Minutes of the 22nd meeting of the Senate held on 24th December 2007 in the Senate Hall of the Institute.

The following were present: -

1.	Prof. S.C. Saxena, Director	- Chairman
2.	Prof. H.K. Verma, Dy. Director	
3.	Prof. S.Y. Kulkarni	(Architecture & Planning)
4.	Prof. R.P. Singh	(Biotechnology)
5.	Prof. Shri Chand	(Chemical Engg.)
6.	Prof. Vijay Kumar Agarwal	(Chemical Engg.)
7.	Prof. G. Bhattacharjee	(Chemistry)
8.	Prof. R.N. Goyal	(Chemistry)
9.	Prof. Kamaluddin	(Chemistry)
10.	Prof. V.K. Gupta	(Chemistry)
11.	Prof. Anil Kumar	(Chemistry)
12.	Prof. (Mrs) Mala Nath	(Chemistry)
13.	Prof. A.K. Singh	(Chemistry)
14.	Prof. N.M. Bhandari	(Civil Engineering)
15.	Prof. V.K. Gupta	(Civil Engineering)
16.	Prof. Deepak Kashyap	(Civil Engineering)
17.	Prof. P.K. Garg	(Civil Engineering)
18.	Prof. Manoj Kumar Arora	(Civil Engineering)
19.	Prof. M. Parida	(Civil Engineering)
20.	Prof. Praveen Kumar	(Civil Engineering)
21.	Prof. N.K. Samadhiya	(Civil Engineering)
22.	Prof. D.K. Paul	(Earthquake Engg.)
23.	Prof. G.I. Prajapati	(Earthquake Engg.)
24.	Prof. Ashwani Kumar	(Earthquake Engg.)
25.	Prof. H.R. Wason	(Earthquake Engg.)
26.	Prof. H. Sinvhal	(Earth Sciences)
27.	Prof. R.P. Gupta	(Earth Sciences)
28.	Prof. V.N. Singh	(Earth Sciences)
29.	Prof. H.O. Gupta	(Electrical Engg.)
30.	Prof. S.P. Gupta	(Electrical Engg.)
31.	Prof. Vinod Kumar	(Electrical Engg.
32.	Prof. G.K. Singh	(Electrical Engg.)
33.	Prof. S. Mukherjee	(Electrical Engg.)
34.	Prof. S.P. Singh	(Electrical Engg.)
35.	Prof. R.P. Agarwal	(E. & C. Engg.)
36.	Prof. D.K. Mehra	(E. & C. Engg.)
37.	Prof. A.K. Saxena	(E & C.Engg.)
38.	Prof. S.N. Sinha	(E. & C. Engg.)
39.	Prof. Manoj Mishra	(E. & C. Engg.)
40.	Prof. N.K. Goel	(Hydrology)
41.	Prof. Pashupati Jha	(Hum. & Soc. Sc.)

42. Prof. Sukh Pal Singh (Hum. & Soc. Sc.)
43. Prof. M.C. Bansal (Paper Technology)
44. Prof. A.K. Ray (Paper Technology)
45. Prof. J.S. Upadhyay (Paper Technology)
46. Prof. Satish Kumar (Paper Technology_
47. Prof. V.P. Singh (Paper Technology)
48. Prof. V.K. Nangia (Management Studies)
49. Prof. G.S. Srivastava (Mathematics)
50. Prof. S.P. Sharma (Mathematics)
51. Prof. T.R. Gulati (Mathematics)
52. Prof. R.C. Mittal (Mathematics)
53. Prof. Sunita Gakkhar (Mathematics)
54. Prof. Pradeep Kumar (Mech. & Indl. Engg.)
55. Prof. Satish C. Sharma (Mech. & Indl. Engg.)
56. Prof. Dinesh Kumar (Mech. & Indl. Engg.)
57. Prof. P.K. Jain (Mech. & Indl. Engg.)
58. Prof. Akhilesh Gupta (Mech. & Indl. Engg.)
59. Prof. B.K. Mishra (Mech. & Indl. Engg.)
60. Prof. Satya Prakash (Met. & Mat. Engg.)
61. Prof. P.K. Ghosh (Met. & Mat. Engg.)
62. Prof. S.K. Nath [Met. & Mat. Engg.)
63. Prof. Ishwar Singh (Physics)
64. Prof. Jagdish Rai (Physics)
65. Prof. A.K. Jain (Physics)
66. Prof. G.S. Singh (Physics)
67. Prof. Rajesh Srivastava (Physics)
68. Prof. S.K. Tripathi (W.R.D.&M.)
69. Prof. Karmeshu, JNU, New Delhi
70. Mr. Arun Kumar, Head, AHEC
71. Mr. R.K. Jain, Associate Dean (Discipline)
72. Dr. Deepak Khare, Associate Dean (Foreign Students)
73. Dr. R.P. Maheshwari, Assoc. Professor, Electrical Engineering
74. Dr. M.R. Maurya, Assoc. Professor, Chemistry
75. Lt.Col. (Retd.) A.K. Srivastava, Registrar - Secretary

The Chairman welcomed the members to the 22nd Meeting of the Senate and specially Prof. Karmeshu, Dean, School of Computers & Systems Sciences, JNU, New Delhi.

The Senate also welcomed the under-mentioned new members and hoped for their valuable contribution and active participation in its functioning:

1. Prof. S.K. Ghosh, Department of Civil Engineering
2. Prof. Mahendra Singh, Department of Civil Engineering

3. Prof. Manoj Arora, Department of Civil Engineering
4. Prof. Manoranjan Parida, Department of Civil Engineering
5. Prof. Praveen Kumar, Department of Civil Engineering
6. Prof. N.K. Samadhiya, Department of Civil Engineering

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

1. Prof. U.C. Chaube, WRD&M
2. Prof. G.L. Asawa, Department of Civil Engineering
3. Prof. S.S. Jain, Department of Civil Engineering
4. Prof. Renu Bhargava, Department of Civil Engineering
5. Prof. S.K. Ghosh, Department of Civil Engineering
6. Prof. Pramod Agarwal, Department of Electrical Engineering
7. Prof. Ravi Bhushan, Department of Chemistry
8. Prof. I.D. Mall, Department of Chemical Engineering

The agenda was then taken up.

Item No.22.1.1 To confirm the minutes of the 19th meeting held on 18th June 2007, 20th meeting held on 23rd July 2007 and 21st Meeting held on 29th October 2007.

The Senate confirmed the minutes of the 19th meeting held on 18th June 2007, 20th meeting held on 23rd July 2007 and 21st Meeting held on 29th October 2007.

Item No. 22.1.2 To receive a report on the actions taken to implement the decisions taken by the Senate in its 19th meeting held on 18th June 2007, 20th meeting held on 23rd July 2007 and 21st Meeting held on 29th October 2007.

The Senate noted that the actions have been taken on the decisions taken by the Senate in its 19th meeting held on 18th June 2007, 20th meeting held on 23rd July 2007 and 21st Meeting held on 29th October 2007 with the following observations:

MEETING DATED 18TH JUNE 2007:

19.7 (a) To consider the new names in the panel of eminent personalities outside Roorkee for screening and evaluating

Alumni Awards for the year 2006-07 and onwards.

The panel of eminent personalities out side IIT Roorkee for screening and evaluating Alumni Awards, as approved by the Senate, be notified.

(b) Institution of Distinguished Service Award (DSA) to alumni for their contributions in running various Chapters, getting donations and representing the Institute in various forums of PAN IIT and others.

The Committee, so constituted to frame the guidelines for the award of Distinguished Service Award (DSA), be notified and status of the report be given.

MEETING DATED 29.10.2007:

1.1.2 Reconstitution of the Committee for Screening and Evaluation of the nominations for the Distinguished Alumnus Award.

The Committee constituted for Screening and Evaluation of the nominations for the Distinguished Alumnus Award, be notified.

ITEMS FOR CONSIDERATION:

Item No.22.2.1: To consider the report of committee constituted in case of Mr. M.P.S. Chawla, QIP Research Scholar

After extensive discussion on the issue, the Senate decided as under:

(a) A Standing Ethical Committee be constituted by the Institute.

(b) Dean, PGS&R in consultation with Head, Department of Electrical Engineering to respond to Dr. Gari D. Clifford, regarding the issue of

alleged plagiarism on the part of Mr. M.P.S. Chawla.

(c) The Department be advised to provide Mr. M.P.S. Chawla a supervisor in the subject area. The recommendations of the SRC are approved; the Dean, PGS&R may take necessary action in this regard.

(d) Mr. Chawla may be given strict warning that he should refrain himself from such activities in future. Minimum period for submission of the Ph.D. thesis be extended by one year.

(e) Mr. Chawla be directed not to communicate things critical to the Institute/Faculty to the outside persons/agencies without putting up the matter to the competent authorities of the Institute and waiting for the redressal of the same. However, if he persists in communicating to outside persons/agencies, then strict disciplinary action may be initiated against him including cancellation of Ph.D. registration and expulsion from the Institute.

Item No.22.2.2: To consider the proposal of Department of Electrical Engineering to start a Dual Degree Programme with B.Tech(Elect.) from IITR and a Master in Engg. Science (M.E.Sc) from University of Western Ontario, Canada.

The Senate considered the proposal of the Department of Electrical Engineering to start a Dual Degree Programme with B.Tech. (Electrical) from IIT Roorkee and a Master in Engineering Science (M.E.Sc.) from University of Western Ontario, Canada and accepted the same in principle. The proposal be suitably modified, keeping in view the suggestions made by the Senators on the floor.

The Senate further decided that the Schemes of Teaching of the Programme be brought before the Senate for consideration.

Item No.22.2.3: To consider the proposal of the Department of Management Studies to include "BM-628: Knowledge Management" as Institute Elective.

As considered and recommended by the Board, UGS, the Senate decided that the proposal of the Department of Management Studies to include the "BM-628: Knowledge Management" as an Institute Elective, be approved.

Item No.22.2.4: To consider the syllabi of Institute Electives proposed by the Department of Earthquake Engineering.

The Senate considered the syllabi of IEQ-01 to IEQ-06 and it was resolved that the Dean, UGS will get the syllabi modified incorporating the suggestions received on the floor of the Senate. The Chairman Senate be authorized to approve the modified syllabi.

Item No. 22.2.5: To consider the policy of continuation of summer term and back paper.

The issue was deferred to the next meeting of the Senate. Further decided that the inputs from the Departments be also obtained prior to the next meeting of the Senate.

Item No.22.2.6: To consider the minimum requirement of earned credits for continuation of registration.

As considered and recommended by the Board, UGS, the Senate decided that the minimum requirements of earned credits for continuation of registration for different programmes, as given in the enclosed Table **(Appendix 'A')** be approved.

Item No.22.2.7: To consider the Academic calendar for the Spring Semester 2007-08 session.

The Senate decided that the Academic calendar for the Spring Semester 2007-08 sessions as given in **Appendix 'B'** be approved.

Item No. 22.2.8: To consider the credits of N.C.C./ Proficiency for Branch Change.

As considered and recommended by the Board, UGS, the Senate decided that the regulation 13.2 given in the Ordinances/Regulations for the UG Programme be modified as given below:-

"13(2): A student enrolled for B.Tech / B.Arch./ Integrated Dual Degree/ Integrated M.Tech./ Integrated M.Sc. programmes through Joint Entrance Examination carried out by JEE, shall be eligible for change of Branch/ Programme at the end of the 1st year provided he/she satisfies the following criteria:

1. CGPA for General Category ≥ 7.5
2. CGPA for SC/ST Category ≥ 6.5
3. Earned credits at the end of 1st year ≥ 48

The credits for NCC/NSS/NSO/ Rangering, proficiency and discipline shall **not** be counted for the calculation of CGPA and earned credits for this purpose".

Item No. 22.2.9: To consider the issue of transcript on Water Mark Paper.

After discussion, the Senate decided that the proposal for putting a hologram of Indian Institute of Technology Roorkee on each transcript with a remark **"TRANSCRIPT VALID ONLY IF IT BEARS INSTITUTE HOLOGRAM"** be approved. The proforma of transcript as approved by the Senate is given at **Appendix 'C'.**

The Senate further decided that the under mentioned committee be constituted to examine the other aspects of security of transcripts:

1. Prof. Harsh Sinvhal - Convenor
2. Prof. S.N. Sinha
3. Prof. Jagdish Rai

Item No.22.2.10: To consider the revision of proforma regarding award of Grade in M.Tech. Dissertation.

As considered and recommended by the Board, PGS&R, the Senate decided that the proforma for evaluation of M.Tech./M.Arch/MURP dissertation as given in the **Appendix 'D'** be approved.

Item No.22.2.11: To consider the revision of certain clauses of the Senate Manual dealing with the functioning of DFB/DRC/CRC in the Department/ Centre.

As considered and recommended by the Board, PGS&R, the Senate decided the revision in the undermentioned clauses of the Senate Manual dealing with the functioning of DFB/DRC/CRC in the Department/ Centre be placed before the Board of Governors for approval.

No.	Existing Clause	Proposed Clause
3.4.1.4	The DFB/CFB shall meet as and when necessary but not less than once in a month and that 50% of its members shall form a quorum for its meetings.	The DFB/CFB shall meet as and when necessary but there should be a minimum of 3 meetings in a semester and that 50% of its members shall form a quorum for its meetings.
3.4.3.1	There shall be a DRC/CRC in a Department/ Centre consisting of full time faculty members representing all the major PG and research programmes of the Department/ Academic Centre and the Head of the Department/ Centre. 1/3 of the faculty strength with a minimum of 7 members shall constitute the DRC/CRC. The membership shall be rotated among various faculty members at all cadres. The faculty representative of the Department/ Centre in the	There shall be a DRC/CRC in a Department/ Centre consisting of full time faculty members representing all the major PG and research programmes of the Department/ Academic Centre. There should be a minimum of 7 and a maximum 12 of members in the DRC/CRC. The membership shall be rotated among various faculty members at all cadres. The faculty representative of the Department/ Centre in the BPGS&R shall also be a member of the DRC/CRC.

	BPGS&R shall also be a member of the DRC/CRC.	
3.4.3.4	The DRC/CRC shall have a term of two years from the date of its constitution by the DFB/CFB. The term of office of the members of the committee shall coterminous with that of committee. Any vacancy in the committee shall be filled up by another faculty member to be nominated by the DFB/CFB and approved by the Dean PGS&R for the remainder of the term of the member in whose vacancy the nomination is being made.	Same continued.
3.4.3.5	The DRC/CRC shall meet as often as necessary but not less than once every month and its confirmed minutes shall be sent to the Dean, PGS&R for PG and research programmes and to the Dean, UGS for IDD programmes. The minutes shall also be sent to all the faculty members of the Department/ Centre for information and necessary action.	The DRC/CRC shall meet as and when necessary but there should be a minimum of 3 meetings in a semester and its confirmed minutes shall be sent to the Dean, PGS&R for PG and research programmes and to the Dean, UGS for IDD programmes. The minutes shall also be sent to all the faculty members of the Department/ Centre for information and necessary action.
3.4.4	**The Departmental Undergraduate Committee (DUGC).**	**The Departmental Undergraduate Committee (DUGC).**
3.4.4.1	There shall be a DUGC in each Department which shall consist of 1/3 of the full time faculty members of the Department and the Head of the Department. All major sections and all the faculty cadres shall be represented in	There shall be a DUGC in each Department which shall consist of full time faculty members. There should be minimum 4 and maximum 12 members. All major sections and all the faculty cadres shall be represented in the DUGC and

	the DUGC and the membership shall be rotated every two years in a staggered manner. The faculty representative of the Department in the BUGS shall also be a members of the DUGC.	the membership shall be rotated every two years in a staggered manner. The faculty representative of the Department/ Centre in the BUGS shall also be a members of the DUGC.

Item No.22.2.12: To consider elective course for Pre-Ph.D. level and revision of course title for M.Sc. programme.

The Senate considered the revised Pre-Ph.D. Course (subject CY-922) as recommended by the Professor & Head, Chemistry Department and approved the same as given at **Appendix 'E'**.

Item No.22.2.13: To consider the final structure of all B.Tech./IDD/ Integrated M.Tech./Integrated M.Sc. Programme.

The Senate considered the Curriculum Structure of all B.Tech./IDD/ Integrated M.Tech./Integrated M.Sc. Programme (except B.Arch.).

It was resolved that the curriculum structures be sent to the respective departments and minor modifications if any be carried out and incorporated in the structures by Dean, UGS. The Chairman, Senate be authorized to approve the modified curriculum structures.

Item No.22.2.14: To consider the proposal of the DFB, Electrical Engineering Department regarding a Dual Degree programme.

Refer to item No.22.2.2.

Item No.22.2.15: To consider an increase in the seats for the M.Tech. Programme in AHEC (Conservation of Rivers & Lakes).

As considered and recommended by the Board, PGS&R, the Senate decided that the 5 additional GATE qualified Institute Assistanceships (MHRD) may be allowed for M.Tech. (Conservation of Rivers & Lakes) in the AHEC.

Item No.22.2.16: To consider modification and addition of elective course under M. Tech. (CRL) AHEC Department.

As considered and recommended by the Board, PGS&R, the Senate decided that the proposal of AHEC for modifications and additions of elective courses for M.Tech. (CRL), as given at **Appendix 'F'** be approved.

Courses of M.Tech. Programme(Revision of Syllabi)

(a) AH-522: Waste Water Collection, treatment and disposal.
(b) AH-523: Water Quality Assessment
(c) AH-525: Ecology & Limnology
(d) AH-526: Environmental Laws, Public Participation and Institutional Development
(e) AH-527: Laboratory course
(f) AH-544: Project Formulation and Implementation

New Elective course:

AH-546: Advances in Aquatic Ecology

Item No.22.2.17: To consider the case of Mr. N.D. Winny, Principal, Sri Muthukumaran Institute of Technology, Chennai, for producing a fake Ph.D. Degree from the Department of Mechanical Engineering to the Anna University, Chennai.

After deliberation, the Senate decided that a letter be written to the Chancellor with a copy to Vice-Chancellor of the Anna University, Chennai stating the facts of the case and requesting him to take further action as the Sri Muthukumaran Institute of Technology is affiliated to the Anna University, Chennai, and the Chancellor is the competent authority to take action in the matter.

Item No.22.2.18: To consider the general curriculum structure and credits for five year M.Sc. and M.Tech. (Sciences) Programmes.

As considered and recommended by the Board of Under Graduate Studies, the Senate decided that the general curriculum structure and credits for the five

year M.Sc. and M.Tech. (Sciences) Programmes as given at **Appendix 'G'** be approved**.**

Item No.22.2.19: To consider the requirements for the faculty of IIT Roorkee for admission to the Ph.D. programme at IIT Roorkee.

As considered and recommended by the Board, PGS&R, the Senate decided that the changes in the under-mentioned Ordinances and Regulations for admission to the Ph.D. programme for the faculty of IIT Roorkee be placed before the Board of Governors for approval:

Existing Regulation	Proposed Regulation
R.2ADMISSION ELIGIBILITY	
1 An applicant possessing the following qualifications in appropriate areas shall be eligible to apply for admission for Ph.D. programme of the Institute.	No Change
a) Masters degree in Engineering/ Technology/Architecture/ Urban & Rural Planning/ Sciences/ Humanities & Social Sciences and Management in respective discipline or equivalent with a minimum Cumulative Grade Point Average (CGPA) of 6.0 on a 10 point scale or equivalent as determined by the Institute wherever letter grades are awarded; or 60% marks in aggregate (of all the years/ semesters) where marks are awarded. OR Applicants with B.Tech./ B.Arch. degree or equivalent in	

respective discipline with excellent academic record (with a minimum CGPA of 7.0 on a 10 point scale or equivalent or 70% marks) may be considered eligible for admission. b) Applicants for admission for full-time studies who do not possess an M.Tech./ M.Arch/ MURP degree or equivalent in the relevant field must have a valid GATE score (at least 75 percentile) for Engineering/ Technology/Science disciplines or must have qualified national level fellowship examinations such as NET (JRF/LS) conducted by UGC/CSIR for Science/Humanities and Social Sciences disciplines. **2 Admission of Institute Faculty/Staff** a) A faculty member or non-academic staff of the Institute who satisfies eligibility qualifications may be considered for admission to the Ph.D. programme as a part time student provided he/she has been given administrative clearance by the Director of the Institute. Those with B.Tech/ B.E./B.Arch/M.Sc./M.A. or equivalent qualification and with **less than two years** of relevant working experience must have a valid GATE score or must have qualified any other examination by those like UGC/CSIR, etc.	No change

b) Permanent academic staff of the Institute may be given administrative clearance to seek registration on part-time basis after satisfactory completion of the period of probation subject to the recommendation of the concerned Head of the Deptt./Centre. Such applicants need not clear GATE or equivalent national examination even if they do not have an M.Tech. degree.	
R.5 REGISTRATION **2 Time Period Requirement for Submission** a) A candidate who has a B.Tech./M.Sc./M.A. degree or its equivalent shall be required to be registered for the degree for a period of not less than three calendar years (36 months) from the date of his initial registration; in exceptional cases, the minimum period of registration may be reduced to two calendar years (24 months) with the approval of the Senate. For a candidate who has an M.Tech. degree or its equivalent the minimum period of registration shall be two calendar years (24 months). b) The candidates of all categories shall normally submit their thesis within a period of five years from the date of their initial registration for the Ph.D. programme. However, as a	**R.5 REGISTRATION** **2 Time Period Requirement for Submission** a) A candidate who has a B.Tech./M.Sc./M.A. degree or its equivalent shall be required to be registered for the degree for a period of not less than three calendar years (36 months) from the date of his initial registration; in exceptional cases, the minimum period of registration may be reduced to two calendar years (24 months) with the approval of the Senate. For a candidate who has an M.Tech. degree or its equivalent the minimum period of registration shall be two calendar years (24 months). b) The candidates of all categories shall normally submit their thesis within a period of five years from the date of their initial registration for the Ph.D. programme. However, as

special case, this limit may be extended to a maximum of seven years by the Dean, PGS&R after which the registration shall stand cancelled automatically.	a special case, this limit may be extended to a maximum of seven years by the Dean, PGS&R after which the registration shall stand cancelled automatically. **c) Faculty members of IIT Roorkee exempted for course(s) as well as written comprehensive examination will not have any relaxation in the maximum period of seven years for submission of thesis.**
R.6 THESIS SUPERVISOR(s) **2** A Supervisor(s) can be any full-time faculty member of the Institute with a Ph.D. degree. Regular/full time faculty members who do not have Ph.D. degree may be allowed to supervise provided they have been engaged in research for five or more years as evidenced by publication in refereed/reputed journals. No person who himself is registered for Ph.D. degree at this Institute or any other Institution, would qualify to act as a supervisor. Those without a Ph.D. degree appointed as supervisors would cease to be supervisors if they themselves register for Ph.D.	No change
R.8 COURSE CREDIT REQUIREMENTS AND REGISTRATION FOR COURSES **1** Each student will be required to	**R.8 COURSE CREDIT REQUIREMENTS AND REGISTRATION FOR COURSES** **1** Each student will be required

take some courses of credit requirements **(Table-1)** as prescribed by the Supervisor and approved by the SRC. Student earns credits for a course only if he/she obtains a minimum of B Grade for successfully completing the course.	to take some courses of credit requirements **(Table-1)** as prescribed by the Supervisor and approved by the SRC. Student earns credits for a course only if he/she obtains a minimum of B Grade for successfully completing the course.
2 SRC may recommend additional course(s) as Audit course(s), if required, in a particular case. Student earns credit for Audit Course(s) if he/she obtains a minimum of D Grade for successfully completing the course.	**2** SRC may recommend additional course(s) as Audit course(s), if required, in a particular case. Student earns credit for Audit Course(s) if he/she obtains a minimum of D Grade for successfully completing the course.
3 A student is normally registered at the beginning of a semester. However, if in special case, a student joins the programme in the middle of a semester as per R.5 (iii), his/her initial registration shall be considered from the next semester for the purposes of pre-Ph.D. courses comprehensive examination.	**3** A student is normally registered at the beginning of a semester. However, if in special case, a student joins the programme in the middle of a semester as per R.5 (iii), his/her initial registration shall be considered from the next semester for the purposes of pre-Ph.D. courses comprehensive examination.
4 The pre-Ph.D. courses including Audit course are to be completed successfully in three/four semesters (counted from the date of registration) by full time/part time students respectively.	**4** The pre-Ph.D. courses including Audit course are to be completed successfully in three/four semesters (counted from the date of registration) by full time/part time students respectively.
	5. The faculty members of IIT Roorkee pursuing the Ph.D. programme can be exempted from the course requirements, if the SRC/ CRC recommends so, provided he/she has taught

	courses at the postgraduate level for at least four semesters.
R.10 COMPREHENSIVE EXAMINATION 1 Soon after successfully completing the Pre- Ph.D. course requirements, each student will be required to take a comprehensive examination and qualify it. It will test students comprehension of his broad field of research and his academic preparation and potential to carry out the proposed research plan. Comprehensive examination within the stipulated time frame of 18 months/24 months for full time/part time Ph.D. Scholars respectively, shall invariably be conducted by the concerned department/ centre. The comprehensive examination should be a combination of written and oral examination and should be separately conducted before evaluation of the research proposal. The examination will be conducted by a committee called Student's Research Committee (SRC), which will be constituted as follows: a) Chairman, DRC/CRC or his nominee: Chairman b) One expert in the field from the Department/Centre. c) One Institute faculty expert, preferably in the concerned area, from outside the	**R.10 COMPREHENSIVE EXAMINATION** 1 Soon after successfully completing the Pre- Ph.D. course requirements, each student will be required to take a comprehensive examination and qualify it. It will test students' comprehension of his broad field of research and his academic preparation and potential to carry out the proposed research plan. Comprehensive examination within the stipulated time frame of 18 months/24 months for full time/part time Ph.D. Scholars respectively, shall invariably be conducted by the concerned department/ centre. The comprehensive examination should be a combination of written and oral examination and should be separately conducted before evaluation of the research proposal. The examination will be conducted by a committee called Student's Research Committee (SRC), which will be constituted as follows: a) Chairman, DRC/CRC or his nominee: Chairman b) One expert in the field from the Department/ Centre. c) One Institute faculty expert,

Department/Centre to which the student belongs. d) Supervisor(s): Member Experts at (b) and (c) above will be nominated by Head of the department from amongst those proposed by Supervisor(s). 2 The Student's Research Committee (SRC) on the basis of the performance of Student in the examination will make one of the following recommendations: a) (i) Passed (ii)To reappear in the examination after a defined period of time specified by the SRC and after taking additional courses, if any. (iii) Failed b) Research Plan (i) Approved (ii)Not approved 3 A student will be provided a maximum of two attempts to pass the comprehensive examination.	preferably in the concerned area, from outside the Department/ Centre to which the student belongs. d) Supervisor(s): Member Experts at (b) and (c) above will be nominated by Head of the department from amongst those proposed by Supervisor(s). 2 The Student's Research Committee (SRC) on the basis of the performance of Student in the examination will make one of the following recommendations: a) (i) Passed (ii) To reappear in the examination after a defined period of time specified by the SRC and after taking additional courses, if any. (iii) Failed b) Research Plan (i) Approved (ii) Not approved 3 A student will be provided a maximum of two attempts to pass the comprehensive examination. **4 Faculty members of IIT Roorkee pursuing the Ph.D. programme, who are duly exempted from the course(s) requirements will also be exempted from appearing in the written comprehensive examination**

Item No.22.2.20: To consider the request of candidates who have cleared CSIR/UGC examination for Admission to the Ph.D. Programme

The proposal of the Board for Post Graduate Studies & Research is approved. Further, after discussion, the Senate decided that the views of the departments be obtained on the issue of admission to the Ph.D. programme in respect of such candidates who are receiving assistantship from research projects or other sources. The Dean, PGS&R should then look into the issue in totality, and bring it before the Senate for its consideration, in its next meeting.

Item No.22.3.1: To Report about consideration of the observations of different DFBs regarding Change of 2nd year common courses and the teaching of these courses

The Senate noted the following modifications regarding changes in the teaching of 2nd year Institute Core Courses:

a) The 2nd year Institute Core Courses will be taught department/programme wise instead of batch-wise.

b) The Department of Mechanical and Industrial Engineering will provide one teacher in each semester for CE-201 (Computer Aided Graphics).

c) The course CE-101 be taught uniformly by the Civil Engineering Department and Mechanical & Industrial Engineering Department throughout the semester with a loading of 1-0-2.

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

APPENDIX 'A'
Item No.Senate/22.2.6

Table-3: MINIMUM REQUIREMENT OF EARNED CREDITS FOR CONTINUATION OF REGISTRATION

	Year	B.Tech.	B.Arch	Integrated Dual Degree (IDD)	Integrated M.Tech (IMT)	Integrated M.Sc (IMS)
1	I Yr.*	24	24	24	24	24
2	II Yr**	50	50	50	50	50
3	III Yr.	78	78	78	78	78
4	IV Yr.	108	108	108	108	108
5	V Yr.	140	140	140	140	140
6	VI Yr.	176***	176	176	176	176
7	VII Yr.		198***	202***	202***	202***

* Excluding Proficiency / NCC Discipline credits

** Including credits, if any, earned during summer term

*** The figure should not be less than the minimum prescribed

APPENDIX 'B'

Item No. Senate/22.2.7

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

ACADEMIC CALENDAR FOR THE SPRING SEMESTER
(SESSION 2007-08)

1.	Institute reopens for the Spring Semester	January 01, 2008	Tuesday
2.	Registration for all Courses in respective Departments/ Centres	January 01, 2008	Tuesday
3.	Classes begin for all Courses	January 02, 2008	Wednesday
4.	Last date for addition/deletion of subjects without late fee	January 15, 2008	Tuesday
5.	Subject Registration of Ph. D. students (New Entrants)	January 15, 2008	Tuesday
6.	Last date of Subject/Course registration with late fee	January 31, 2008	Thursday
7.	Academic Section (UGS) to request to the departments about the names of the Institute Electives to be run by various departments in Autumn Semester of 2008-09	February 08, 2008	Friday
8.	GATE – 2008 Exam	February 10, 2008	Sunday
9.	Mid Term Examination – I for all UG/PG/Ph.D. & Preparatory course students	Feb.14-15, 2008	Thu. & Fri.
10.	All HODs to send to Academic Section (UGS) the details of Institute Electives to be run by the departments in Autumn Semester of 2008--09 session	February 19, 2008	Tuesday
11.	Last date for withdrawal of courses	February 21, 2008	Thursday
12.	Last date for display of attendance record of students falling short of minimum attendance requirement during the middle of semester (By departments/centres)	February 21, 2008	Thursday
13.	Intimation to parents/guardians of students having short attendance by Academic Sections (UGS and PGS&R)	February 25, 2008	Monday
14.	SCIENCE DAY	February 28, 2008	Thursday
15.	Hobbies Club – Annual Hobbies Exhibition	Feb 29 to March 2, 2008	Fri. to Sunday
16.	Semester Break (For students only)	March 17- 21, 2008	Mon. to Fri.
17.	Information to HODs by Academic Section (UGS) about Institute Electives to be run in Autumn Semesour of 2008-09 and request for preparation of time table	March 20, 2008	Thursday
18.	COGNIZANCE – 2008	March 28 to March 30, 2008	Fri. to Sunday
19.	JAM – 2008 Examination	March 30, 2008	Sunday
20.	Mid Term Exam- II for all UG/PG/Ph.D. students	April 7- 8, 2008	Mon. & Tue.
21.	Last day to display the time table by departments/centres	April 08, 2008	Tuesday
22.	Joint Entrance Examination for UG courses 2008(JEE-2008)	April 13, 2008	Sunday
23.	Filling of response forms by all UG / PG students in the respective departments during the week	April 09-11 & April 15-17, 2008	Wed. to Fri Tue to Thu.
24.	Provisional Subject Registration of UG students for Autumn Semester of 2008-09 session	April 09-11, 2008	Wednesday to Friday
25	Provisional Subject Registration of PG/Ph.D. students for Autumn Semester of 2008-09 session	April 12-13, 2008	Saturday to Sunday
26.	Notification of seating Plan and Exam Schedule for all classes including common papers	April 15, 2008	Tuesday
27.	Last date for submission of proficiency grades by Chief Advisors/O.C.N.C.C./D.O.S.(W) TO Academic Section (UGS)	April 25, 2008	Friday
28.	Chairman DRC to invite and receive the topic for P.G. dissertation/Project/Seminar from faculty members	April 25, 2008	Friday
29.	Notices to students' Notice Board regarding shortage of attendance	April 25, 2008	Friday
30.	Issue of blank Progress Forms for Ph.D. students by the P.G. Section to respective departments/centres	April 28, 2008	Monday
31	Last date of submission of applications for change of branch during 2008-09 session by B.Tech. /B.Arch/IDD /Int.M.Tech/Int.M.Sc. 1st year students to Academic Section (UGS)	April 28, 2008	Monday
32.	Action by Academic Sections (UGS & PGS&R) to ascertain that the detained students do not appear in End Term Exam.	April 29, 2008	Tuesday
33.	Last date of teaching for all UG/PG classes	April 30, 2008	Wednesday

34.	Practical Examination	May 01-03, 2008	Thu. to Sat
35.	End Term Exam. for all classes	May 05 to 12, 2008	Mon. to Mon.
36.	TECHNOLOGY DAY	May 11, 2008	Sunday
37.	Allotment of topic of dissertation to students	May 13, 2008	Tuesday
38.	Last date to show the Answer Script of End Term Examination to the students	May 19, 2008	Monday
39.	Moderation of Grades by the Grade Moderation Committee	May 20, 2008	Tuesday
40.	Display of Grades for all examinations	May 20, 2008	Tuesday
41.	Last date for sending of Grades to Academic Sections (UGS and PGS&R) for all UG/PG classes (within seven days from the date of Exam.) except Viva-Voce Exam. for B.Tech. final year project.	May 21, 2008	Wednesday
42.	Viva voce exam. for B.Tech. Final Year Project	May 22 & 23, 2008	Thu & Fri
43.	Declaration of result except B. Tech. final year	May 26, 2008	Monday
44.	B.Tech. IV yr Project Grades to be submitted to Academic Section (UGS) by departments	May 26, 2008	Monday
45.	Declaration of Results of B.Tech. Final Yr. classes	May 29, 2008	Thursday
46.	Declaration of JEE-2008 Result	May 30, 2008	Friday
47.	Summer Vacation	May 30 to July 18, 2008	----------
48.	Submission of Progress Reports by the Ph.D. students to Departments/Centres	June 13, 2008	Friday
49.	Joint Entrance Examination Counselling for B.Tech. /B.Arch./IDD/Int.M.Tech/Int.M.Sc. Programmes	June 18 to 21, 2008	Wednesday to Saturday.
50.	Joint Entrance Examination Arch./Design Aptitude test	June 21, 2008	Saturday
51.	Last date for submission of M.Tech. / M.Arch./ MURP / M.Phil / M.Sc. & M.Tech.(ES) dissertation.	June 30, 2008	Monday
52.	Declaration of JEE-2008 Course Allocation Results	June 30, 2008	Monday
53.	Institute Reopens for the session 2008-09	July 21, 2008	Monday
54.	Date of registration of all UG/PG Students other than New Entrants	July 28, 2008	Monday
55.	Classes begin for all students, other than New Entrants	July 29, 2008	Tuesday
56.	Registration of all New UG Students including IDD/ 5 years Integrated Courses	July 29, 2008	Tuesday
57.	Registration of all New PG Students including New Research Scholars	July 30, 2008	Wednesday
58.	Orientation Programme for all New UG and PG Students	July 31, 2008	Thursday
59.	Classes begin for all New Students including research scholars	August 01, 2008	Friday

Note:- Heads of Department are requested to please plan the functions / Seminars on Saturdays and Sundays so that the Institute is able to maintain the minimum teaching days required in a semester.

Summer Term 2007-08 for 1st & 2nd Yr B.Tech. /B.Arch./IDD/Int.M.Tech/Int.M.Sc.,

1.	Registration for Summer Term	21.5.2008 (Wed) to 23.5.2008 (Fri)
2.	Beginning of Summer Term for UG Classes	26.5.2008 (Monday) to 07.07.2008 (Monday)
3.	Examination of Summer Term Classes	July 09-10, 2008 (Wednesday & Thursday)
4.	Declaration of Summer Term Results	July 14, 2008 (Monday)

Appendix 'C'
Item No. Senate / 22.2.9

TRANSCRIPT VALID ONLY IF IT BEARS INSTITUTE HOLOGRAM

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

OFFICIAL TRANSCRIPT

(Statement of Earned Credits & Grades)

HOLOGRAM

ENROLLMENT NO. OF THE STUDENT: NAME:

PROGRAMME: BACHELOR OF TECHNOLOGY (CIVIL)

SESSION 2004-05 SEMESTER Autumn

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
ST-101	FUNDAMENTALS OF BIOTECHNOLOGY	A	2
MI-101	BASIC MANUFACTURING PROCESSES	B	3
CY-101	CHEMISTRY	A	5
MA-101	MATHEMATICS-I	A	4
PH-101	PHYSICS-I	B	5
HS-101	ENGLISH (BASIC/ADVANCE)	B+	4
CE-101	ENGINEERING GRAPHICS-I	A	3

EARNED CREDITS 25 SGPA 8.230
REG. CREDITS 26 TOTAL EARNED CREDITS 26 CGPA 8.230

SESSION 2004-05 SEMESTER Spring

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
IC-102	COMPUTER SYSTEMS & PROGRAMMING	C+	4
MA-102	MATHEMATICS-II	B	4
PH-102	PHYSICS-I	B	5
EC-102	ELECTRONICS	B+	4
MI-106	ENGINEERING GRAPHICS-II	C-	3
EE-101	ELECTRICAL SCIENCE	B	4
PR-201	GARDENING	A	2
PR-501	N.C.C.	C	2
DISP	DISCIPLINE	A+	2

EARNED CREDITS 30 SGPA 7.100
REG. CREDITS 30 TOTAL EARNED CREDITS 56 CGPA 7.625

SESSION 2005-06 SEMESTER Autumn

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
MA-201	MATHEMATICS III	B+	4
CE-251	BUILDING CONSTRUCTION & DRAWING	C+	3
IC-202	FLUID MECHANICS	B+	4
IC-201	NUMERICAL METHODS	A	4
IC-204	SOLID MECHANICS	A	4
HS-201	TECHNICAL COMMUNICATION	B+	4

EARNED CREDITS 23 SGPA 8.087
REG. CREDITS 23 TOTAL EARNED CREDITS 79 CGPA 7.759

SESSION 2005-06 SEMESTER Spring

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
EQ-01	INTRODUCTION TO EARTHQUAKE ENGINEERING	C+	4
CE-200	GROUP DISCUSSION	C+	1
MV-201	MANAGEMENT	B+	4
CE-232	PIPE AND CHANNEL HYDRAULICS	B	4
CE-254	CONSTRUCTION MATERIAL & ESTIMATION	B	2
CE-242	PRINCIPLES OF SURVEYING	C+	4
CE-252	STRUCTURAL ANALYSIS-I	B+	4
PR-115	KHO-KHO	A	2
DISP	DISCIPLINE	A+	2

EARNED CREDITS 27 SGPA 7.333
REG. CREDITS 27 TOTAL EARNED CREDITS 106 CGPA 7.551

SESSION 2006-07 SEMESTER Autumn

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
CE-351	STRUCTURAL ANALYSIS-I	B+	4
CE-341	GEOMATICS ENGINEERING	C+	5
HS-51	PSYCHOLOGICAL BASIS OF BEHAVIOUR	B	4

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

OFFICIAL TRANSCRIPT

(Statement of Earned Credits & Grades)

ENROLLMENT NO. OF THE STUDENT: NAME:

PROGRAMME: BACHELOR OF TECHNOLOGY (CIVIL)

HS-301	ECONOMICS	B+	4
CE-331	HYDROLOGY	B+	3
CE-321	SOIL MECHANICS & ENGINEERING GEOLOGY	B+	6
CE-300	GROUP DISCUSSION	B	1

EARNED CREDITS 27 SGPA 7.444

REG. CREDITS 27 TOTAL EARNED CREDITS 133 CGPA 7.609

SESSION 2006-07 SEMESTER Spring

SUBJECT CODE	SUBJECT TITLE	GRADE	CREDIT
CE-322	FOUNDATION ENGINEERING	C+	4
IEQ-03	UNDERSTANDING EARTHQUAKE DISASTER	S	4
CE-362	TRANSPORTATION ENGINEERING-I	D	5
CE-352	DESIGN OF CONCRETE STRUCTURES I	C	4
CE-354	DESIGN OF STEEL STRUCTURE I	C	3
CE-312	ENVIRONMENTAL ENGINEERING-I	C+	5
PR-102	BADMINTON	B-	0
DISP	DISCIPLINE	A+	2

EARNED CREDITS 27 SGPA 5.815

REG. CREDITS 27 TOTAL EARNED CREDITS 160 CGPA 7.306

STUDENT HAS NOT YET COMPLETED THE PROGRAMME

Evaluation and Grading : The student is graded for his/her academic performance on a ten point scale in the following manner:

Outstanding - A+(10), Excellent - A(9), Very Good - B+(8), Good - B(7), Average - C+(6), Below Average - C(5), Marginal - D(4), Poor - E(2), Very Poor - F(0), Audit Pass - AP, Audit Fail - AF, Incomplete Course - I, Incomplete Project/Dissertation X, Satisfactory completion of Dissertation - S, Unsatisfactory Dissertation - U, Withdrawal - W, Non-completion of course requirement and/or training - Z

Note:-

The medium of instruction at this Institute is English.

The Institute does not issue rank certificates.

The Institute does not prescribe any formula for conversion of grades into percentage of marks and vice-versa.

The Minimum CGPA for the award of B.Tech. Degree is 5.0

Place: Roorkee

Dated:

Authorised Signatory

Appendix 'D'
Item No. 22.2.10

DEPARTMENT OF .....
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

M.TECH. DISSERTATION GRADE -SHEET (IV Semester, Session.....)
Candidate's Name.....Enrolment No.....
Branch.....Year of Initial Registrarion.....
Title of Dissertation.....Submission of Dissertation for first time after Minor Revision/ Resubmission.

Examiners Weightage	**Qualifying Figure**	**Marks in Words**	**Marks in Figures**
*Publication of Research Paper(s)	10%		
Supervisor/ guide on the basis of thesis and research paper work	20%		
External examiner on the basis of thesis evaluation	20%		
Board of Examiners based on merit of Dissertation and Viva-voce Performance	50%		
Grand Total	100%		

Letter Grade Points in Figures

Absolute Grade Awarded:

The Viva-voce examination was held on..... .....at Roorkee.

Supervisor(s) External Examiner

DRC Nominee HOD or his Nominee

*Publication of Research Paper(s). To be Awarded by the Board of Examiners.

1. upto 10% Published/ accepted for publication in journal, with the consent of the Supervisor.
2. upto 8% To be considered for possible publication in journal after revision with the consent of the Supervisor.
3. upto 5% Communicated for possible publication in a journal/ Presented or accepted/ communicated for possible presentation in a Conference.

Note:

1. In case a student is allowed to work to an Institute other than IIT Roorkee (such as DAAD, KTH etc.), a certification from the guide of that Institute for the progress of work (satisfactory/ unsatisfactory) is required.

Appendix 'E'
Item No. Senate/22.2.12

1. Subject: **CY-922**
Course Title: ***Nuclear Techniques for Material Characterization***

2. Contact Hours: **L-3; T-0, P-2/2**

3. Examination Duration (Hrs): Theory: **03** Practicals: **0**

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

5. Credits: **03** 6. Semester: **Spring**

7. Pre-requisite: **None**

8. Subject Area: **Pre-Ph.D. Course**

9. Objective of Course: To familiarize students with the nuclear techniques suitable for material characterization and applications in other areas, and to give practical training on nuclear instruments.

10. Details of Course:

Sl. No.	Particulars	Contact Hours
1	***Basic Radiochemistry:*** Types of radioactivity, decay methods, radioactive equilibrium, choice and production of radionuclides, interaction of radiation with mater	6
2	***Nuclear Detectors:*** Properties of a detector, gas filled counters, scintillation and semiconductor detectors, Clover detectors.	4
3	***Applications of Radioactivity:*** Isotope dilution analysis, radioimmunoassay, radiochemical methods for determining biological activity, radiopharmaceutical, neutron activation analysis	8
4	***Ion Beam Analysis and Micro-analysis:*** Proton Induced X-ray Emission (PIXE), Rutherford Backscattering spectrometry (RBS), Nuclear Reactions Analysis. Nuclear microprobe - μ-PIXE, μ-RBS, scanning transmission ion microscopy (STIM) Comparison with other microprobes: electron microprobe, synchrotron based μ-XRF	10
5	***Applications of Ion Beam Analysis:*** Quantitative elemental imaging; applications to biomedical science, geological science, materials science, toxicology, single cell irradiation, proton beam writing for nanostructure fabrication	14

Recommended Books:

1. Ehmann (WD), Vance (DE), Raciochemistry and Nuclear Methods of Analysis, 1991, John Wiley and Sons, New York.
2. Sood, (DD), Reddy (AVR), Ramamoorthy (N). Fundamentals of Radiochemistry, 2004, Indian Association of Nuclear Chemists and Allied Scientists, Mumbai.
3. Johansson (SAE), Campbell (JL), Malmqvist (KG), Particle Induced X-ray Emission Spectrometry, (Chemical Analysis: A series of Monographs on Analytical Chemistry and Applications), 1995, Wiley Interscience.
4. Meyer (JW) and Rimini (E), Ion Beam Handbook for Material Analysis, Academic Press, 1977.

Laboratory Experiments:

1. Resolution of a scintillation detector by using single channel analyser.
2. Dead time of GM Counter and statistical aspects of radiation
3. Measurement of activity with scintillation detector by using a single channel analyser and a multichannel analyser
4. Determination of attenuation coefficient in Aluminium by using gamma source
5. Calibration and gamma spectrum recordiing by HPGe detector.
6. Recording of alpha ray spectrum
7. Measurement of Half-life of a suitable radioactive source

APPENDIX 'F'
Item No.Senate/22.2.6

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. **Subject Code: AH-522 Course Title: Waste Water Collection, Treatment and Disposal**

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

3. **Examination Duration (Hrs): Theory: 03 Practical: 00**

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

5. **Credits: 04** 6. **Semester:** [ ] Autumn [✓] Spring [ ] Both

7. **Pre-requisite:** Knowledge in Fluid Mechanics 8. **Subject Area:** PG-14

9. **Objective of Course:** The course is intended to appraise domestic waste water flows, collection treatment and disposal including rational design.

10. **Details of Course**

Sl. No.	Particulars	Contact hours
1.	Waste Water Engineering, overview, quality, sources of water and effluent standards, waste load and its evaluation, Flow rates. Water Supply data. Actual measurement, analysis of flow data.	4
2.	Natural drainage system and waste water disposal	2
3.	Waste water collection, sewerage systems and sewage pumping, Software for sewer design and estimating	8
4.	Waste water treatment objectives, methods and implementation strategy, centralised and decentralised system. • Physical operations, screening, grit removal, flow equalisation, sedimentation. • Biological processes: Aerobic and anaerobic attached and suspended growth processes. Pond system, combination and / or alternatives. • Design of treatment units. • Life Cycle Cost	11
5.	Polishing of treated waste water, disinfection, nutrient removal.	4
6.	Natural treatment systems.	3
7.	Treatment of sludge.	2
8.	Disposal of treated effluent & sludge.	3
9.	***Generation of resources and revenues from STPs and ETPs***	2
10.	***Disaster management in the operation and maintenance of treatment plants***	3
	TOTAL	42

Demonstration: Operation and maintenance of STPs & ETPs.

Suggested Readings

S. No.	Authors/ Title / Publisher	Year of Publication
1.	Metcalf and Eddy, (Revised by G. Tchobanoglous and Franklin L. Burton), Waste Water Engineering Treatment, Disposal Reuse. McGraw Hill incl.	2003
2.	M.L. Davis, David A. Cornwell. WCB, Introduction to Environmental Engineering. McGraw Hill	2006
3.	Manual of Sewerage and Sewage Treatment, CPHEEO	1993
4.	Manual on Water Supply and Treatment, Ministry of Urban Development, New Delhi	1999

INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE
NAME OF DEPTT/CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. **Subject Code: AH-523** **Course Title: Water Quality Assessment**

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

3. **Examination Duration (Hrs): Theory: 03** **Practical: 00**

4. **Relative Weightage:** **CWS 15** **PRS 15** **MTE 30** **ETE 40** **PRE 00**

5. **Credits: 04** 6. **Semester:** [✓] **Autumn** [ ] **Spring** [ ] **Both**

7. **Pre-requisite:** Nil 8. **Subject Area:** PG-14

9. **Objective of Course:** To understand sources/causes and impacts of water pollution. To provide basic, monitoring principles and analytical techniques, appraise conservation measures.

10. **Details of Course**

Sl. No.	Particulars	Contact hours
1.	Types of water pollution, objectives and standards. Water quality criteria. Natural water quality	2
2.	Sources of water pollution, point and non-point sources.	4
3.	Water quality monitoring, schedules, data generation, quality assurance, data validation, method development and evaluation. Grab, integrated, composite sampling, preservation of samples, expression of results.	5
4.	Fundamentals of Chemistry in water and waste water. Quality characterization. Importance of quantitive measurements. Standard methods of measurements, volumetric, gravimetric, colorimetric techniques.	4
5.	Physical methods of analysis, turbidimetry Nephlometry. Optical methods of measurement, potentiometry, Chromatography, Spectroscopy.	4
6.	Measurement of turbidity, color, pH, Acidity Alkalinity, Hardness, Chloride and Chlorine residuals, dissolved oxygen, B.O.D., C.O.D., Nitrogen in various forms, solids, Fe and Mn. Trace contaminants phosphorus as phosphates, sulphur as sulphates, fluorides, oil and grease, volatile acids.	8
7.	Biological and Bacteriological parameters, Phytoplankton, Zooplankton, indicator organisms. MPN, MF methods of coliform and Streptococcus measurements.	5 3
8.	River and Lake pollution. Water quality indices	3
9.	Uniform Protocol for water quality managements (WQM) and its Provisions.	2
10.	Case histories of ongoing National Conservation programmes.	2
	TOTAL	42

List of Practicals

(1) Measurement of the Total Dissolved Solids (TDS), Total Suspended Solids (TSS) and Total Solids (TS) in water sample.

(2) Determination of Chlorides, Total Hardness, Calcium and Magnesium Hardness of the water sample.

(3) Determination of Alkalinity and acidity of water sample.

(4) Determination of Total Phosphorus.

(5) Bacteriological Examination for Total Coliform, Faecal Coliform etc. of sewage and water

Contd..

Suggested Readings

Sl. No.	Authors / Title / Publisher	Year of Publication
1		
2	David H. Liu and Bela G., Environmental Engineers' Handbook Crcnetbase Water Pollution Liptak 1999	1999
3	*M.L. Davis, David A. Cornwell WCB, Introduction to Environmental Engineering, McGraw Hill*	1998
4	*AWWA and WEE, Standard Methods for the Examination of Water and Waste Water, 20th Edition A.P.H.A.*	1998
5	*Clairn, Sawyer, Perry L. McCarty, Gene F Parkin, Chemistry for Environmental Engineering, McGraw Hill*	1994
6	*W. Stumm and James J. Morgan, John Wiley, Aquatic Chemistry, Sons*	1996
7.	*Guidelines for Drinking Water Quality Vol. 1 (1993), Vol. II (1996) & Vol. III(1996), WHO.*	1997

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. **Subject Code:** AH-544 **Course Title:** **Project Formulation & Implementation**

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

3. **Examination Duration (Hrs): Theory: 03** **Practical: 00**

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

5. **Credits: 04** 6. **Semester:**

Autumn	Spring	Both
	✓	

7. **Pre-requisite:** NIL 8. **Subject Area:** PG-13

9. **Objective of Course:** To understand basic elements of project management: project management activities, project communication, project monitoring, financial management evaluation and control.

10. **Details of Course**

Sl. No.	Particulars	Contact hours
1	Programme and Project objectives	1
2	Preparation of reports; PFR, DPR, Cost Estimates,	3
3	Project Implementation methods: Self management, Project management ***and project management agencies***	2
4	***Public hearing process***	4
5	Tendering procedures: ***Tender documents of central & different state governments. Standard Tender documents from international bodies like world bank, ADB & other funding agencies. Procedures for developing on-line tendering procedure.***	5
6	Procurement **procedure**	2
7	Internal Rate of Return, Cost Benefit Analysis	4
8	Financial Management	2
9	Resource ***mobilization and*** sustainability of the Project	3
10	Project planning - Effective planning, background of network charts, network elements, drawing the network, PERT and CPM comparison and application., monitoring and control	6
11	Management concepts: Planning - organizing, staffing, directing and controlling.	3
12	Use of application softwares in project management.	5
13	***Specific regulations/statuary acts of other countries not practiced in India.***	2
	TOTAL	**42**

Suggested Readings

Sl. No.	Authors / Title / Publisher	Year of Publication
1	The Engineering and Constructive Contract: Vol A to F and 4 other Volumes – The Institutions of Civil Engineers, UK	1995
2	Quality in the Constructed Project – Manual No. 73, ASCE	1990
3	Vambari V.P and Jha CN, Commentary on MP Works Department Manual, Suvidha Law House	2002
4	Analysis of Rates for Civil Works Vol. I & II, CPWD	2000
5	Project Implementation Guidelines-World Bank, CPWD and State Agencies.	Latest editions
6	Application Softwares MS-Project	Latest version

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. **Subject Code: AH-526** **Course Title: Environmental Laws, Public Participation & Institutional Development**

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

3. **Examination Duration (Hrs): Theory: 03 Practical: 00**

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

5. **Credits: 04** 6. **Semester:** [ ] **Autumn** [✓] **Spring** [ ] **Both**

7. **Pre-requisite:** NIL 8. **Subject Area:** PG-14

9. **Objective of Course:** The course is intended to introduce the legal aspects of environmental protection. The course is intended to introduce to the candidates the subjects of awareness, informed participation of civil society and institutions and their linkages with conservation of natural resources.

10. **Details of Course**

Sl. No.	Particulars	Contact hours
1.	Genesis of environmental acts.	1
2.	Main national laws	1
3.	Water (prevention and control of pollution) Act-1974 and amendments. Title and definitions. Constitution of central and state boards. Prevention and control of water pollution.	2
4.	Water (prevention and control of pollution) rules, cess act, cess rules	1
5.	Environment (protection) act rules 1986 powers of central govt., Prevention control and abatement of environmental pollution. Hazardous wastes (management and handling rules 1989)	1
6.	*Pollution Abatement Policy, 1992*	*1*
7.	Municipal and solid waste (management and handling) rules 2000, biomedical waste rules 1998 and chemical accidents rule 1998.	2
8.	*Environment policies: National Environmental policy (NEP) 2006, Water policy 2002*	*2*
9.	National Environmental Tribunal Act and Appellate Authority.	1
10.	Environment Audit: Concept and procedure	3
11.	International Protocol, Treaties and Conventions	1
12.	*Latest International global environmental concepts like global warming and its impact on water resources, Stock-holm Convention and Basal convention*	3
13.	*Rio-Earth summit, maintenance of biodiversity,* awareness: need, concept & significance	3
14.	Modes of awareness generation information, education, communication.	2
15.	Costing of awareness generation	3
16.	Sustainability and impact assessment.	2
	Civil Society: Concept and components	
	a) Role of civil society in awareness generation	1
	b) Stages of Public Participation	1
	c) Forms of Public Participation.	1
17.	Concept and role of Institutions;	
	a) Evaluation of existing institutions	3
	b) Design of institutions	2
	c) Case studies	3
18.	d) Laws related to the institutions	2
	TOTAL	42

Contd....

Suggested Readings

Sl. No.	Authors / Title / Publisher	Year of Publication
1	Manual on Environmental Law 2001. Commercial law publishers (India) 2001	2001
2	Water (prevention and control) Act 1974 and amendments.	1974
3	Environmental (protection) Act 1986 and amendments.	1986
4	Satjal Upadhyay and Videh Upadhyay, Handbook of Environmental Law. Vol. 2. Lexis Nexis Butterworth	2002
5	P.R. Trivedi, International Environmental Laws. APH Publishing Corporation	1996
6	Magdolna Toth Nagy, Margaret Bowman, Jiri Dusik, Jerzy Jendroska, Stephen Stec, Manual on Public Participation in Environmental Decision making, Current Practice and Future Posibilities in Central and Eastern Europe, Karel vander Zwiep and Jajor Zlinszky, Budapest	1994
7.	Environmental Policy MoEF	2006
8.	Pollution Control Acts, Rules and Modifications by Central Pollution Board New Delhi	2006

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. Subject Code: AH-525 Course Title: Ecology and Limnology

2. Contact Hours: L: 3 T: 1 P: 2/2

3. Examination Duration (Hrs): Theory : 03 Practical : 00

4. Relative Weightage: CWS 15 PRS 15 MTE 30 ETE 40 PRE --

5. Credits: 04 6. Semester: [ ] Autumn [✓] Spring [ ] Both

7. Pre-requisite: Course on Biology, Microbiology and Ecology 8. Subject Area: PG-14

9. Objective of Course: Appraisal of aquatic resources.

10. Details of Course

Sl. No.	Particulars	Contact hours
1.	Ecology, its relevance to human welfare, sub-divisions, principles and scope.	3
2.	Ecosystems, structure and functions, biotic and abiotic components, productivity and energy flow, cycling of materials, energy efficiency, limiting factors, development and evolution.	6
3.	Trophic levels, food chain and food webs, ecological pyramids, competition, population ecology.	4
4.	Natural and man-made ecosystems	2
5.	Lakes, wetlands and rivers, structure and functions, usefulness	2
6.	Aquatic biodiversity and its importance	2
7.	System analysis, approach to development of models	3
8.	Stressed ecosystems, homeostasis, ecological succession	2
9.	Pollution of lakes and rivers, eutrophication	4
10.	Conservation and management of lakes, wetlands and rivers	2
11.	Principles and application of restoration methods, technologies	2
12.	Catchment rehabilitation, wastewater treatment, biomanipulation, bio-remediation, removal of sediments, aeration, siphoning of hypolimnion, maintaining minimum dependable water flow, flood-plain restoration, use of constructed wetlands for upgrading water quality, improvement in hydrology, selective use of weed removal, stabilisation of shores	3
13.	National/international perspectives, policies etc. Ramsar Convention, NLCP, NRCD	2
14.	Case histories of Dal Lake, Nainital Lake, Chilka and Loktak wetlands, River Ganges and Yamuna etc.	5
	TOTAL	42

List of Practicals:

(1) To determine the pH, Electrical Conductivity and Turbidity.
(2) To determine the Fluoride, Phosphorous and Nitrogen and Total Iron.
(3) To determine the Oil and Grease content in water sample.
(4) To determine the Dessolved Oxygen, BOD and COD.
(5) To identify Plankton, phytoplankton, zooplankton and macroinvertebrates.
(6) To determine the P/R ratio

Contd....

Suggested Readings

Sl. No.	Authors / Title / Publisher	Year of Publication
1	P. A. Kiddy, Wetland Ecology: Principles and Conservation. Cambridge University Press, Cambridge	2000
2	The Ramsar Convention on Wetlands: Its history and development. Ramsar Convention Bureau, Gland, Switzerland. 120 pp.	
3	E. P. Odum, Fundamentals of Ecology, 3rd Ed. W. D. Saunders, USA	1996
4	C. Serruya and U. Pollingher, Lakes of the warm Belt.: Cambridge Univ. Press, Cambridge	1983
5	R. G. Wetzel, Limnology: Lakes and Rivers Eco Systems, Saunders, Philadelphia, USA Rev. Ed.	2001
6	G. E. Hutchinson, A treatise on Limnology Vol. I-IV, Wiley Interscience, New York	1995
7	R.L. Kitching, Systems Ecology, Univ. of Queensland Press	1989
8	Hermann Remmert, Ecology, A Text Book, Springer-Verlag, New York	1982
9	Christer Brönmark and Lars –Anders Hansson, The Biology of Lakes and Ponds, Oxford University Press	2001
10	J.S. Gupta, Text Book of Algae, Oxford & IBH Publishing Co.	1981
11	Ward, H.B. and Whipple, G.C. (Edited by W.T. Edmonson). Fresh Water Biology, John Wiley	1992
12	Marten Scheffer, Ecology and Shallow lakes, Chapman and Hall	1998
13	P. Odum, Ecology, Eugene Sinauer Associates Inc.	1996
14	Clark, and Brian Morr, A guide to the restoration of nutrient enriched shallow lakes, Jane Madgwick and Geoft Phillips	1996
15	Cooke et al: Restoration and management of lakes and reservoirs, Taylor & Francis publication (CRC Publication)	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. **Subject Code:** AH-527 **Course Title:** Laboratory Course

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

3. **Examination Duration (Hrs): Theory:** 0 **Practical:** 03

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

5. **Credits:** 02 6. **Semester:** [✓] Autumn [ ] Spring [ ] Both

7. **Pre-requisite:** 8. **Subject Area:** PG-13

9. **Objective of Course:** To understand the features of environmental degradation.

10. **Details of Course**

Sl. No.	Particulars	No. of Practicals
1.	Solid waste characterization	1
2.	Soil characteristics, importance & relevance for waste treatment, sludge disposal and solid waste disposal; permeability, porosity LL, PL, grain size distribution, soil classification and resistivity.	2
3.	Leak detection	1
4.	Flow measurement techniques: 'V' notch, flume etc.	1
5.	*Sediment Analysis*	1
6.	*Trace element analysis*	1
7	Performance evaluation of various waste water treatment systems: a) Lagoons b) Oxidation Pond c) ASP d) UASB & other treatment plants	4
8.	*Demonstration of latest equipment*	1
	TOTAL	12

Continuous evaluation procedure shall be followed.

Suggested Readings

1. Standard methods of analysis (APHA, EPA, WHO, IS)
2. Indian & International Standards

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT./CENTRE: ALTERNATE HYDRO ENERGY CENTRE

1. Subject Code: AII- 546 Course Title: ADVANCES IN AQUATIC ECOLOGY

2. Contact Hours: L: 3 T: 1 P: 2/2

3. Examination Duration (Hrs): Theory: 03 Practical: 00

4. Relative Weightage: CWS 15 PRS 15 MTE 30 ETE 40 PRE ---

5. Credits: 04 6. Semester: Autumn [✓] Spring [✓] Both [ ]

7. Pre-requisite: Knowledge of Ecology

8. Subject Area: PG-14

9. Objective of Course: The course is intended to expose Master's level students with latest advancement in theories, principles and practices in the field of Aquatic Ecology.

10. Details of Course

Sl. No.	Particulars	Contact hours
1	Brief overview of course, the special properties of water, Living organisms in water, site selection, project design, rapid field bio-assessment protocol, physic-chemical characterization, introduction to sampling gears and their uses.	3
2	Rapid field bio-assessment: sample collection and preservation techniques, microbiological analysis, structure and productivity of aquatic ecosystems, the oxygen content of freshwaters and salinity of inland waters	4
3	Physico-chemical analysis using test kits, Inorganic carbon, the nitrogen cycle, biological samples identification, the Phosphorous Cycle, Iron, sulphur and silica cycles	4
4	The river continuum concept: A model, hydrological characteristics: The hydrological cycle, stream order, fluctuations in flow, the transport of material, the channel, the stream and its valley	5
5	Physical Characteristics: light, current, substrate, temperature, chemical characteristics, biological characteristics, major water quality issues in rivers, identification of samples, calculation of biological indices	4
6	Lake ecosystem concept, characteristics and typology, water quality issues, assessment strategies, calculation and validation of biotic scores and indices, developing water quality maps.	5
7	Properties of marine environments, biological components of marine ecosystems, geomorphologic features of marine environments	4
8	Hydrographic features, contrasts of coastal and open water column ecosystems, controls of production and abundance in coastal environments, Effect of climate change on the worlds oceans and freshwaters, acid rain and freshwater ecosystems, pesticides in water, long range transport of pollutants	4
9	Deliberate modification of rivers, urbanization and its effects on river flow and quality, deforestation and its effects on river flow and water quality, the human impact on lake levels, change in groundwater conditions, water pollution by chemicals from agriculture and other activities, thermal pollution with suspended sediments	4
10	Ecological assessments: Use of benthic algae as indicators of environmental quality, use of macro-invertebrates as biotic indicators of environmental quality, Introduction of Analytical Approaches: Multimetric approach of analysis, multivariate approach of analysis, establishing cause-effect relationships in multi-stressor environments	5
	Total	42

Contd....

Practicals

1. Rapid field bio assesment – 3
2. Bio assessment of water quality using bio indicators – 3
3. Assessment of bio indices – 2

Suggested Reading:

Sl. No.	Authors / Title / Publisher	Year of Publication
1	Rajgopalan G. & Trivedy R.K. *"Aquatic Ecology"* Published by Agrobios, Jodhpur, 2002	2002
2	Sharma L.L. & Saini V.P. *"Methods in Aquatic Ecology"* Published by Udaipur Agrotech , Udaipur	2003
3	Walter K. Dodds *"Freshwater Ecology: Concepts & Environmental Applications (Aquatic Ecology"* Published by Academic Press, California	2002
4	Hawksworth David L. & bull Alan T. *"Marine, Freshwater, and Wetlands Biodiversity"* Published by Springer Verlay	2007
5	Livingston Robert J. *"Restoration of Aquatic System"* Published by CRC Pr. I Llc	2005
6	Paul del Giorgio & Peter J. Leb Williams *"Respiration in Aquatic Ecosystems"* Published by Oxford Uni. Press	2005
7	Andrea Belgrano, Jannifer Dunne, Ursula M. Schorler & Robert E. Ulanowicz, *"Equatic Food Webs: An ecosystem Approach"* Published by Oxford Uni. Press	2005

Appendix 'G'
Item No. Senate/22.2.18

GENERAL CURRICULAR STRUCTURE & CREDITS FOR THE 5 YEAR INTEGRATED M.SC./M.TECH SCIENCE PROGRAMMES

(A) **Common Courses for the First Four Semester (Two Years) Institute Core Courses:**

	(i) Humanities and Social Sciences		**Credits**
HSSMC	Technical Communication	1-0-2	02
HSSMC	Management Concepts & Practices	2-0-2	03
HSSMC	Economics & IPR	2-1-0	03
HSSMC	Behavioral Science	2-0-0	02
		Total	10
	(ii) General Science & Engineering Sciences		
ESC	Electrical Science	3-1-2/2	04
ESC	Computer Systems & programming or Fundamentals of Object Oriented Prog.	3-0-2	04
ESC	Electronics	3-1-2/2	04
ESC	Engineering Graphics	2-0-4	04
ESC	Thermodynamics	2-1-0	03
ESC	Computer Aided Graphics	1-0-2	02
ESC	Manufacturing Techniques	2-0-2	03
GSC	Environmental Studies	2-0-0	02
GSC	Introduction to Geosciences	2-0-0	02
GSC	Fundamentals of Biotechnology	2-0-0	02
		Total	30
	(iii) Basic Sciences (Except for M.Tech. in Geological Tech..)		
BSC	Physics		15-20
BSC	Chemistry		15-20
BSC	Mathematics		16-20
		Total	50-51
	For M.Tech. in Geological Technology:		
BSC	Physics		08
BSC	Chemistry		08
BSC	Mathematics		12
BSC	Geology		22
		Total	50

(B) **Specific Programme Courses For Next 06 Semesters(3 Years)**

Specific Programme Courses

(i)	Departmental Core (Including group discussion & viva)	64-68
(ii)	Departmental Electives	20-22
	Total	84-90
	Institute Electives	09-12
	Seminar	04
	Project	04-06
	Dissertation	12-16

(C) **Others**

Discipline	06
NCC/NSS	02
NSO(Proficiency)	04

Grand Total of Credits: 215-228