Ranga Rao	Professor	Department of Chemistry, IIT Madras KCL 106, Department of Chemistry Indian Institute of Technology Madras, Chennai grrao@iitm.ac.in +91-44-2257-4226	Electro Catalysis, Nanostructured Materials, Energy devices

36	Prof N Munichandraiah	Professor	Room No: B 014 Department of Inorganic and Physical Chemistry Indian Institute of Science Bangalore 560 012, India muni@iisc.ac.in 080 2293 3183	Electro Catalysis, Nanostructured Materials, Energy devices
37	Prof Y C Sharma		IIT BHU, HOD Dept. of Chemistry vsharma.apc@iitbhu.ac.in 9935616119	Renewable Energy and Bio-fuels, Development and characterization of heterogenous catalysts, Synthesis of nanoadsorbents
38	Prof Ashok K Ganguli	Professor	Department of Chemistry, Indian Institute of Technology, Delhi Hauz Khas, New Delhi-110016, India ashok@chemistry.iitd.ac.in +91-11-26591511	Nanomaterials
39	Prof. Krishnaveni Mishra,	Professor	Dept. of Biochemistry, School of Life Sciences, University of Hyderabad, Hyderabad- 500046 India krishnaveni@uohyd.ac.in kmsl.uohyd@nic.in + 91 40 23134544	Biochemistry, Molecular and Cellular Biology : Genome organization and inter-organelle communication

40	Prof. H.A.Nagarajar am	Professor	Dept. of Systems and Computational Biology, School of Life Sciences, University of Hyderabad, Hyderabad- 500046 India hansl@uohyd.ac.in 040-23134561	Computational Biology, Bioinformatics
41	Prof. T. P. Singh	Professor	SERB Distinguished Fellow Department of Biophysics AIIMS tpsingh.aiims@gmail.com	Biophysics/ Drug Discovery/ Protein Structure Determination and Peptide Design; Protein Structure Determination and Peptide Design
42	Prof. Pawan K. Dhar	Professor	School of Biotechnology Jawaharlal Nehru University. New Mehrauli Road, New Delhi 110067. pawandhar@mail.jnu.ac.in, pawan.dhar@outlook.com	Bioinformatics/ Computational Biology; Synthetic Biology applications in health, energy and environment
43	Prof. Suresh Rayala	Professor	Department of Biotechnology, Bhupat and Jyoti Mehta School of Biosciences, Indian Institute of Technology Madras, Chennai 600036,India. rayala@iitm.ac.in +91-44-2257-4137	Biotechnology; Developing small molecules/peptide therapeutics
44	Prof. Attipalli R. Reddy	Professor	Prof. MNV Prasad, Department of Plant Sciences, School of Life Sciences, University of Hyderabad arrsl@uohyd.ernet.in 9849630115	Carbon sequestration ; Biofuels

45	Prof. Jayaram B.	Professor	Professor of Chemistry, Coordinator, Supercomputing Facility for Bioinformatics and Computational Biology & Coordinator, School of Biological Sciences, Indian Institute of Technology, Hauz Khas, New Delhi-110016, India. bjayaram@chemistry.iitd.ac.in; bjayaram@scfbio-iitd.res.in +91-11-2659 1505; 2659 6786	Biocomputing; Computational Chemistry and Biology; Bio-molecular Modeling, Simulation and Drug Design
46	Prof. Mukesh Doble	Professor	Department of Biotechnology, Indian Institute of Technology, Madras, Chennai, Tamil Nadu, India – 600036 mukeshd@iitm.ac.in +91-44-2257-4107	Biochemistry and Molecular Biology; Biostatistics and Six Sigma, Bioreactors, Drug Design, Biomaterials and Bioflim, Scale up, Chemical process, Molecular modelling and Bioinformatics.
47	Prof. Biswajit Chowdhury	Professor	Department of Chemistry and Chemical Biology, IIT(ISM) Dhanbad Indian Institute of Technology (ISM) Dhanbad Jharkhand, India-826004 biswajit72@iitism.ac.in	Heterogeneous Catalysis, Photocatalysis, CO2 Mitigation, Biomass. Biofuel, Hydrogen Production And Utilization, Nanomaterials
48	Prof Mahendra Yadav		Department of Chemistry and Chemical Biology, IIT(ISM) Dhanbad Indian Institute of Technology (ISM) Dhanbad Jharkhand, India-826004 mahendra@iitism.ac.in 9431711185	Corrosion Science, Electrocatalysis, Hydrogen Energy

Mathematics

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1	Prof Bimal Roy	Professor	Combinatorics and Cryptography	Applied Statistics Unit, Indian Statistical Institute, Kolkata 700108	bimal@isical.ac.in	022-2575 280	Pure Mathematics, Theoretical Computer Science
2	Prof. Sudhir R. Ghorpade	Professor	Algebriac Gemoetry and Coding Theory	Department of MathematicsIndian Institute of Technology Bombay, Powai Mumbai-400076	srg@math.iitb.ac.in	022-2576 7470	Pure Mathematics, Theoretical Computer Science
3	Prof. U. K. Anandavardhanan	Professor	Number Theory	Department of MathematicsIndian Institute of Technology Bombay, Powai Mumbai-400076	anand@math.iitb.ac.in	022-2576 7433	Pure Mathematics
4	Prof. R. K. Sharma	Professor	Algebra and Cryptography	Department of MathematicsIndian Institute of Technology New Delhi 110016	rksharma@maths.iitd.ac.in	011-2659 1480	Pure Mathematics, Theoretical Computer Science
5	Prof. Kotyada Srinivas	Professor	Number Theory	The Institute of Mathematical Sciences,CIT Campus Taramani, Chennai 600 113	srini@imsc.res .in	044-2254 3215	Pure Mathematics

6	Prof. Mohua Banerjee	Professor	Rough Set Theory and its Applications, Modal Logics	Department of Mathematics& Statistics Indian Institute of Technology KanpurKanpur-208 016	mohua@iitk.ac.in	9450494555	Pure Mathematics, Theoretical Computer Science

7	Prof. Sukata Pati	Professor	Matrices and Graphs	Department of Mathematics, IIT Guwahati, Guwahati-781039, India	pati@iitg.ac.in	0361-258 2607	Pure Mathematics, Theoretical Computer Science
8	Prof. Satya Deo	NASI Senior Scientist	Algebraic and Differential Topology	Harish-Chandra ResearchInsitute Chhatnag Road, Jhunsi,Allahabad - 211019	sdeo@hri.res.in sdeo94@gmail.com	9415309323	Pure Mathematics
9	Prof. M. Thamban Nair	Professor	Applicable Functional Analysis: Spectral Approx., Operator Eqns.	Department of Mathematics, Indian Institute of Technology, MadrasChennai - 600 036	mtnair@iitm.ac.in	044-2257 6610/ 2257 0474	Pure Mathematics
10	Prof. P. Sankaran	Professor	Algebraic groups and Representation theory, Transformation groups	Chennai Mathematical Institute 92 G N ChettyRoad Chennai 600 017	sankaran@cmi.ac.in	044- 8284232	Pure Mathematics
11	Prof. G. P. Raja Sekhar	Professor	Boundary Integral Methods, Singularity Methods for Viscous Flows	Department of Mathematics, IIT, Kharagpur (WB), 721302	rajas@iitkgp.ac.in	0322-2283684	Applied Mathematics
12	Prof. Satyajit Roy	Professor	Computational Fluid Dynamics, Convective Heat& Mass Transfer.	Department of Mathematics, IIT Madras,Chennai, Tamil Nadu 600036	sjroy@iitm.ac.in	044-22574617	Applied Mathematics

13	Prof. Neela Natrajan	Professor	Numerical Analysis, Finite Element Methods	Department of Mathematics, IIT BombayPowai, Mumbai, Maharashtra 400076	neela@math.iitb.ac.in	022-25767468	Applied Mathematics

14	Prof. B. V. Rathis Kumar	Professor	Numerical Methods for PDEs, Computational Fluid Dynamics, Finite Element Analysis.	Department of Mathematicsand Statistics, IIT Kanpur, Kalyanpur, Kanpur, Uttar Pradesh 208016	bvrk@iitk.ac.in	0512-2597660	Applied Mathematics
15	Prof. Govinda Rangarajan	Professor	Non Linear Dynamics	Department of MathematicsIndian Institute of Science Bangalore 560 012 INDIA	govindan.rangarajan@gmail.com , rangaraj@iisc.ac.in	8022932265	Applied Mathematics
16	Prof. A. S. Vasudeva Murthy	Professor	Numerical Analysis of PDEof Evolutionary Type, Mathematical Modelling of Atmospheric Phenomenon	Centre for Applicable Mathematics, TIFR Bangalore, Karnataka 560065.	vasu@math.tifrbng.res.in	08066953737	Applied Mathematics
17	Prof. S. Mukhopadhyay	Professor	Applied Mathematics, Mathematical Modelling, Non-Fourier Heat Conduction.	Department of Mathematical Sciences, IIT(BHU), Varanasi, (UP),221005	mukhosant.apm@iitbhu.ac.in, mukho_santwana@rediffamil.com	9453358562	Applied Mathematics

18	Prof. Natesan Srinivasan	Professor	Computational Fluid Dynamics, Numerical Solution of Singular Perturbation Problems, Finite Difference and Finite Element Methods.	Department of Mathematics, IIT Guwahati, Guwahati,Assam 781039	natesan@iitg.ernet.in	0361-258 2650	Applied Mathematics

19	Dr. R.V. Ramanan	Scientist H	Orbital mechanics (Space Mission Design, Trajectory design).	Dept. of Aerospace Engineering, Indian Institute of Space Science and Technology, Thiruvananthapuram, Valiamala Road, Valiamala, Kerala 695547	rvramanan@iist.ac.in	9446567528	Applied Mathematics ,Aerospace engineering
20	Prof. Maithili Sharan	Professor	Computational Fluid Dynamics, Numerical meth ods, Finite Difference and Finite Element Methods. Mathematical Modeling,	Indian Institute of Technology, Delhi, Hauz Khas, New Delhi, Delhi 110016	mathilis@cas.iitd.ac.in	9446567528	Applied Mathematics
21	Prof. Neeraj Misra	Professo r(HAG)	Ranking and Selection Problems and Related Estimation Problems	Dept. of Mathematics andStatistics, IIT Kanpur Kanpur- 208 016	neeraj@iitk.ac.in	9450351936; 0512-2597087	Statistics
22	Prof. Debasis Kundu	Professo r(HAG)	Statistical Signal Processing, Nonlinear Regression, Reliability and Survival Analysis	Dept. of Mathematics andStatistics, IIT Kanpur Kanpur- 208 016	kundu@iitk.ac.in	0512-2597141	Statistics

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24	Prof. Rahul Mukerjee	Professo r(HAG)	Design of Experiments, Asymptotic Theory, Survey Sampling	Operations ManagementGroup, IIM Calcutta West Bengal 700104	rmuk@iimcal.ac.in rmuk0902@gmail.com	033-24678300; 033-24678301	Theoretical and Applied Statistics
25	Prof. Probal Chaudhuri	Professor	Statistical Methods in Pattern Recognition and Image Analysis	Theoretical Statistics andMathematics Unit, ISI Kolkata West Bengal 700108	probal@isical.ac.in	033-25753414; 033-25753400	Statistics
26	Prof. Mahendra Prasad Biswal	Professor and Head	Operations Research & Mathematical Programming Problems, Stochastic Programming	Dept. of MathematicsIIT Kharagpur Kharagpur- 721302	mpbiswal@maths.iitkgp.ac .In	03222-283642	Operations Research
27	Prof. Sanjeet Singh	Professor	Mathematical Programming, Bilevel Programming, Fuzzy Optimization	Indian Institute of Management Lucknow, Prabandh Nagar, IIM RoadLucknow-226013, India	sanjeet@iiml.ac.in	0522-666009	Operations Research
28	Prof. S.K. Neogy	Professor and Head	Matrix Analysiswith applications in Optimization theory, Special matrices, Complementarit y Problem	Statistical Quality Controland Operations Research Unit, ISI Delhi, S. J. S. Sansanwal Marg, New Delhi, Delhi 110016	skn@isid.ac.in	011-41493966	Operations Research

29	Prof. Niladri Chatterjee	Professor	Machine Translation, Artificial Intelligence, Statistical	Department of Mathematics, IIT Delhi,Hauz Khas, New Delhi-110016	niladri@maths.iitd.ac.in	011-26591490	Statistics, Theoretical Computer Science

			Modelling and Semantic web				
30	Prof. Rajani R Joshi	Professor	Bioinformatics, Biostatitstics, Statistical Data Mining	Department of Mathematics, IIT Bombay Powai, Mumbai, Maharashtra 400076	rrj@maths.iitb.ac.in	022-2576 7485	Statistics, Theoretical Computer Science
31	Prof. Venkatesh Raman	Professor	Parameterize dcomplexity, graph algorithms	The Institute of Mathematical Sciences(IMSc), CIT Campus Taramani, Chennai 600 113	vraman@imsc.res.in	044-22543220	Theoretical Computer Science
32	Prof. PVSN Murthy	Professor	Bio-Fluid Mechanics, Convective Transport in Porous Media	Department of Mathematics, IIT Kharagpur, Prof. P.V.S.N. Murthy Professor Department of Mathematics Indian Institute of Technology Kharagpur West Bengal 721302	pvsnm@maths.iitkgp.ac.in,	Phone. +91-94340 26966	
33	Prof. Thirupati Gudi	Professor	Numerical Analysis, Partial Differential Equations	Department of Mathematics, IISc Bangalore Prof. ThirupathiGudi Professor Department of	gudi@iisc.ac.in	+91-8095952365	

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34	Prof. SubramanyaSastryChalla	Professor	Wavelets, Inverse Problems, Sparsity seeking optimization techniques and its applications in machine learning	Department of Mathematics, IIT Hyderabad Prof. SubramanyaSastryChalla Professor Department of Mathematics, IIT Hyderabad PIN: 502285,	csastry@math.iith.ac.in	+91-9963128002	
35	Prof. Balasubramania mJayaram	Professor	Connectives in Multivalued-Logic, Approximate reasoning, Issues in High Dimensional Data Analysis	Department of Mathematics, IIT Hyderabad, Prof. BalasubramaniyamJayaram Professor Department of Mathematics, IIT Hyderabad PIN:502285	jbala@math.iith.ac.in	+91-8008441461	

36	Prof. A K B Chand	Professor	Fractal Interpolation, Shape Preserving Interpolation, Geometric Modelling, Fractal Approximation, Wavelets	Department of Mathematics, IIT Madras, Prof. A.K.B Chand, Chennai - 600036, INDIA	chand@iitm.ac.in	+91-9444845583	
37	Prof. S R Manam	Professor	Differential and Integral Equations, Wave-Structure Interactions	Department of Mathematics, IIT Madras, Prof. S R Manam, Department of Mathematics, IIT Madras , Chennai - 600036, INDIA	manam@iitm.ac.in	+91-9884442476	
38	Prof. Natesan Srinivas	Professor	Numerical Analysis and Computational Fluid Dynamics	Department of Mathematics, IIT Guwahati, 781039, INDIA,	natesan@iitg.ac.in	+91-9101891646	
39	Prof AparnaMehra	Professor	Optimization Theory	Department of Mathematics, IIT Delhi, Haus Kha, New Delhi 110016, INDIA,	apmehra@maths.iitd.ernet.in	+91-9818368250	

40	Prof V Vetrivel	Professor	Topics in nonlinear analysis, non-smooth analysis and applications to non-smooth optimization, Variational inequality problems, complementarity problems, fixed point theory	Department of Mathematics, IIT Madras , Chennai - 600036, INDIA	vetri@iitm.ac.in	+91-9884000612	
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42	Prof. Akhilesh Prasad	Professor	Pseudo-Differential Operators, Wavelets, Distribution Theory	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	aprasad@iitism.ac.in	9431711231	

43	Prof G N Singh	Professor	Sample Surveys, Missing Data Analysis, Data Analysis	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	gnsingh@iitism.ac.in	9431711004	
44	Prof. Mritunjay Kumar Singh	Professor	Groundwater modelling	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	drmks29@iitism.ac.in	9431125817	
45	Prof. Ranjit Kumar Upadhyay	Professor	Differential Equations, Mathematical Modeling, Chaotic Dynamics And Dynamical System Theory	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	ranjitupadhyay@iitism.ac.in	9431126485	
46	Prof. S. P. Tiwari	Professor	Topology, Category Theory And Fuzzy Automata Theory	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	sptiwari@iitism.ac.in	9431711226	

47	Prof. Shishir Gupta	Professor	Theoretical Seismology	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	shishir@iitism.ac.in	9431725281	
48	Prof. Subhashis Chatterjee	Professor	Software Reliability, Web Software Reliability, Algorithm	Department of Mathematics and Computing, IIT (ISM), Dhanbad 826004	subhashis@iitism.ac.in	9431126486	

ELECTRICAL ENGINEERING

Suggested Panel of Experts in the field of Power System Engineering

Sl. No.	Experts	Designation/Affiliation	Area of Specialization	Complete Postal Address with Pin Code	Email address	Official Website Link and Mobile No.
1.	Saikat Chakrabarti	Professor Department of Electrical Engineering Indian Institute of Technology Kanpur	Power system state estimation ;• Power system dynamics and stability ; Modelling of power system loads ;;Smart grid • Microgrid ; Application of synchronized measurement technology to power systems	Department of Electrical Engineering Indian Institute of Technology Kanpur 208016 India	saikatc@iitk.ac.in	+91-512-2596598
2.	S.N. Singh	Professor (HAG) , Department of Electrical Engineering , IIT, Kanpur	Power System Dynamics, Operation and Control, Power System Restructuring	Department of Electrical Engineering, Indian Institute of Technology Kanpur, 208016 (U.P.) India	snsingh@iitk.ac.in, snsingh93@gmail.com	http://www.iitk.ac.in/ Mobile: +91-9450605039 Phone: +91-551-2273958, +91-8765783730,
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4.	A. K. Pradhan	Professor, Department of Electrical Engineering Indian Institute of Technology, Kharagpur	Machine Learning Applications to Power System Protection, Control and Monitoring, Power System Relaying and Monitoring, Wide Area Measurement Technology	Room No: N-218, Electrical Engineering Department, IIT Kharagpur, WB 721302, India.	akpradhan@ee.iitkgp.ac.in Alternate Email: pradhan.ashok@gmail.com	http://www.facweb.iitkgp.ac.in/~akpradhan/akpradhan.html Ph (O): +91 – 3222 - 283098
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8.	Sukumar Mishra	Professor, Department of Electrical Engineering Indian Institute of Technology, Delhi	Power System Engineering, Intelligent Techniques for Control of Power System and Power Quality Studies, Renewable Energy	Department of Electrical Engineering, Indian Institute of Technology, Delhi, II/217, Hauz Khas, New Delhi 110 016, India	sukumar@ee.iitd.ac.in	http://www.iitd.ac.in/15 Mobile: +91-1126591074
9.	R. K. Saket	Professor, Department of Electrical Engineering, IIT (BHU).	Reliability Engineering, Power System Reliability, Reliability Aspects of SEIG/DFIG, Reliability Enhancement of Electrical Machines & Drives, Micro Hydro Power Generation System, Renewable Energy Applications, Control System Design.	Department of Electrical Engineering, IIT (BHU), Varanasi-221005, (UP) India.	rksaket.eee@iitbhu.ac.in, drrksaket@gmail.com	https://www.old.iitbhu.ac.in/eee/index.php/peo/faculty/31-rksaket.html Mob.+91-9451067022, 9889848412 Ph. (O): 0542-6702837, 6702934, 2368727, 2307033
10.	Rakesh Kumar Mishra	Professor Department of Electrical Engineering, IIT (BHU) Varanasi	Power Systems Operations & Control, Applications of Computational Intelligence in Power Systems	Department of Electrical Engineering, IIT (BHU) Varanasi	rkmishra.eee@iitbhu.ac.in	0542-2368727
11.	D Das	Professor, Electrical Engineering, Indian	Distribution Systems, Microgrid, Distributed Generation	IIT, Kharagpur N-249, Electrical Engineering Department	ddas@ee.iitkgp.ernet.in	http://www.iitkgp.ac.in/department/EE/faculty/ee-ddas

		Institute of Technology, Kharagpur		India-721302		09593400350(M) Phone (office) +91 – 3222 – 283042
12.	Praveen Kumar	Professor Department of Electrical Engineering, IIT Guwahati	Optimization of electrical motors and drives; State of the art algorithm development for Multi-objective optimization and Simulation; and design of electrical motors and actuators using Finite Element Methods	Room No. 001, EEE Department, IIT Guwahati, Guwahati-781039, INDIA	praveen_kumar@iitg.ernet.in	Phone: +91-361-258-2525 (Office)
13.	L. Satish	Professor Department of Electrical Engineering, IISc, Bngalore	Studies on transformer windings, Frequency response analysis, Fault localization Testing of high-speed high-resolution ADCs	Room 210 High Voltage Laboratory, Department of Electrical Engineering, IISc, Bngalore	satish@iisc.ac.in	Phone: +91 80 2293 3175
14.	R. Sarathi	Professor Department of Electrical Engineering, IIT-Madras	Condition Monitoring of power apparatus, influence of space charge on breakdown process in nanocomposites and elastomers, Fault diagnosis in transformers using Acoustic emission and, Fractal Modeling and Simulation of Treeing in electrical Insulation	Department of Electrical Engineering [ESB - 347] IIT Madras	rsarathi@iitm.ac.in sarathi@ee.iitm.ac.in	Phone: +91 - 44 – 22574436 Mobile: +91 - 9444246436
15.	N. Gupta	Professor Department of Electrical Engineering, IIT-Kanpur	High Voltage Engineering, dielectric and Insulation, Plasma and gas discharges, Field estimation.	Department of Electrical Engineering, IIT Kanpur UP, India-208016	ngupta@iitk.ac.in	Phone: +91-0512-259-7511

Suggested Panel of Experts in the field of POWER ELECTRONICS, ELECTRICAL MACHINES & DRIVES

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16.	K. Gopakumar	Professor, Department of Electronic Systems Engineering (formerly CEDT), Indian Institute of Science (IISc).	Power electronics, Electric drives, Electrical Machines.	Department of Electronic Systems Engineering (formerly CEDT), Indian Institute of Science (IISc), Bangalore 560012.	kgopa@iisc.ac.in	http://kgopakumar.dese.iisc.ac.in/ Ph. +91 80 23600810 Ext 234 (off.) Mob. +91-9448227853
17.	B. G. Fernandes	Professor, Department of Electrical Engineering, IIT Bombay.	Inverter topologies for VAr compensation, Power electronic interfaces for non-conventional energy sources, Permanent magnet machines for wind power generation, Switched reluctance machines for electric vehicle application.	Department of Electrical Engineering, IIT Bombay, Powai, Mumbai 400 076, India.	bgf@ee.iitb.ac.in	https://www.ee.iitb.ac.in/wiki/faculty/bgf Ph. +91-22-2576 7428
18.	Kishore Chatterjee	Professor, Department of Electrical Engineering, IIT Bombay.	Utility friendly converter topologies, Power Factor Correction techniques, STATCOM, Switched Mode Rectifiers, Electronic Ballast, Control of Electric Drives.	Room no. 032, Ground Floor, Department of Electrical Engineering, IIT Bombay, Powai, Mumbai 400 076, India.	kishore@ee.iitb.ac.in	https://www.ee.iitb.ac.in/web/people/faculty/home/kishore#researchinterest Ph. +91-22-2576-7472
19.	R K Srivastava	Professor, Department of Electrical Engineering, IIT (BHU).	Linear Induction Motor Electromagnetics	Department of Electrical Engineering, IIT (BHU), Varanasi-221005.	rksri_itbhu@yahoo.com , rksrivastava.eee@itbhu.ac.in	https://www.old.iitbhu.ac.in/eee/index.php/peo/faculty/26-rks.html Ph. +91-9839082961
20.	Shyama Prasad Das	Professor, Department of Electrical Engineering, IIT Kanpur.	Power electronics, Electric drives, Electrical Machines, Microprocessor systems & Instrumentation.	WL 111B, Department of Electrical Engineering, Indian Institute of Technology, Kanpur UP, India-208016	spdas@iitk.ac.in	http://www.iitk.ac.in/new/shyama-prasad-das Ph. +91-512-259-7106
21.	Krishna Vasudevan	Professor, Department of Electrical Engineering, IIT Madras.	Power Conversion and control for renewable energy, Motor drives.	Department of Electrical Engineering, IIT Madras, Chennai-600 036, India	krishna@ee.iitm.ac.in krishna.vasudevan@ieee.org	http://www.ee.iitm.ac.in/user/krishna/ Ph. +91-44-22574428
22.	Debaprasad Kastha	Professor, Department of Electrical Engineering, IIT Kharagpur.	Machine Drives, Wind Power Generation, Switched Mode Power Converters, Power Converters for DC micro grid.	Department of Electrical Engineering, IIT Kharagpur, Kharagpur, India - 721302	kastha@ee.iitkgp.ac.in	http://www1.iitkgp.ac.in/fac-profiles/showprofile.php?empcode=aVmUV

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24.	Satya P. Srivastava	Professor, Department of Electrical Engineering, IIT Roorkee.	Electric Machines and Drives.	Department of Electrical Engineering, Indian Institute of Technology Roorkee, Roorkee (India)-247667.	satyafee@iitr.ac.in	https://www.iitr.ac.in/departments/EE/pages/People+Faculty+satyafee.html Ph. +91-1332-285583

Suggested Panel of Experts in the field of Control System Engineering

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27.	Indra Narayan Kar	Professor, Department of Electrical Engineering, Indian Institute of Technology	Control Systems	**Office Address :** Room No. II/322,IIT Delhi Phone : +91 11 26591093	ink@ee.iitd.ac.in	http://web.iitd.ac.in/~ink/ Tel : +91-11-26591093

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2	Prof. Suryanarayana Doolla	Professror Dept. of Energy Science & Engineering, IIT Bombay	Smartgrids, Microgrids, Converter topologies and control, Grid integration of distributed energy resources.	Dept. of Energy Science & Engineering IIT Bombay Mumbai 400076 Office: Room. No-4, Old Stationery	suryad@iitb.ac.in	https://www.ese.iitb.ac.in/~suryad/ +91 22- 2576- 7872

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3	Prof. B. Kalyan Kumar	Professor, Electrical Engineering, IIT Madras	Wind power generation, Restructured power systems	ESB 349B, Department of Electrical Engineering, IIT Madras, Chennai-600 036	bkalyan@iitm.ac.in	https://sites.google.com/ee.iitm.ac.in/kalyan-kumar-b/home 044 2257 4446 (office)
4	Prof. Siva Kumar K	Professor Electrical Engineering, IIT Hyderabad	Multilevel inverters, Pole Phase Modulated Electric Drives, Microgrid, Power Quality and Control	Department of Electrical Engineering, IIT Hyderabad, Kandi, Sangareddy - 502285, Telangana, India.	ksiva@ ee.iith.ac.in	https://people.iith.ac.in/ksiva/+91-4023016459
5	Prof. Chandan Chakraborty	Professor, Department of Electrical Engineering, IIT Kharagpur	power converters, industrial drives and renewable energy integration.	Electric Drives Laboratory, Department of Electrical Engineering, IIT Kharagpur, Kharagpur-721302	cc@ee.iitkgp.ac.in	http://www.facweb.iitkgp.ac.in/~chandan/ +91-3222-283096 (Office)

Department of Petroleum Engineering and Earth Sciences Engineering

Petroleum Engineering

Sl No.	Name of Expert, with complete address	Area of Specialization
1.	**Prof. Anugrah Singh**, Department of Chemical Engineering, IIT Guwahati, Guwahati 781039 Email: anugrah@iitg.ac.in, Phone: +91 361 258 2251/2259	Multiphase Flow (PetroleumProduction Operation)
2.	**Mr. Omkarnath Gyani,** Asset Manager ONGC, KDM Bhavan, ONGC, Mehsana Asset, Palavasana, Mehsana-384003 Mob.:+91-9969220086,E-mail-gyani_omkarnath@ongc.co.in.	**Expertise:** Petroleum Reservoir Engineering and Field Development
3.	**Mr. Pradip Kumar Mishra, Ex-Executive Director,** Institute of Drilling technology (IDT),ONGC, Dehradun -248195, Mob.: +91 99692 23183, E-mail: mishra_pk@ongc.co.in.	**Expertise:** Drilling Engineering
4.	**Dr. Ravi Raman** ED-HOI, Institute of Oil and Gas Production Technology, ONGC, Phase-2, Panvel, Navi Mumbai - 410221 E-mail-**ravi raman_ravi@ongc.co.in**, Mob.- **9969227143**	**Expertise:** Petroleum Production, Operation and Safety
5.	**Prof. G. Suresh Kumar**, Department of Ocean Engineering IIT Madras, Chennai - 600036 Email: gskumar@iitm.ac.in Phone: 91 44 22574814	Enhanced oil recovery (production operation)
6.	**Prof. K K Pant**, Department of Chemical Engineering, IIT Delhi, Email: kkpant@chemical.iitd.ac.in Phone: +91 11 2659 6172	Oil & Gas Processing
7.	**Prof. Vinay Juvekar**, Department of Chemical Engineering, IIT Bombay Email: vaj@che.iitb.ac.in Phone: +91 (22) 2576 7236	Flow assurance (Petroleum Production Operation)
8.	**Prof. Jitendra Sangwai,** Department of Ocean Engineering IIT Madras, Chennai 600036 Email: jitendrasangwai@iitm.ac.in Phone: +91 44 2257 4825	Petroleum Production Operation

9.	**Prof. S. Nallayarasu**, Department of Ocean Engineering IIT Madras, Chennai 600036Email: nallay@iitm.ac.in Phone: +91-44-2257 4819	Offshore and Pipelines
10.	**Mr. Om Prakash Sinha**, ED-Head IRS ONGC, IRS, Chandkheda Ahmedabad-380005Telephone: 079-23291704 E-MAIL ID : sinha_omprakash@ongc.co.in	Petroleum Production Engineering, Enhanced Oil Recovery
11.	**Dr. P S R Prasad**, Senior Principal Scientist, NGRI Uppal Road Hyderabad, Hyderabad - 500007 Email: psrprasad@ngri.res.in Phone: 04027012710	Unconventional Energy Resources
12.	**Prof. Sudarsan Neogi**, ***Professor***, Chemical Engineering, IIT-Kharagpur, Kharagpur-721302, WB. Mob.: +91 9474618791, Email: sneogi@che.iitkgp.ernet.in	Surface Science and Engineering; Modeling and Simulation of Chemical Process Plants; Environmental Pollut Control; PolymerComposites
13.	**Dr. Vinod A. Mendhe**, CIMFR Dhanbad, Dhanbad n-826015 Email: avmendhe@yahoo.com, vamendhe@gmail.com Phone: +91-0326 -2296027/28/29/4352	Non-conventional Gases
14.	**Prof. S K Bhattacharya**, Department of Ocean Engineering IIT Madras, Chennai 600036Email: skbh@iitm.ac.in Phone: +91-44-2257 4803	Offshore Engineering
15.	**Prof. (Mrs.) Subrata Borgohain Gogoi,** Department of Petroleum Technology, Dibrugarh University of Engineering and Technology, School of Earth, Dibrugarh - 786004Email: subrata@dibru.ac.in Phone: +91 9435039590	Petroleum Production Operation
16.	**Dr. P. K. Bhattacharya,** Professor, Department of Chemical Engineering, Indian Institute of Technology Kanpur, Kalyanpur-208016; E-mail- pkbhatta@iitk.ac.in, Mob -9450500915	Expertise: Membrane Separations; Environmental Pollution; Process Modeling
17.	**Dr. Shirsendu De,** Professor, Chemical Engineering, IIT-Kharagpur, Kharagpur-721302, WB. Mob.: +91-9434017363, Email: sde@che.iitkgp.ernet.in	**Expertise:**Membrane separations; Transport Processes; Flow throughmicro channels.

18.	**Dr. S. Pushpavanam** Professor, Institute Chair Chemical Engineering Department, IIT, Madras CHL 211, 044-22574161 Email: spush@iitm.ac.in	**Expertise:**Hydrodynamic stability, Nonlinear dynamics, Micro fluidics, Energy: Production and efficient utilization, Green engineering, eco-chemistry and kinetics for sustainability, Flow visualization
19.	**Ashok N. Bhaskarwar** Professor Chemical Engineering Department, IIT, Delhi Block II -285, Phone: +91 11 2659 1028 Email: ashoknb@chemical.iitd.ac.in	**Expertise:** Chemical Reaction Engineering, Interfacial Engineering, Chemical Product Design, Pollution-preventing technologies (inks, paints and fuels), Nanotechnology platformsfor effective and safe cancer diagnostics and therapeutics
20.	**Professor K KESAVA RAO** Chemical Engineering Department, IISc Bangalore Phone (Off) : +91-80-2293 2341 Phone (Res) : +91-80-2341 2695 Email : kesava@iisc.ac.in	**Expertise:** Granular Flow; Thermodynamics, Water treatment
21.	**Prof. Suddhaswata Basu** Director, CSIR-Institute of Minerals & Materials Technology (IMMT) Bhubaneswar - 751 013 (Professor on lien of Chemical Engineering, IIT Delhi) E-mail: dir@immt.res.in; sbasu@iitd.ac.in; +91-67425 67126, +91-67423 79401.	**Expertise:** Material development for electrochemical storage for renewable energy system: Fuel Cell PEMFC, SOFC, Hydrogen generation, Na-ion Battery, Super-capacitor; Interfacial &Electro-Chemical Eng. and Micro- Fluid Mechanics and their application in artificial photosynthesis, CO2 reduction to chemical fuel and Bio- sensing.
22.	**Dr. Raghunathan Rengasamy** Professor, Institute Chair Chemical Engineering Department,IIT, Madras HSB 150C, 044-22574159 Email: raghur@iitm.ac.in	**Expertise:** Fuel Cell Technology, Energy Systems, Systems Biology, Multiscale Modeling and Optimization, Process Fault Diagnosis
23.	**Dr. Sunando Dasgupta** Professor Chemical Engineering Head, Advanced Technology Development Centre Contact sunando@che.iitkgp.ac.in +91-3222-283922	**Expertise:** Microfluidics, Microscale Transport Processes, Interfacial Phenomena

24.	**Prof. A. S. K. Sinha**, ***Director***, Rajiv Gandhi Institute of Petroleum Technology, (RGIPT), Bahadurpur, Mukhetia More, Post: Harbanshganj,Jais Amethi-229304, UP, Mob. +91 9335660220, Email: asksinha.che@iitbhu.ac.in	**Expertise:** Photocatalysis for Water Splitting and Pollution Control, Conversion ofMethanol to Hydrocarbons, Hydrogen Fuel Cell, Heterogeneous Process for Biodiesel Production, Catalytic Cracking of Methane, Production, Storage and Uses of Hydrogen, Nanomaterials, Functionalization ofCarbon Nanotubes.
25.	**Dr. Goutam Deo**, ***Professor***, Chemical Engineering, IIT Kanpur, Kalyanpur-208016, UP. Mob.: +91 99360 55437, Email: goutam@iitk.ac.in	**Expertise:** Catalysis and reaction engineering; Supported metal and metal oxide catalysis: synthesis, characterization and reactivity; Reaction kinetics
26.	**Dr. Rajdip Bandopadhyaya,** Professor,Department of Chemical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400 076. E-mail: rajdip@che.iitb.ac.in; Mob. 9969451715	**Expertise:** Nanomaterials: Nanoparticles, porous materia nanotubes, thin films; Colloid and Interfacial Science: Self-assembly, surfactants; Nanocomposites: Silica-polymer, polymer-nanotube, silica-nanoparticle; Mathematical modeling: Population balance, Monte Carlo simulation; Aerosols: Measurement, simulation
27.	**P. S. Ghoshdastidar** (PhD, University of South Carolina) Professor FB 358 (Faculty Building) 0512-259-7019 (O) E-mail: psg@iitk.ac.in Personal homepage	Computational Heat Transfer, Rotary Kiln modelling, Non-Newtonian Flowand Heat Transfer, Simulation of Boiling Heat Transfer, Heat transfer innanofluids, Electronic & optonic cooling.
28.	**Anindya Sarkar** Professor Geology and Geophysics Head: Deysarkar Centre of Excellence in Petroleum Engineering Email: anindya@gg.iitkgp.ac.in +91-3222-283392	Petroleum Geology
29.	**Dr. Suryendu Dutta** Professor Department of Earth Sciences IIT Bombay Phone : +91-22-2576 7278 Email: s.dutta@iitb.ac.in	Petroleum Geology

30.	**Dr. Pratul Kumar Saraswati** Professor Department of Earth Sciences Phone : +91-22-2576 7268 Email: pratul@iitb.ac.in	Petroleum Geology
31	**Prof T Kumar** Professor Petroleum Engineering, IIT (ISM) Dhanbad, Email: tkumar2002@yahoo.com Mobile Number: 9732025025; 8051088444	Petroleum Production and Reservoir Engg, Optimization of Petroleum Production, Formation Damage Modeling and Evaluation, Testing and Evaluation of Oil, Gas and CBM Resources, Oil and Gas Field Development, Petroleum Production Problems Related to Oilfield Emulsions, Scale and Corrosion, Paraffin, Sand Control, Acidizing and Hydraulic Fracturing
32	**Prof Sukumar Laik** Professor Petroleum Engineering, IIT (ISM) Dhanbad Email: sukumar_ism@hotmail.com Mobile Number: 9431124500	Hydraulic Fracturing, Pipeline Engg., Production Engg., Offshore & Deep Sea Engineering, Gas Hydrate
33	**Prof. Ajay Mandal** Professor Petroleum Engineering, IIT (ISM) Dhanbad Email: ajay@iitism.ac.in; mandal_ajay@hotmail.com Mobile Number: 9431711017	Chemical Enhanced Oil Recovery, Gas Hydrates, Synthesis and Characterization of Surfactants, Separation of Oil from Oil-In-Water Emulsion, Multiphase Flow
34	**Prof. Vikas Mahto** Professor Petroleum Enginering, IIT (ISM) Dhanbad Email: vikas@iitism.ac.in, vikas.ismpe@gmail.com Mobile Number: 9431711023	Chemical Process Modeling and Simulation, Drilling Fluid Design and Analysis, Water Shutoff and Profile Modification Jobs, Flow Assurance Problems, Well Stimulation Techniques
35	**Prof. Anugrah Singh** Professor Chemical Engineering Department, IIT Guwahati Email: anugrah@iitg.ac.in Mobile Number: 9435305298	Computational and Experimental Fluid Dynamics, Rheology of Complex Fluids, Microfluidics, Material Processing, Flow through Porous Media.
36	**Prof Rajnish Kumar** Professor Chemical Engineering Dept, IIT Madras Email: rajnish@iitm.ac.in Mobile Number: 8805340709	Gas Hydrates (Formation, Inhibition & Recovery), Carbon Dioxide Capture, Storage & Utilization, Methane & Hydrogen Storage, Sub & Supercritical Hydrothermal Liquefaction
37	**Prof Suresh Kumar Govindarajan** Professor Ocean Engineering Department, IIT Madras Email: gskumar@iitm.ac.in Mobile Number: 9884681900	Fluid flow through porous media

38	**Prof. Debasis Deb** Professor Mining Engineering Former Dean, Undergraduate Studies, IIT Kharagpur Email: deb.kgp@gmail.com ; deb@iitkgp.ac.in Mobile Number: 09434701966	Geomechanics and rock engineering; FEM/X-FEM and mesh-free numerical methods in reinforced fractured porous media; SMART Bolts for early warning; Digital Image Correlation (DIC) for contact-free strain measurement; Explosives, blasting and dynamic behavior of rock structures
39	**Prof. Keka Ojha** Professor Petroleum Enginering, IIT (ISM) Dhanbad Email: kekaojha@iitism.ac.in Mobile Number: 9431125577	Reservoir Engg, CBM-Shale, HF, EOR

Geophysics

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1	Prof. Anand Joshi	Professor	Earth Sciences Department, IIT Roorkee, Roorkee, Uttarakhand, India – 247667 Email: joshi.anand@es.iitr.ac.in Phone: 091-1332-285887	Strong motion Seismology, Attenuation tomography, Simulation of strong ground motion
2	Prof. P N S Roy	Professor	Department of Geology & Geophysics, IIT Kharagpur-721302. Email: pareshsr@gg.iitkgp.ac.in Phone No. +91-3222-281790	Mathematical Geophysics, Seismology, Borehole Geophysics and Geophysical Signal Processing
3	Prof. Shashi Prakash Sharma	Professor	Department of Geology & Geophysics, IIT Kharagpur-721302. Email: spsharma@gg.iitkgp.ernet.in Phone No. +91-3222-283386	Modeling and inversion of 2-D and 3-D subsurface structures considering numerical Techniques; Integrated interpretation of various geophysical observations for mineral and groundwater exploration; Mapping of subsurface contamination by simultaneous applications of electrical and electromagnetic data;

				Global optimization of geophysical data.
4	Prof. William Kumar Mohanty	Professor	Department of Geology & Geophysics, IIT Kharagpur-721302. Email: wkmohanty@gg.iitkgp.ac.in Phone No. +91-3222-283360	Seismology; Geophysical Prospecting
5	Prof. M. Israil	Professor	Earth Sciences Department, IIT Roorkee, Roorkee, Uttarakhand, India – 247667 Email:	Geoelectromagnetism, Modelling, Inversion, groundwater
			mohammad.israil@es.iitr.ac.in Phone No: 091-1332-285078	geophysics, environmental geophysics, Geoelectromagnetism, Forward & Inverse Modelling, Magetotellurics, Groundwater geophysics
6	Prof. Sagarika Mukhopadhyay	Professor	Earth Sciences Department, IIT Roorkee, Roorkee, Uttarakhand, India – 247667 Email: sagarika.mukhopadhyay@es.iitr.ac.in Phone No: 091-1332-2855563	Seismology, Seismic Tomography, Study of Attenuation and Anisotropy, Surface Wave Analysis, Engineering Seismology, Seismic Hazard Microzonation, Near Surface Studies
7	Prof. Munukutla Radhakrishna	Professor	Department of Earth Sciences, Indian Institute of Technology, Powai, Mumbai 400076 (India) Email: mradhakrishna@iitb.ac.in Phone No: 9869272316	Gravity and Magnetic methods; Exploration Seismology; Global Geophysics; Solid Earth and Exploration Geophysics; Geodynamics
8	Prof. Kumar Hemant Singh	Professor	Department of Earth Sciences Indian Institute of Technology, Powai, Mumbai 400076 (India) Email: kumar.h.singh@iitb.ac.in Phone No: +91-22-2576 7283	Petrophysical and Rock physical evaluation of Reservoirs; Near-surface Geophysical and Geotechnical investigations; Applications of
				Machine Learning tools in Geophysics
9	Prof. E Chandrasekhar	Professor	Department of Earth Sciences Indian Institute of Technology, Powai, Mumbai 400076 (India) Phone No: +91-22- 2576 7257 Email: esekhar@iitb.ac.in	Geo-electromagnetic Induction Studies Using Satellite and Ground Magnetic Data, Magnetotelluric Studies, Electrical Resistivity Imaging Studies, Geomagnetism,

				Wavelet · and Multiresolution Analyses in Geomagnetism and Geophysics, Fractal and Multifractal Analyses in Geomagnetism and Geophysics, Geophysical Signal Processing
10	Prof. G Mohan	Professor	Department of Earth Sciences Indian Institute of Technology, Powai, Mumbai 400076 (India) Phone No: +91-22- 25767274 Email: esekhar@iitb.ac.in	Waveform Modeling, Seismic Tomography (Body and Surface waves), Seismic Anisotropy, Seismotectonics
11	Dr V M Tiwari	Director	NGRI, Uppal Road, Hyderabad, Telangana Phone: 9440328269 Email Virendra.m.tiwari@gmail.com	Gravity, Magnetics, Tectonics
12	Dr Sunil K Singh	Director	NIO, Goa Phone: 8322450201 Email: sunil@nio.org	Metamorphic Petrology, Isotope Systematic, Structural Geology
13	Prof. A K Saraf	Professor	Phone: ++91-1332-285549 Department of Earth Sciences, Indian Institute of Technology, Roorkee, ROORKEE – 247667, INDIA Email: arun.saraf@es.iitr.ac.in	Remote Sensing, GIS & GPS and their applications in earthquakes & water resources
14	Prof. M L Sharma	Professor	Department of Earth Sciences, Indian Institute of Technology, Roorkee, ROORKEE – 247667, INDIA Email: m.sharma@eq.iitr.ac.in Mobile Number: + 91-01332-285536	Engineering Seismology, Seismotectonics, Seismic hazard analysis,Digital telemetered seismic arrays , SAR Interferometry, Strong ground motion prediction, Seismic Microzonation
15	Prof. Kamal	Professor	Department of Earth Sciences, Indian Institute of Technology, Roorkee, ROORKEE – 247667, INDIA Email: kamal.@es.iitr.ac.in Mobile Number: + +91-1332-285526	Seismology, Seismic Hazard Assessment, Earthquake Triggering, Fractals

16	Prof Kusala Rajendran	Professor	Center for Earth Sciences C V Raman Ave, Bangalore, Karnataka, India - 560012, INDIA Email: kusala@ceas.iisc.ernet.in Mobile Number: +91-80-22932633	Physical Geography Seismotectonics, Crustal Processes, Role of Water in Faulting Process, Paleoseismology, earthquake recurrence and active tectonics, Tsunami recurrence and hazard evaluation
17	Prof K S Krishna	Professor	University of Hyderabad, Centre for Earth, Ocean and Atmospheric Sciences, India Post Lingampally CR Rao Road, Hyderabad Central University Rd, Gachibowli, Hyderabad, Telangana 500046, India Email: nio.krishna@gmail.com; krishna@uohyd.ac.in Phone Number: +91 040 23132669, 9765494935, 9765321229	Gravity and magnetic, Tectonics
18	Dr. B P K Patro	Chief Scientist	Uppal Road, NGRI, Hyderabad, Telangana Phone: +91-8985417644 Email: patrobpk@ngri.res.in	Geoelectromagnetism, Tectonics

Geology

Sl.No	Name	Designation	Contact Address, Institute / Organization, Email	Specialization
1	Prof. G. J Chakrapani	Professor	Professor, Department of Earth Sciences Indian Institute of Technology (IIT), Roorkee Roorkee. Uttaranchal – 247667 (Currently Vice Chancellor, Berhampur University Odisha) Phone No 91-1332-285080 Email. gjcurfes@iitr.ac.in	Hydrogeology, Environmental Geosciences and Sedimentology
2	Prof. P.K. Saraswati	Professor	Professor, Department of Earth Sciences Indian Institute of Technology, Bombay Powai, Mumbai 400076, India phone +91-22-25767268 Email. pratul@iitb.ac.in	Micropaleontology Biostratigraphy, Sedimentology
3	Prof. Rajeev Sinha	Professor	Professor, Department of Earth Sciences 303B Western Laboratory Extension IIT Kanpur, kalyanpur Kanpur,	Sedimentology, Quaternary Geology River Science – river morphology and

			208016 Uttar Pradesh, India Phone . +91-512-259-7317, 7898 Email: rsinha@iitk.ac.in, rsinha6499@yahoo.com	dynamics, flood hazards,, morphologyecology linkages; Remote Sensing and GIS Applications; Climate Change and paleoclimate reconstruction
4	Prof. J.N. Malik	Professor	Professor and Head, Department of Earth Sciences Indian Institute of Technology IIT Kanpur, Kalyanpur Kanpur, 208016 Uttar Pradesh, India Phone. +915122597723 Email. Javed@iitk.ac.in	Active Tectonics and paleo-seismology Geomorphology
5	Prof. Pankaj Srivastava	Professor	Professor and Head, Department of Geology University of Delhi Delhi 110 007 Phone No Office 27667073 Residence 27662927 Mobile 9868454197 Email pankaios@omail.com	Sedimentology
6	Prof. Santanu Banerjee	Professor	Professor, Department of Earth Sciences Indian Institute of Technology, Bombay Powai, Mumbai 400 076, India Phone: +91-22-2576 7282 santanu@iitb.ac.in	Sedimentology and Petroleum Geology
7	Prof. D Chandrasekhar	Professor	Professor, Department of Civil Engineering, IIT Hyderabad, Kandi Sangareddy-502285,Telangana, India Phone:+ 91402301 6154 Email: dchandra@iith.ac.in	Hydro-geochemistry and Geothermic
8	Prof. D Nagesh Kumar	Professor	Professor, Dept. of Civil Engineering Associate Faculty, Center for Earth Sciences, IISc Bangalore - 560012, India Phone: + 91- 80 2293 2666 Email: nagesh@civil.iisc.emet.in	Remote Sensing and Hydrology
9	Prof. Arun Saraf	Professor	Professor, Department of Earth Sciences. IIT Roorkee, Roorkee 247667, India Phone: 013320285549 Email: saraffes@iitr.ac.in	Remote Sensing. GIS & GPS and their application in earthquakes & water resources
10	Prof. Alok Porwal	Professor	Professor, Center for Studies in Resource Engineering, IIT Bombay, Powai, Mumbai 400076 Phone: + 91• 22 2576 7673 Email: aporwal@i1tb.ac.in	GIS-based Mineral prospectivelymodeli ng Uranium. gold and nickel mineral systems Spectroscopy of geologic material and geologic remote sensing: Machine learning and artificial

11	1 Prof. S. Gupta, FNA	Professor	Professor and Head, Geology and Geophysics Department Indian institute of Technology Kharagpur Kharagpur, India • 721302 Phone: +91 3222-283370 Email saibl@gg.iitgp.ernet.in	Structural Geology, Metamorphic Petrology, Tectonics
12	Prof. S. C. Patel	Professor	Professor and Head Department of Earth Sciences, Indian Institute of Technology, Bombay Powai, Mumbai, 400 076, India, Phone: +91-22-2576 7270 Email: scpatel@iitb.ac.in	Metamorphic Petrology, Isotope Systematic, Structural Geology
13	Prof. G. Mathew	Professor	Professor, Department of Earth Sciences, Indian Institute of Technology, Bombay Powai, Mumbai, 400 076, India, Phone: +91-22-2576 7275 Mobile: +91- 9820287275 Email: gmathew@iitb.ac.in	Mineralogy and Tectonics
14	Prof. Kanchan Pande	Professor	Professor, Department of Earth Sciences, Indian Institute of Technology, Bombay Powai, Mumbai, 400 076, India, Phone: +91-22-2576 7276 Email: kanchanpande@iitb.ac.in	Geochronology, Isotope Geology and Geochemistry
15	Prof. RavikantVadlamani	Professor	Professor, Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur, India, 721 302, Phone: +91-3222-281808 Email: vravikant@gg.iitkgp.ernet.in	Geochronology, Isotope Geology, Geochemistry and Crustal Evolution
16	Prof. D. C. Srivvastava, FNA	Professor	Professor, Department of Earth Sciences, Indian Institute of Technology, Roorke, Uttaranchal- 247 667, India, Phone: +91-1332-285558(Off) Email: dpkesfes@iitr.acc.in	Structural Geology, Structural Geometry of deformed Terrains, Fluid Inclusions, Stress and Strain Estimation in Rocks
17	Prof. T. K. Biswal	Professor	Professor Department of Earth Sciences Indian Institute of Technology Bombay Phone : +91-22- 2576 7280 tkbiswal [at] iitb.ac.in	Structural Geology and Tectonics
18	Prof. Manish A Mamtani	Professor	Professor, Department of Geology & Geophysics, IIT Kaharagput. Phone: +91-3222-283388 Email: mamtani@gg.iitkgp.ernet.in	Structural Geology Microtectonics

19	Prof. Malay Mukul	Professor	Professor Department of Earth Sciences Indian Institute of Technology, Bombay Phone : +91-22- 2576 7260 Fax: 91-(022) 2576 7253 Email: malaymukul [at] iitb.ac.in malaymukul@iitb.ac.in	Structural Geology,GPS Geodesy, Neotectonics
20	Prof. Sandeep Singh	Professor	Professor Department of Earth Sciences IIT Roorkee Phone: +91- 1332-28S559 Email: sandpfes@iitr.ac.in	Tectonics, Igneous Petrology. Geochronology and Isotope Geology of Rocks and Water, Tectonics, Igneous Petrology. Geochronology
21	Prof. Muganka Kumar Panigrahi	Professor	Professor Geology and Geophysics Khargapur, Kharagpur Contact: mkp@gg.iitkgp.ernet.in +91-3222- 283376	Crustal Fiuids, Ore Deposits, Geochemistry, Modeling and Simulation
22	Prof. Arindam Basu	Professor	Professor, Department of Geology and Seophysics, IIT Kharagpur. Ph: +91- 3222-283366; Email: abasu@gg.iitkgp.ac.in;	Engineering Geology
23	Prof. R. Krishnamurthi	Professor	Professor, Department of Earth Sciences Indian Institute of technology (IIT), Roorkee Roorkee, Jttaranchal-247667 Ph.01332-285416 ,office), Email: rkmurthi2001@rediffmail.com, krishfes@iitr.ac.in	Ore Geology Geology and Economic
24	Prof. Amit K Sen	Professor	Professor, Department of Earth Sciences Indian Institute of Technology (IIT), Roorkee, Roorkee, Uttaranchal – 247667 Ph. 01332-285416	Ore Geology and Economic Geology, Mineral Exploration
25	Prof. G.N. Jadhav	Professor	Professor, Department of Earth Sciences IIT Bombay Phone: + 91 – 22-25767273 Email: jadhav@iitb.ac.in	Economic Geology
26	Prof. H S Pandalai	Professor	Professor and former Deputy Director Department of Earth Sciences IIT Bombay Phone: + 91 – 22-25767265 Email: pandalai@iitb.ac.in	Ore Geology, Geostatistics, Mining Geology
27	Prof. S. Das	Professor	Professor, Geology & Geophysics IIT Kharagpur Phone: +91- 3222-283358 Email: sdas@gg.iitkgp.ernet.in	Sedimentology and petroleum geology
28	Prof. S. Dutta	Professor	Professor, Department of Earth Sciences Indian Institute of Technology Bombay Powai,	Organic Geochemistry

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29	Prof. Sunil Bajpai	Professor	Professor and Head Department of Earth Sciences IIT Roorkee Phone: +91-1332-285079 Email: sunilfes@iitr.ac.in	Paleontology Biostratigraphy, Paleobiogeography, Paleoclimatology, Paleoecology
30	Prof. Anil K Gupta	Professor	Professor, Geology & Geophysics IIT Kharagpur Email: anilg@gg.iitkgp.ernet.in	Paleo – oceanography Paleoclimatology
31	Prof. T N Singh	Professor	Professsor, IIT Bombay Specialization: Engineering Geology Department of Earth sciences Institute of Technology Bombay, Powai, Mumbai 400076, India Vice Chancellor, Mahatma Gandhi Kashi Vidyapith, Varanasi – 221002(UP) Phone: + 91- 542-222 5472 (O) 2221268 (Camp off) Email: tnsingh@iitb.ac.in , tnsiitb@gmail.com	Engineering Geology Geotechnical Engineering
32	Prof. Manish A. Mamtani	Professor	Department of Geology and Geophysics, IIT Kharagpur, 721302,Email: mamtani@gg.iitkgp.ac.in Phone No: +91-3222-283388 Email http://www.iitkgp.ac.in/department/GG/faculty/gg-mamtani	Structural Geology and & Micro tectonics; Fractal Analysis of Microstructures
33	Prof. Saibal Gupta	Professor	Department of Geology and Geophysics, IIT Kharagpur Departmentof Geologyand Geophysics, Indian Institute of Technology,Kharagpur, 721302 Email: saibl@gg.iitkgp.ac.in MobileNumber:+91-3222-283370 ht://ww›v.iitk,ac.iii/deartment/GG/facult-stiibl	Structural Geology; Metamorphic Petrology; Tectonics; Planetary Geology
34	Prof.D.C.Srivastava	Professor	Department and Institute: Geology and Geophysics, IIT Roorkee, Earth Sciences Department, IIT Roorkee, Roorkee, Uttarakhand, India – 247667 Email. deepak.srivastava@es.iitr.ac.in Phone. +91-1332-285558	Structural Geology, Fluid Inclusions, Stress and Sttain estimation in rocks, Structural Geology, StrucRiral Geometry of deformed terrains

35	Prof. Tapas Kumar Biswal	Professor	Department of Earth SciencesIndian Institute of Technology, POwai. MUmb£tl 400076 (India) Departmcnt of Earth Scicnccs Indian lnstit¥llg Of Technology, Powili. MţljT\bei 400076 (India) Email. tkbiswal@iitb.ac.in +91 -22-2576 7280	Structural Geology, Tectonics, Structural Analysis, Precambrian Geology: Climate Geology.
36	Prof.A.K.Varma	Professor	Department of Applied Geology, lIT (ISM), Dhanbad Jharkhand, lNDl A, 826004Department of Applied Geology, IIT (ISM), Dhanbad Jharkhand, INDIA, 826004, Email. atul@iitism.ac.in Phone. +91-326-2235449	Coal Geo1ogy,Organic Petrology,Organic Geochemistry,CBM, Shale Gas,Source Rock Characterization. CO* Sequestration And Coal Conversion
37	Prof.ASVenkates h	Professor	Department of Applied Geology, IIT (ISM), Dhanbad Jliarkhãfld. NDIA, 826004, Department of Applied Geology, IIT (ISM), Dhanbad Jharkhand, INDI A, 826004, Email. asvenkatesh@iitism.ac.in, Phone. +91-326-223-5271	Ore Geology, Mining Geology, Environmental Geology, Medical Geology and MİnİMUl Exploration
38	Prof. Debasis Deb	Professor	Department of Mining Engineering, IIT Kharagpur, Department of Mining Engineering; Indian Institute of Technology, Kharagpur; PIN-721 302 (WB) INDIA, Email. deb.kgp@gmail.com , deb@iitkgp.ac.in	Geomechanics and Rock engineering; FEM/X-FEM and mesh-free numerical methods in geosciences and engineering, Digital Image Correlation (DIC) for contact-free strain measurement, Dynamic behavior of rock structures, Flow through porous media, AI methods and their applications in geosciences
39	Prof. Arindam Basu	Professor	Department of Geology and Geophysics, UT Kharagpur, Department of Geology and Geophysics; Indian Institute of Technology, Kharagpur; PIN-721 302 (WB) INDIA Email. abasu@gg.iitkgp.ac.in, abasu.arndam@gmail.com Phone. +91-3222-283366, +91-9732527275	Engineering Geology and Rock Mechanics

40	Prof. Mahendra Singh	Professor	Civil Engineering Department, IIT Roorkee, Room No : 12S-A, Civil Engit1eering Department, IIT Roorkee, Roorkee, Uttarakhand, India – 247667 Email. Phone. +91-1332-285651(R), +91-1332-285006(M) 9412070268	RockMechanics; Stability of Soil and RockSlopes; Landslide Analysis and Mitigation; Tunnels, Underground Excavation
41	Prof. Biswajit Samanta	Professor	Department of Mining Engineering, IIT Kharagpur, Department of Minning Enginnering; Indian Institute of Technology, Kharagpur; Pin-721302(WB) India, Email. samantab@mining.iitkgp.ac.in Phone . +91-3222-281752	Geostatistics; Data Analytics, Machine Learning