

सीनेट की द्वितीय बैठक का कार्यवृत्त
MINUTES OF THE 2nd MEETING OF THE SENATE

13.03.2002



भारतीय प्रौद्योगिकी संस्थान रुड़की
रुड़की – 247 667 (भारत)

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE-247 667 (INDIA)

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE

No. MS/484(ii)/Senate/IITR(3/2002)

Dated 5th April ,2002

All Members of the Senate
Indian Institute of Technology, Roorkee

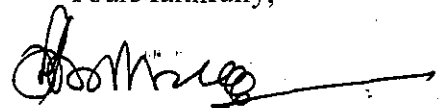
Subject: Minutes of the 2nd Meeting of the Senate held on 13.03.2002 at
11.00 A.M. in the Senate Hall

Dear Sir,

Enclosed herewith please find a copy of the Minutes of 2nd meeting of the
Senate held on 13.03.2002 at 11.00 A.M. in the Senate Hall, for your kind perusal.
Your comments, if any, on the minutes, may please be sent within 15 days.

Encl: as above

Yours faithfully,



(A.K.Srivastava)
Lt. (Col.) Retd.
Registrar &
Secretary-Senate

Minutes of the 2ND Meeting of Senate held on 13.3.2002 at 11.00 A.M. in the Senate Hall

The following were present:

- | | | |
|-----|---------------------------|----------|
| 1. | Prof. Prem Vrat, Director | Chairman |
| 2. | Prof. V.K. Goel | |
| 3. | Prof. Najamuddin | |
| 4. | Prof. S.Y. Kulkarni | |
| 5. | Prof. (Mrs) Ritu Barthwal | |
| 6. | Prof. G.S. Randhawa | |
| 7. | Prof. S.D. Bhattacharya | |
| 8. | Prof. S.C. Gupta | |
| 9. | Prof. I.M. Mishra | |
| 10. | Prof. C.P. Agarwal | |
| 11. | Prof. Surendra Kumar | |
| 12. | Prof. Bikash Mohanty | |
| 13. | Prof. A.K. Jain | |
| 14. | Prof. G. Bhattacharjee | |
| 15. | Prof. R.N. Goel | |
| 16. | Prof. A.N. Garg | |
| 17. | Prof. Kamaluddin | |
| 18. | Prof. V.K. Gupta | |
| 19. | Prof. Anil Kumar | |
| 20. | Prof. (Mrs) Mala Nath | |
| 21. | Prof. S.S. Saini | |
| 22. | Prof. A.K. Mathur | |
| 23. | Prof. M.K. Mittal | |
| 24. | Prof. H.C. Mehndiratta | |
| 25. | Prof. Arvind Kumar | |
| 26. | Prof. N.M. Bhandari | |
| 27. | Prof. N. Puri | |
| 28. | Prof. P.K. Jain | |
| 29. | Prof. R.M. Vasan | |
| 30. | Prof. S.S. Jain | |
| 31. | Prof. (Mrs) Renu Bhargava | |
| 32. | Prof. S.K. Thakkar | |
| 33. | Prof. D.K. Paul | |
| 34. | Prof. Ashwani Kumar | |
| 35. | Prof. H.R. Wason | |
| 36. | Prof. H. Sinvhal | |
| 37. | Prof. V.N. Singh | |
| 38. | Prof. Sri Niwas | |
| 39. | Prof. A.K. Pachauri | |
| 40. | Prof. H.K. Verma | |
| 40. | Prof. A.K. Pant | |

42. Prof. J.D. Sharma
43. Prof.S.C.Saxena
44. Prof..M.K.Vasantha
45. Prof.R.N.Mishra
46. Prof. H.O. Gupta
47. Prof. S.P.Gupta
48. Prof. R.P. Agarwal
49. Prof. R.C. Joshi
50. Prof. A.K.Sarje
51. Prof. A.K. Saxena
52. Prof. S.K.Verma
53. Prof. (Mrs.) Kum Kum Garg
54. Prof. S.N. Sinha
55. Prof. Padam Kumar
56. Prof. D.K. Srivastava
57. Prof. Ranvir Singh
58. Prof. N.K.Goel
59. Prof. Sabiruddin
60. Prof. Pashupati Jha
61. Prof. .D.K.Nauriyal
62. Prof. (Mrs) Asha Kapoor
63. Prof. (Mrs) Renu Rastogi
64. Prof. J.S.Upadhyay
65. Prof. S.K.Bhattacharya
66. Prof. J.P.Singh
67. Prof. H.G.Sharma
68. Prof.U.S.Gupta
69. Prof. G.S.Srivastava
70. Prof. (Mrs.) R. R. Bhargava
71. Prof. S.P.Sharma
72. Prof. T.R.Gulati
73. Prof.R.C.Mittal
74. Prof. J.S. Saini
75. Prof. N.K. Mehta
76. Prof. S.C.Jain
77. Prof. S.C.Solanki
78. Prof. .M.L.Kapoor
79. Prof. R.D. Agarwal
80. Prof. Ishwar Singh
81. Prof. B.D.Indu
82. Prof. A.K.Jain
83. Prof. Rajesh Srivastava
84. Prof.G.S.Singh
85. Prof. Vir Singh
86. Prof. Gopal Chauhan

87. Prof. Devadutta Das
88. Prof. U.C. Chaube
89. Prof. S.K. Tripathi
90. Prof. G.C. Mishra
91. Prof. Ram Pal Singh
92. Prof. M. Perumal
93. Prof. R.M. Manikavasagam
94. Prof. Ashwani K. Chaudhry
95. Prof. S.C. Handa
96. Prof. M.P. Jain
97. Prof. S.R. Bhatt, Delhi University, Delhi
98. Mr. Arun Kumar, Head, AHEC
99. Dr. R.P. Singh, Head, Bioscience & Biotechnology
100. Mr. Yogendra Singh, Librarian
101. Dr. S.P. Srivastava
102. Dr. M.J. Nigam
103. Dr. V.P. Singh
104. Dr. Rashmi Gaur
105. Dr. Vijaya Agarwal
106. Dr. Ajai Gairola
107. Dr. S.K. Barthwal
108. Lt. Col. (Retd.) A.K. Srivastava, Registrar

Secretary

The Chairman (Director) welcomed the members to the 2nd meeting of the Senate and he extended a warm welcome to Prof. S.R. Bhatt of Delhi University who was attending the meeting for the first time and placed on record his appreciation to the valuable contribution made by Prof. D.V. Singh-ex-Chairman of the Senate. Prof. V.K. Goel, Dean Academic Programmes on his own and on behalf of the Senate welcomed Prof. Prem Vrat the new Chairman of the Senate and the members joined him in felicitating the new Chairman. The Senate also welcomed the following new members, as appointed by the Chairman of the Board in accordance with Statute No. 4(e), for a period of two years:-

1. Dr. M.J. Nigam, Associate Professor, E&CE Dept.
2. Dr. V.P. Singh, Associate Professor, Deptt. of Paper Tech. Saharanpur Campus.
3. Dr. Rashmi Gaur, Asstt. Professor, Humanities & Social Sciences Deptt.
4. Dr. Vijaya Agarwal, Associate Professor, Met. & Materials Engg. Deptt.
5. Dr. Ajai Gairola, Asstt. Professor, Civil Engg. Deptt.
6. Dr. S.K. Barthwal, Associate Professor, Physics Deptt.

Before taking up the Agenda, the Chairman apprised the house about some important decisions taken in the meeting of Directors of all the IITs held on 17.1.2002 under the Chairmanship of Secretary Education, MHRD, as follows:

- (a) The increased intake of students in the IITs has caused an imbalance in the PG:UG student- ratio. It was decided that the increased intake of students be further accelerated and imbalances, if any, be removed by giving greater emphasis to P.G. programmes, by effecting optimal use of existing resources and with new delivery methods using educational technology for enhancing effectiveness of the teaching-learning process.
- (b) Since only a small number of IIT graduates join PG/ Research programmes in the IITs, with the result that the quality of PG/ Research programmes was not of similar high standards as the UG programmes, the Directors of all the IITs may come up with innovative schemes for attracting the IIT graduates to join their PG/ Research programmes.
- (c) Problem being faced by the IITs in getting quality faculty was a matter of great concern. It was decided that there may be a standing faculty advertisement, so that the outstanding faculty could be recruited by holding frequent selection meetings. The scheme of Visiting Professors be further expanded and such positions could be offered to NRI and PIOs and bright students who could be offered the positions of teaching assistants.
- (d) A need for national strategic thinking for accelerating the pace of research in IITs was strongly felt, hence synergies between different the IITs and CSIR laboratories could be effectively used for taking up research programmes appropriate to the Country's needs. The Joint Secretary, MHRD pointed out that initiatives for promotion of Biotechnology Education and Earthquake Engg. Education in the IITs were being finalised.
- (e) It was felt that the fee level for PG and Research programmes in the IITs was quite high and was thus discouraging the students to go in for PG programmes. It was decided that the Directors of the IITs be authorised to allow 100% fee waiver in deserving cases for PG and Research students.
- (f) It was apprised in the meeting that the super time scale of Rs. 22000-24500 for Professors of Eminence in the IITs, was under finalisation in the MHRD, and orders were likely to be issued soon:

The Agenda was then taken up:

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

1. Prof.S.K.Kaushik, Civil Engg. Deptt.
2. Prof. Ravi Bhushan, Chemistry Deptt.
3. Prof. S.P.Nigam, Mech. & Industrial Engg. Deptt.
4. Prof.T.K.Bhattacharyya,Mech. & Industrial Engg. Deptt.
5. Prof.G.L.Asawa, Civil Engg. Deptt.
6. Prof. Rama Bhargava. Maths Deptt.

2.1.0 To confirm the minutes of the 1st meeting of the Senate held on 13.12.2001:

The minutes of the 1st meeting of the Senate held on 13.12.2001 were confirmed, as circulated.

2.2.0 To receive a report on the action taken to implement the decisions taken by the Senate at its meeting held on 13.12.2001:

Noted with the following clarifications:

Item No. 4.2: In the composition of the Committee, the name of Prof.S.K.Mohanty was corrected as Prof.B.K.Mohanty.

Item No. 4.11: The President's and Director's medals be named President's Gold Medal and Director's Gold Metal. The medals which were to be awarded in the last Convocation, may be given in the next Convocation.

2.3.0 ITEMS FOR CONSIDERATION:

2.3.1 Considered the charges for the various services to be provided to the students:

After some deliberation, the Senate;

RESOLVED that the following charges be made applicable from the session 2002-2003 onwards for the various services:

<u>Details</u>	<u>Amount</u>
(a) Degree in person	NIL
(b) Degree in Absentia	Rs. 200 in person Rs. 250 by post
(c) Migration Certificate	Rs. 100
(d) Duplicate Degree/ Certificate to be sent in India	Rs. 500
(e) Duplicate Degree/ Certificate to be sent abroad	Rs. 700
(f) Transcripts	These charges be confined to three levels. The Deans, Academic Programmes may examine the entry dates and correspondingly recommend charges for the approval of the Chairman on behalf of the Senate, which may then be reported to the Senate.
(g) Duplicate Marks Sheet	Rs. 50 each upto 15 years old Rs. 100 each more than 15 year old
(h) Supplementary Examination	
(i) B.Tech. / B.Arch.	Rs. 100 per paper (only for June/July 2002)

- 2.3.2 Considered the fees to be charged from the students admitted to the various courses in the Institute from the session 2002-2003 onwards, including those admitted through DASA, ICCR etc.

After some deliberation, the Senate RESOLVED as under:

- (a) The tuition fee be charged as per the IIT Council decision, which is same for all the IIT's.
- (b) The local/ additional fees be charged as per senate decision, if these are not included in the IITs Council decision.
- (c) Caution Money of Rs. 2000/- for Library be charged from all B.Tech. , M.Sc. M.Phil., M.Tech. and Ph.D. students.
- (d) A Sub-committee of Dean, U.G. Studies, Dean, P.G. Studies & Research and Dean of Students Welfare may examine other local/ additional fees and a proposal to this effect be placed in the next meeting of the Senate.
- (e) The tuition fee for M.Tech. (IT) and MBA programmes would remain at the existing levels, if there is no decision of IITs council about the fee structure for these courses. For the MBA programme the tuition fee will be Rs. 30000 per semester plus Rs. 5000/- per semester as the charges for reading material.

All types of fee will be treated as Institute receipts.

- 2.3.3 Considered the tuition fee waivers in respect of students studying in various courses, including self-financing courses like, MBA, Information Technology and MCA at par with the practice followed in the other IITs:

RESOLVED that, as per the practice followed in the other IITs, based on the approval of the IITs Council, the following facilities be approved and made applicable from the session 2002-2003 onwards:

<u>Category of Students</u>	<u>Facilities for Tuition Fee waivers</u>
M.Sc. Students including MCA & M.Tech students in Earth Sciences	Merit-cum-means scholarship of Rs. 300 per month & free tuition to 25% of the sanctioned strength subject to a maximum of five in each deptt as per Institute rules. Admissible to all categories of students whose parents' gross income is less than Rs. 1 lakh per annum including SC/ST students, as approved by the IITs Council. The facilities will not be available to the students studying in MBA, M.Tech. (IT) or any other Self Financing course.

Employees' ward

NIL

Employees 50% waiver in tuition fee for Ph.D. scholars
(as part -time candidates) 100% waiver for tuition fee for PG studies
can be given by Director, as approved by
the IITs Council.

- 2.3.4 Considered the eligibility criteria and the amount of Merit-cum-Means Scholarships to be paid to the students of Under-graduate courses from the session 2002-2003 and the students already studying in the various branches of U.G. courses, as per the norms adopted at IIT, Delhi:

RESOLVED that the eligibility criteria and the amount of Merit-cum-Means Scholarships to be paid to students of Undergraduate courses be approved, as per the norms given in **Appendix 'A'** which are based on the approval of the IITs Council, and be made applicable from the session 2002-2003.

- 2.3.5 Considered the proposal of the BOS of Civil Engg. Department regarding changes in qualifications for admissions to M.Tech. courses:

RESOLVED that the changes in the qualifications for admission to M.Tech. courses, as recommended by the BOS of the Department and later considered in the PG Board meeting held on 17.1.2002 be approved, as detailed below:

Sl. No.	Course of Study	Minimum Educational Qualifications
1.	M.E. (Building Science & Technology)	Bachelor's degree in Civil Engg./Structural Engg./Construction Technology or its equivalent. B.Arch. for two seats reserved for Architecture candidates.
2.	M.E. (Computer Aided Design)	Bachelor's degree in Civil Engg. or its equivalent.
3.	M.E. (Environmental Engg.)	Bachelor's degree in Civil Engg./ Chemical Engg./ Environmental Engg. or its equivalent.
4.	M.E. Geotechnical Engg. (with diversification to Rock Mechanics)	Bachelor's degree in Civil Engg. / Mining Engg. or its equivalent.
5.	M.E. (Hydraulic Engg.)	Bachelor's degree in Civil Engg. or its equivalent.
6.	M.E. (Remote Sensing & Photogrammetric Engg.)	Bachelor's degree in Civil Engg./Electronics Engg./Electrical Engg./ Computer Science/ Information Technology/ Marine Engg./ Mining Engg./ Architecture.

- | | | |
|----|---------------------------------------------------------------------|----------------------------------------------------------------------|
| 7. | M.E. (Structural Engineering- with diversification to Bridge Engg.) | Bachelor's degree in Civil Engg./ Structural Engg. or its equivalent |
| 8. | M.E.(Transportation Engg.-with diversification to Traffic Engg.) | Bachelor's degree in Civil Engg. or its equivalent. |

This changed qualifications will be implemented for the admission to be made in July 2003.

- 2.3.6 Considered the reservation of 3% seats for the Physically Handicapped category of candidates in P.G. Admissions:

RESOLVED that , as considered and recommended by the PG Board in its meeting held on 17.1.2002, the reservation of 3% seats for physically handicapped candidates in the PG admissions, be made over and above the normal intake of the course.

- 2.3.7 Considered the proposal of the B.O.S. of Mech. & Indl. Engg. Department for adding new electives:

RESOLVED that as recommended by the BOS of the Department and later considered and recommended by the PG Board in its meeting held on 17.1.2002, the new electives be added in the existing list of electives to be offered to the PG students in the areas of Industrial/ Production Design. These electives will be added in M.Tech. (Machine Design Engg.) and M.Tech. (Production & Industrial System Engg.) programmes, as per Appendix-'B' attached, with the proviso that the recommended list of Books, under course No. MI-570 'Product Economics & Marketing Principles,' be changed to reflect the contents of the course.

- 2.3.8 Considered the Reports of the Examiners on Ph.D. viva-voce examination for award of the Ph.D. Degree:

RESOLVED that the Reports of the Examiners on Ph.D. viva voce examination be approved and the following candidates be awarded the Ph.D. Degree:

<u>Sl. No.</u>	<u>Name of the</u>	<u>Department</u>	<u>Title of the thesis</u>
1.	Vaishali (Ms).	Chemistry	Kinetics of Oxidation of Some Amines Aminoalcohols and Diols Diperoatoargentate (III)
2.	Hassan Fadhil Naji	Biosciences & Biotechnology	Genetic and Symbiotic Studies on Aromatic Amino Acid Auxotrophs Of Sinorhizobium meliloti.

FURTHER RESOLVED that in future such cases be reported to the Senate after approval of the Director, who is so authorised by the Senate. The Examiners' Reports need not to be attached with the Agenda.

- 2.3.9 Considered the proposal of the Head of Arch. & Planning Department regarding increase in the intake of Master of Architecture and Master of Urban & Rural Planning programmes:

RESOLVED that, as considered and recommended by the PG Board in its meeting held on 12.2.2002, the seats be increased from 06 to 12 in each programme. Six seats in each programme may be with assistanceship and the remaining seats without assistanceship. Further, MHRD be requested to enhance the number of assistanceships in each programme for the students who are admitted with the GATE qualification. The increase in seats will be effective from the 2003-2004 academic session.

- 2.3.10 Considered the question of late registration for those students who do not register on the notified dates due to one or the other reason:

RESOLVED that late registration be allowed only upto a maximum of 10 days after the scheduled registration date. However, proxy registration be permitted which has to be decided by the Deans Academic Programmes.

- 2.3.11 Considered the definition of some of the grades awarded while evaluating the performance of the students under the grade system, which have not been defined earlier i.e. I, W, X and Z grades:

RESOLVED that, as considered and recommended by Board of U.G. Studies in its meeting held on 12.2.2002, the period of absence on medical ground be counted towards the total time allowed for completing a course. Further, the definition of some of the grades awarded, be approved as given below:

- (a) 'I' GRADE: An 'I' grade denotes incomplete performance in any course due to absence at the end of semester. Upon completion of all course requirements, the 'I' grade is converted to a regular grade (A+ to F).
- (b) 'W' GRADE: The 'W' grade is awarded in a course where the student has opted to withdraw from the course. Withdrawal from a course is permitted until one week after the first Minor Tests.
- (c) 'X' GRADE: The 'X' grade is awarded for incomplete project work, at the end of semester. Subsequently it is converted into a regular grade upon completion of the project work and its evaluation. The grade is not awarded for Project Part-I.
- (d) 'Z' GRADE: The 'Z' grade is awarded for non completion of the course requirement and the student will have to register for the course until he/she obtains the 'S' grade i.e. Satisfactory performance.

- 2.3.12 Considered the practical training requirement of B.Tech./B.Arch. students after completion of minimum credits at the end of the 6th semester:

RESOLVED that as considered and recommended by the Board of UG Studies in its meeting held on 12.2.2002, a student will be eligible for practical training only after he has earned a minimum of 100 credits upto the 6th semester, and the practical training is for a duration of eight weeks. The new guidelines be implemented from the session 2002-2003 onwards.

- 2.3.13 Considered the award of S & Z grades in NCC/ Proficiency and Discipline in place of usual the 10 grades system:

RESOLVED that the above issue be referred to the Departmental Faculty Boards for consideration, comments and the matter be then placed before the Senate for its consideration.

- 2.3.14 Considered the criteria for change of branch after B.Tech. I year:

RESOLVED that the practice in vogue in other the IITs in this regard be collected and circulated to the Departments for their comments. The matter be then placed before the Senate for its consideration.

- 2.3.15 Considered the policy of allowing the students of other Institutes to undertake short term training at IIT, Roorkee as one of the components of their academic curriculum and to decide the fees to be charged from them:

RESOLVED that, as considered and recommended by the Board of UG Studies in its meeting held on 12.2.2002, the policy and the fee for the above be approved as under:

- (a) Students only from Government Engineering Colleges be accepted provided the Supervisor and the concerned Head of the Department agree to provide the training and facilities in the Deptt.
- (b) Only 10 to 15 students be accepted in the Institute at any one time.
- (c) A bench fee of Rs. 5000/- p.m. per student be charged by the Institute from the students/ sponsoring institute(s) for the facilities made available at IITR. Other contingent expenses are to be met by the trainees themselves.
- (d) Facilities of hostel, messing and library will be provided on usual payment, if available.
- (e) The sponsoring institution will not advertise in any of their publications that the practical training will be arranged at IITR.
- (f) The training certificate will be given by the faculty supervisor only, after satisfactory completion of the training.

- 2.3.16 Considered whether the period of withdrawal from studies on medical grounds should count towards the total period allowed to complete a course i.e. 06 years for B.Tech. and 07 years for B.Arch. course:

RESOLVED that as considered and recommended by the Board of UG Studies in its meeting held on 12.2.2002, the period of absence on medical grounds be counted towards the total time allowed for completing a course.

- 2.3.17 Considered the recommendations of BOS of Mathematics Department regarding improvement in the Syllabus of MA-692 "Discrete Mathematics".

RESOLVED that, as considered and recommended by the Board of PG Studies in its meeting held on 12.2.2002, the improved syllabus of MA-692 "Discrete Mathematics" as given in Appendix-'C' attached, be approved.

- 2.3.18 Considered the recommendations of BOS of Mathematics Department regarding the changes in the teaching and examination schemes of Master of Computer Applications (MCA):

RESOLVED that, as considered and recommended by the Board of PG Studies in its meeting held on 12.2.2002, the changes in the teaching and examination schemes of the Master of Computer Applications (MCA) Programme, as given in Appendix -'D' attached, be approved, since the changes are in line with the normal practice.

- 2.3.19 Considered the recommendations of BOS of Bio-Sciences and Biotechnology Department regarding modification of course structure of BT-101 "Fundamentals of Biotechnology" for B.Tech. I year classes:

RESOLVED that, as considered and recommended by the Board of UG Studies in its meeting held on 12.2.2002, the modified course structure as given in the Appendix 'E' attached, be approved.

- 2.3.20 Considered the proposal from Prof. & Head, Humanities and Social Sciences Department regarding changes in the course content of 'Building Economics' to be taught to B.Arch. IV year class:

RESOLVED that, as considered and recommended by the Board of UG Studies in its meeting held on 12.2.2002, and as agreed by Prof. & Head of Arch. & Planning Department, the changed course content of 'Building Economics', as given in Appendix 'F' attached, be approved.

- 2.3.21 To consider the MOU to be signed between IIT Roorkee and KTH Sweden:

RESOLVED that the above proposal be referred to the Professor Incharge Planning for review and specific recommendations. The matter be then placed before the Senate for its consideration.

- 2.3.22 To consider the MOU to be signed between IIT, Roorkee and ARBA MINCH WATER TECHNOLOGY INSTITUTE, ARBA MINCH, ETHIOPIA:

RESOLVED that the above proposal be referred to the Professor Incharge Planning for review and specific recommendations. The matter be then placed before the Senate for its consideration.

- 2.3.23 To consider the collaboration between University of Waterloo, Canada and IIT Roorkee:

RESOLVED that the above proposal be referred to the Professor Incharge Planning for review and specific recommendations. The matter be then placed before the Senate for its consideration.

- 2.3.24 Considered the provision of credit transfers from any other Institute to IIT Roorkee for award of Degree:

RESOLVED that the above matter be referred to all the Departments/ Centres for their comments. The Institutions in India and abroad be identified and the matter be then placed before the Senate for its consideration.

- 2.3.25 Considered waiving off of the Institute fee from the students of Foreign Technical Institutes visiting under a MOU on a reciprocal basis: .

RESOLVED that the above be made a part of the MOU and thus, the matter be referred to the Professor Incharge Planning for review and recommendations. The same be then placed before the Senate for its consideration.

- 2.3.26 To consider if a student be not allowed academic registration in a semester after one month from the date of registration:

This item was withdrawn in view of the foregoing item No. 2.3.10.

- 2.3.27 Considered the recommendations of the Board of Studies of Civil Engg. Deptt. for recognising the Space Application Centre (SAC, ISRO) Ahmedabad as a Centre for carrying out research work for a Ph.D. degree in Civil Engg.:

RESOLVED that the Space Application Centre (SAC, ISRO) Ahmedabad be recognised as a Research Centre for carrying out the research activities by the Civil Engg. Department and also by other Departments/ Centres of the Institute, who wish to undertake research work there.

The Senate also RESOLVED that all national research laboratories be recognized as Research Centres for carrying out research work leading to postgraduate and Ph.D. degrees of the Institute in the relevant disciplines.

- 2.3.28 Considered the proposal to start a modular M.Tech. (Process Integration) programme in the Chemical Engineering Department:

The house agreed in principle that such a modular M.Tech. programme should be started in the Institute, without compromising on standards/ quality of education. There may not be any subsidy to anybody, and the programme must be fully sponsored. After some preliminary discussions, it was RESOLVED that the Senate members may send their comments on the proposed modular M.Tech. (Process Integration) programme to Prof. I.M. Mishra, Head of Chemical Engg. Department. The modified proposal, taking into account the inputs so received, be placed before the Senate for its consideration through the PGS&R Board.

- 2.3.29 Considered admission of candidates to the Ph.D. programme in various departments upto March 31, 2002:

RESOLVED that, as considered and recommended by the Research Degree Committee in its meeting held on 28.2.2002, the candidates as per the criteria finalised by the RDC be offered admission to the Ph.D. programme in various limbs and allowed to join upto 31.3.2002. Since 31. March is a Sunday, the candidates may join on 1 April 2002.

- 2.3.30 Considered award of fellowships to the students who were admitted to various Postgraduate Programmes without fellowship during the session 2001-2002:

After some discussion, the Senate RESOLVED as under:

- (i) The students admitted in July 2001 with a minimum of 75 percentile GATE score and a 7.5 CGPA but without fellowship, be selected for the award of Fellowship.

- (ii) The fellowship be awarded w.e.f. 21.9.2001 or when the seats were vacated by those students who were admitted with fellowship, whichever was later.
- (iii) The names of such students who are now awarded fellowship will be reported to the Senate.
- (iv) Relaxation to SC/ST candidates in terms of GATE percentile/CGPA be allowed.

2.3.31 Considered the recommendations of the BOS of Biosciences and Biotechnology Department for some changes in the M.Sc. (Biotechnology) programme:

RESOLVED that, as considered and recommended by the Board of PG Studies in its meeting held on 28.4.2001, the changes in M.Sc. (Biotechnology) programme be approved as follows:

- (i) Course MA-550 'Computer Applications' shifted from the Spring Semester (2nd Semester) to the 1st Semester (Autumn Semester).
- (ii) Course BT-524 'Genetic Engineering' shifted from the 1st Semester to the 2nd Semester.
- (iii) Course No. BT-516 'Biotechnology Laboratory' be renumbered as BT-513.
- (iv) In the 3rd Semester one minor elective out of three electives be converted into a major elective. Course BT-609 'Gene Regulations' listed as one of the major elective course units to be offered by the Department.

Further, the proposed syllabus of BT-609 'Gene Regulation' attached as Appendix 'G', be approved.

2.3.32 Considered a relaxation in time to Shri Kamal Jain, part time Research Scholar in the Civil Engineering Department, for submission of his Ph.D. thesis:

After some consideration, the Senate RESOLVED as under:

- (a) Only the time frame for submission of Thesis be relaxed.
- (b) A second Scrutiny Committee will be constituted with two more members nominated by the Chairman of the Senate. Only thereafter, the thesis would be submitted. This Scrutiny Committee will assess whether the quantum of work done by Mr. Kamal Jain is sufficient for submission of his Ph.D. thesis.

2.3.33 Considered the Ordinance for Ph.D. programmes:

At the outset, Prof. V.K.Goel, Dean , Academic Programmes stated that the draft Ordinance for the Ph.D. programme were framed by Prof. Ravi Bhushan's Committee, on the basis of inputs received from the other IITs, and these were circulated to all the Departments/ Centres for their comments. He further briefed the house about some salient features of the draft Ordinance. Several members pointed out a few discrepancies, inconsistencies etc.

After protracted discussion, the Senate RESOLVED that the Ordinance (No. 1), be approved subject to incorporation of the suggestions given by the members of the Senate who may send their suggestions with regard to the omissions, discrepancies, inconsistencies, additions, deletions etc. to the Dean, Academic Programmes immediately but within one week. Prof. Ravi Bhushan's Committee may incorporate the suggestions considered appropriate and modify the Ordinance, which may be placed in the next meeting of the Board of Governors for consideration.

2.3.34 Considered the issue of recognition of TIFAC-CORE in Disaster Mitigation as an Academic Centre of the Institute:

Prof. S.S.Saini , Head of Civil Engineering Department and the Coordinator of the proposed Centre briefed the house about the salient features of the programme. After some discussion, the Senate RESOLVED that 'TIFAC-CORE in Disaster Mitigation' be recognised as a multi-disciplinary Academic Centre of the Institute for conducting post graduate and other courses only, and not as a Centre in the conventional sense, with participation of the Departments of Civil Engg., Earthquake Engineering , Earth Sciences and Hydrology. The programme will be for a three year duration, after which the Institute will review it at its own level. Further RESOLVED that the following positions be allocated for the above Centre out of the existing sanctioned posts in the Institute:

- (i) Faculty - 04 Nos.
- (ii) Office Staff - 03 Nos.
- (iii) Laboratory Staff - 02 Nos.

2.3.35 Considered the structures of the revised curriculum for B.Tech. programmes in Engineering and Technology during the 8th Semester:

RESOLVED that, as considered and recommended by the Board of UG Studies in its meeting held on 2.11.2001, the revised structure of curriculum for the B.Tech. programmes in Engg. & Technology during the 8th Semester, be approved as under:

The 8th semester of the B.Tech. programme should run like a normal semester and course loading be changed to 3-1-0.. The time-table be organised in the slot system so that the students would have the possibility of taking elective courses from other academic departments or from postgraduate programmes. Similarly, the students of postgraduate programmes may also take a few of the elective courses being run in the 8th semester, for B.Tech. students.

The B.Tech. projects be assigned to the students in the beginning of the Autumn Semester. The departments will organise periodical monitoring of project work. The viva of the B.Tech. projects should normally be held 10 days after the theory examination for the Spring Semester.

2.3.36 Considered an Ordinance for the distribution of M.Tech. Assistantships and for the award of degree:

RESOLVED that, as considered and recommended by the Board of PG Studies, the Ordinance (No. 2) for distribution of M.Tech. Assistantships and for award of degrees, be approved as under and be implemented from the 2002-2003 session, in respect of all the Departments/ Centres, except the Department of Earth Sciences:

Only full time students (other than sponsored students), who have qualified GATE/CEED are eligible for Assistantship of Rs. 5000/- per month. Continuation of this Assistantship is contingent on satisfactory academic performance, satisfactory performance in discharge of responsibilities (8 to 10 hours of work per week) under the Scheme and the minimum prescribed attendance requirement.

Assistantship to students whose SGPA at the end of a semester falls below 6.50 (6.25 in the case of SC/ST) will be paid only @ 50% of the assistantship. The students whose SGPA/CGPA falls below 5.5 will not be allowed any assistantship. However, M.Tech. students belonging to SC/ST category who lose their Assistantship due to SGPA requirement, will be given tuition fee exemption. The requirement for continuation of the registration for M.Tech. programmes will be as follows:

SGPA \geq 5.5 at the end of First semester and CGPA \geq 5.5 with valid credits, not less than 75% of the credits registered in a semester.

Minimum CGPA requirement for the award of the degree for M.Tech. Programmes in Engineering, Technology and in Physics (M.Tech Solid State Electronics Materials) except Earth Sciences will be 5.5.

2.3.37 Considered the revised procedure for calculation of CGPA:

RESOLVED that, as considered and recommended by the Boards of UG/PG Studies, in its meeting held on 12.2.2002, the revised procedure for calculation of CGPA, as given below, be approved and implemented from the 2002-2003 session, onwards:

$$SGPA = \frac{\sum (\text{Course Credits} \times \text{Grade Point}) \text{ except audit courses}}{\sum (\text{Course Credits Registered}) \text{ except audit courses}}$$

$$CGPA = \frac{\sum (\text{Course Credits} \times \text{Grade Point}) \text{ For courses with pass grades except audit courses}}{\sum (\text{Course Credits}) \text{ for courses with pass grades except audit courses}}$$

3.38 Considered the revised formula for conversion of CGPA into percentage marks:

RESOLVED that the following table be used for admissions to postgraduate/ Ph.D. Programmes with effect from July 2002.

Further RESOLVED that no equation be used by the Institute for converting marks into equivalent grades as the two systems of evaluation are different.

% marks	10 point Scale	9-point Scale	6-point Scale	4-point Scale
55	6.25	4.78	3.19	2.13
60	6.75	5.34	3.56	2.38
70	7.50	6.19	4.13	2.75
80				
90				

Note: For the higher percentage of marks authenticated information will be provided to the Senate, in the next meeting.

2.3.39 Considered the panel of Experts to act as Nominees of the Senate for the faulty selection:

A separate Booklet, containing the panel of Experts for the various Departments/ Centres, was tabled. After going through the same, some members pointed out a few mistakes, incomplete addresses of the Experts etc. After some discussion, the Senate RESOLVED that the panel of Experts be again examined by the Professorial Committees of the respective Departments/ Centres and the same be sent, duly complete in all respects, which may be approved by the

Chairman on behalf of the Senate . The Departments/ Centres , who have not yet sent the panels, may also send the same immediately to Prof. Ravi Bhushan, who has been coordinating this exercise, with the clear understanding that any expert listed under a Group would be a competent expertise for interviewing a candidate for all the Sub-groups of that Group.

2.3.40 Considered the change in the eligibility requirements of Foreign Nationals and Non-Resident Indians for admission to postgraduate and Ph.D. programmes:

RESOLVED that in order to have common eligibility requirements of Foreign Nationals and Non- Resident Indians with the Indian Students, the changed eligibility requirements be approved, as given below and be made applicable from the session 2002-2003 onwards:

Post-Graduate Programmes

- A Bachelor's degree in Science or Engineering/ Technology in the relevant field with a minimum grade point average of 6.75 on a 10 point scale or 60% marks in aggregate.
- GRE/GMAT Scores.
- Proof of proficiency in English.
- Three reference letters.

Ph.D. Programmes

- Master's degree in Science or Engineering/ Technology in the relevant field with a minimum grade point average of 6.75 on a 10 point scale or 60% marks in aggregate.
- Proof of proficiency in English
- Three reference letters.

2.3.41 Considered the changes in the Teaching Scheme of M.Sc. Applied Mathematics & Industrial Mathematics & Informatics:

RESOLVED that, as considered and recommended by the Boards of UG/PG Studies in its meeting held on 1.3.2002, the changes in the Teaching Scheme of M.Sc. (Industrial Mathematics and Informatics) and M.Sc. (Applied Mathematics) be approved as given below:

(a) For M.Sc. (Industrial Mathematics & Informatics)

1. MA-617 Discrete Mathematics be shifted from III Semester to I Semester as MA-561 with 4 credits.
2. MA-566 Computer Lab. will be of 2 credits instead of 3 credits.

3. MA-619 Data Structures Techniques be shifted from III Semester to II Semester as MA-568.
4. MA-612 Department Elective I be shifted from IV Semester to III Semester.

(b) For M.Sc. (Applied Mathematics)

1. MA-655 Abstract Algebra be shifted from III Semester to I Semester as MA-563.
2. MA 562 Mechanics be shifted from II Semester to I Semester as MA-565.
3. MA-651 Fluid Dynamics be shifted from III Semester to II Semester as MA-562.

(c) Department Elective III be shifted from IV Semester to III Semester.

(d) The revised scheme of teaching is attached at Appendix 'H'.

- 2.3.42 Considered joining JMET for admission to the MBA Programme in IIT, Roorkee from year 2003-2004 and the eligibility criteria for admission to the MBA Programme.

RESOLVED that, as considered and recommended by the Faculty Board of the Department, the proposal for joining the JMET for admission to the MBA programme in IIT Roorkee from the year 2003-2004 onwards be approved, with eligibility criteria for admission as under:

Bachelor's Degree in Engineering/ Technology with a minimum of 60% marks or 6.75 CGPA on a 10 point scale. (55% marks or 6.25 CGPA for SC/ST candidates).

OR

Post-Graduate Qualification in any discipline with a minimum 60% marks or 6.75 CGPA on a 10-point scale (55% marks or 6.25 CGPA for SC/ST Candidates) both in graduate as well as Postgraduate examinations.

Further RESOLVED that any qualification not accepted by the JMET Committee, be deleted.

- 2.3.43 Considered the issue of award of degrees to M.Arch. / M.Tech students having a B.Arch. background admitted to M.Tech. in Building Science and Technology in the Civil Engineering Department

RESOLVED that as considered and recommended by the Board of P.G. Studies in its meeting held on 12.2.2002, the students be awarded the degree of the programme to which they are admitted, irrespective of the different entry qualifications for the particular programme.

- 2.3.44 Considered the proposal to increase the duration of M.Tech. programmes in Engineering and Technology from 18 months to 24 months:

Based on the recommendations of the Board of P.G. Studies, the Senate agreed in principle to increase the duration of M.Tech. programmes in Engg. & Technology from 18 months to 24 months from the session 2002-2003. However, the proposed structure of the M.Tech. programmes as given in Appendix 'A' of the Agenda, be circulated to all the Departments/ Centres for consideration in their Faculty Boards. The inputs so received be considered by the Board of PG Studies & Research and the matter be then placed in the next meeting of the Senate for its consideration before admissions in 2002-2003. If necessary, a special meeting of the Senate may be called.

- 2.3.45 Considered the composition of the four Sub-committees of the Senate:

RESOLVED that the composition of the four Sub-committees of the Senate be approved, as given below:

(a) Executive Committee of the Senate (ECS)

- (i) Director (Ex-officio) - Chairman
- (ii) Dy. Director (Ex-officio)
- (iii) Heads of Departments/ Academic Centres (Ex-officio)
- (iv) Deans of the Institute (Ex-officio)
- (v) Librarian (Ex-officio)
- (vi) Registrar (Ex-officio) - Member Secretary

(b) Board of Undergraduate Studies

- (i) Dean Undergraduate Studies (Ex-officio) - Chairman
- (ii) Dean Postgraduate Studies and Research (Ex-officio)
- (iii) Two Senate Nominees
- (iv) One representative of each Academic Deptt. organizing undergraduate Programmes to be nominated by the Faculty Board and also the Departments Contributing to UG Teaching but not having an UG Programme.
- (v) Chairman JEE (Ex-officio)
- (vi) Three Students Representatives (To be nominated by DOSW for a tenure of 02 years)
- (vii) Asstt. Registrar (UG)- (Ex-officio) - Secretary

Non Ex-Officio Members' Tenure: 02 years

(c) Board for Postgraduate Studies & Research

- (i) Dean, Postgraduate Studies & Research - Chairman
(Ex-officio)
 - (ii) Dean, Undergraduate Studies (Ex-officio)
 - (iii) Two Senate representatives
 - (iv) One representative from each Academic Deptt/
Centre organizing postgraduate programmes
To be nominated by the Faculty Board.
 - (v) Chairman, GATE (Ex-officio)
 - (vi) Three Students Representatives (To be nominated by
DOSW for a tenure of 02 years)
 - (vii) Asstt. Registrar (PG) – (Ex-officio) - Secretary
- Non Ex-Officio Members' Tenure: 02 years**

(d) Board for Sponsored Research & Industrial Consultancy

- (i) Dean, Sponsored Research & Industrial Consultancy (Ex-officio) - Chairman
 - (ii) Associate Dean SRIC (Ex-officio)
 - (iii) Professor Training, Placement & Industrial Liaison (Ex-officio)
 - (iv) One nominee (Prof./Assoc. Prof./Asstt. Prof./
Scientist from each Academic Deptt./ Centre
To be nominated by the respective Faculty Board)
 - (v) Two Nominees of the Senate
 - (vi) Two representatives of Industry to be nominated by the Director
 - (vii) One nominee of the DST/ISRO/CSIR/ other funding agencies.
 - (viii) Asstt. Registrar (SRIC)- (Ex-officio) - Secretary
- Non Ex-Officio Members' Tenure: 02 years**

2.4.0 REPORTING ITEMS:

- 2.4.1 Reported that as per letter No. 9-18/2001-TS.1 dated January 11, 2002 from the Director, Govt. of India, MHRD, New Delhi, scholarships to the M.Tech. students in IIT Roorkee would be admissible @ Rs. 5000/- w.e.f. 21 Sept. 2001.

Noted.

- 2.4.2 Reported that the Director has approved the proposal of the Physics Deptt. for a change in the M.Sc. teaching scheme:

Noted.

- 2.4.3 Reported the minimum eligibility requirements for admission to PG Sciences and M.Phil. including MCA courses, as approved by the Director.

Noted.

- 2.4.4 Reported that the Director has approved the Viva-voce examinations reports for the award of Ph.D. Degrees in respect of the following Research Scholars:

<u>Sl. No.</u>	<u>Name of the candidate</u>	<u>Department</u>	<u>Title of the thesis</u>
1.	Ramakar Jha	Civil Engg.	Stream Water Quality Simulation with Remote Sensing & GIS Support
2.	P.D.Dahe	Hydrology	Planning for Optimal Development of a River Basin.

Noted.

- 2.4.5 Reported that the Director has approved a uniform eligibility criteria for admissions to post graduate programmes :

Noted.

- 2.4.6 Reported that the Director has approved the Academic Schedule for the Autumn Semester of the 2002-2003 session:

Noted and be treated as the first version. For the other gaps i.e. dates for classes and examinations to begin , date on which the vacation begins and for other missing activities, the Academic Deans, may look into these issues and circulate a second version of the Academic schedule. In future, a comprehensive Academic schedule must be prepared and circulated.

- 2.4.7 Reported that the Director has approved a reduction in the intake of students in M.Tech. (IT) programme from 60 to 30 students per year from the session 2002-2003. This is being done in order to enhance the quality of teaching being done at ER&DCI, Noida.

Noted. Dean P.G.S.R. may write to MHRD for the award of Assistanceship to M.Tech. (IT) students.

- 2.4.8 Reported the constitution of the Library Advisory Committee for the Institute Central Library:

Noted, as per the composition given below:

1. A senior Professor to be nominated by the Director as Chairman.
2. One Faculty representative/ scientist from each Academic Deptt./ Centre, generally the Faculty in-charge of the Departmental Library.
3. Three representatives each from UG, PG and Research Scholars to be nominated by IITR Students' Association and FRS, respectively.
4. Librarian- Member Secretary.

- 2.4.9 Reported the nomination of two Professors of the Institute on the Board of Governors on behalf of the Senate:

Noted the nomination of Prof. K.G. Ranga Raju and Prof.S.S.Saini on the BOG for a period of two years, from 1.1.2002 to 31.12.2003.

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

8 SCHOLARSHIPS

8.1 UNDERGRADUATE, DUAL-DEGREE AND INTEGRATED M.TECH. PROGRAMMES

8.1.1 Institute Merit-cum-Means (MCM) Scholarships

The Institute offers merit-cum-means scholarships to under-graduate students in engineering and technology. These are permissible to about 25% of students. The present value of merit-cum-means scholarship is Rs. 300 per month for general students and the recipient is exempted from paying tuition fee.

The 4-year B.Tech., 5-year Dual-degree and 5-year Integrated M.Tech. students will be eligible to receive Merit-cum-Means scholarship at the time of joining the Institute. The criterion of merit for first year is All India Rank in the JEE. The scholarships are renewed on a yearly basis until he/she clears all academic requirements of the programme, provided that he/she continues to satisfy the eligibility criteria (given below).

Continuation of MCM scholarship For general category students of the 4-year B.Tech., 5-year Dual-degree and 5-year Integrated M.Tech. programmes, the requirements of merit for continuation of Institute Merit-cum-Means Scholarship are:

- (i) CGPA must be 6.0 or more; and,
- (ii) Earned credits should not be less than 22 times the number of semesters registered for; and
- (iii) SGPA in the previous semester must be 6.0 or more.

For continuation of MCM, performance of the students will be reviewed at the end of each semester. The first such review will be held at the end of the second semester.

On the criterion of means only those students are presently eligible whose parents have gross yearly income up to Rs. 1 lac per annum for all categories of students including SC/ST students. The terms and conditions of the award of scholarship are laid down in the rules and regulations thereof in force and are subject to change from time to time.

8.1.2 Institute Merit Prizes and Certificates

The Institute offers merit prizes and certificates to the top 7% of the students of each 4-year B.Tech, 5-year Dual-degree and 5-year Integrated M.Tech. programme each semester up to the 8th semester. The value of merit prize is Rs.200.

8.1.3 Institute Free Studentship

The Institute offers free studentship to 10% of the students on the basis of means alone.

Course No. & Title : ME 563 Mechatronics

Semester : Autumn

Contact Hours : L T P
3 1 0

Credits : 4

Objective of the Course :

This course is aimed to understand mechanical engineering, electronics and computing concepts so as to use them in the design of products and processes.

Syllabus :

Introduction :

What is mechatronics? Mechatronics in manufacturing, mechatronics in products, mechatronics and engineering design.

Sensors and Transducers :

Different types of Measurement system, sensors, transducers and measurement, Classification, Development in transducer technology, signal conditioning and Data presentation elements.

Actuation Systems :

Different types of actuation systems, Pneumatic and hydraulic systems, mechanical actuation systems, Electrical actuation system.

Basic System Models and Dynamic Response of Systems :

Mathematical models, Mechanical/Electrical/Thermal/Pneumatic/Fluid system building blocks, Modeling dynamic systems, First order, Second order systems, System transfer functions, and Frequency response systems with feed back loops. Use of MATLAB to design and analyze control systems.

Closed Loop Controllers :

Continuous and discrete processes control modes, Two step mode, Proportional mode, Derivative control, Integral control, Velocity control, Adaptive control, PID controller, Digital controllers, Controller tuning.

Microprocessors :

Digital logic, Number system, Logic gates, Boolean Algebra, Micro-computer structure/Architecture, Micro-controllers languages, Interfacing, Interface requirements, Examples. Input/Output ports, Communication systems.

Design and Mechatronics :

A mechatronic approach in designing, possible design solutions, Case studies of mechatronic systems.

Pre-requisite : Nil

Suggested Lecture Distribution :

Topic	No. of Lectures
1. Introduction	02
2. Sensors and Transducers	10
3. Actuation systems	05
4. Basic system models and Dynamic response of systems	07
5. Closed loop controllers	05
6. Microprocessor	10
7. Design and Mechatronics	03
Total -	42

List of Recommended Books :

1. Measurements Systems Application and Design	Docblin	McGraw Hill
2. Transducers in Mechanical and Electronic Design	Harry L. Trietly	Marcel Dekker
3. Mechatronics	Bolton	Longman
4. Mechatronics	HMT, Ltd.	Tata McGraw Hill, New Delhi, 1998
5. Micro-processors, Architecture, Programming and Application	R.S. Gaonkar	Wily Eastern, Ltd.
6. Modern Control Engineering	K. Ogotata	Prentice Hall

Course No. & Title : MI 564 Computer Aided Product Design

Semester : Autumn

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

Credits : 4

Objective of the Course :

To provide hand on experience on solid modelling softwares to create the various products. The modelling features will also be delivered.

Syllabus :

CAD-Preliminaries :

CAD, Modelling of curves, surfaces, splines and solids, feature based part modelling, parametric part modelling, manipulation of part models.

Problem recognition & Definition :

Analysis and structuring of problems, factors influencing product definitions.

Product data exchange standards, use of databases for material selection, structuring of 2-D and 3-D databases.

Solid Modelling :

Detailed study of solid modelling software.

Development of virtual products :

Animation techniques, product animation.

Case Studies :

Using solid modelling software.

Pre-requisites : Nil

Suggested Lecture Distribution

Topic	No. of Lectures
1. CAD, topic preliminaries	5
2. Problem recognition and definition	10
3. Virtual product development & animation techniques	10
4. Solid modelling software	10
5. Case studies	5

Total 40

List of Recommended Books :

- | | | |
|----------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------|
| 1. Integrated produce development | Anderson, M.M.
Hein, L. 1987 | IFS Publication
Springer-Verlag, |
| 2. Product Development ; Success
through product and cycle time
excellence | McGrath, M.E.,
Anthony, M.T.
Shaprio, A.R. | Electronic Business
Series, Butterworth
Heinmann, Stonehan, |
| 3. Principles of Optimal Design | Papalambros, P.Y.,
Welds, D.J. | Cambridge Univ.
Press, U.K. |
| 4. Product Design & Manufacturing | A.K.Chitale and
R.C.Gupta | Prentice Hall of
India, 1997 |

Course No. & Title : MI 570 Product Economics & Marketing Principles

Semester : Spring

Contact Hours : L T P
3 1 0

Credits : 4

Objective of the Course :

To create awareness of various cost concepts with respect to product design and its development. Also, application of these cost concepts will be taken up to analyse the market and product launching strategies.

Syllabus :

Introduction :

Historical records of products, their strengths, weakness in terms of facilities, functions and cost. Review on Product Design, Development and characteristics.

Cost Concepts :

Factors contributing to cost of product, Nonmonetary considerations. Cost concept, product economics, break even analysis.

Marketing Management :

Organisation and recruitment. Study of product life cycle, monitoring of sale and competition, when to introduce new products. Assessing market potentials for new products, Market research, Consumer research and its demographic aspects, setting up a questionnaire for these aspects. Establishing market segments and their dimensions. Assessing competitors share and locating direct and indirect sources to understand this. Assessing competitors marketing approach and strategies.

Market Investment Analysis :

Developing a strategy to introduce new products using market gaps as competitive edge, cost considerations and profitability of new products, developing a product plans and product mix, price policy, positioning the company, product positioning, planning for future position, Advertisement.

Product Launching Aspects :

Distribution and promotion of new product. Evolving a design brief by interlinking with market/product plan. Seeing product design as a part of a scheme to develop brand image, house style, marketing strategy and corporate image.

Discriminating product range from each other and from competitor's range. Developing product specifications for different products within the range. Market communication, Launching the product, Monitoring the market performance.

Pre-requisites : Nil

Suggested Lecture Distribution :

Topic	No. of Lectures
Introduction	4
Cost concepts	6
Marketing Mgt	10
Market investment analysis	10
Product launch aspects	10
Total	40

List of Recommended Books :

1. Marketing	Philips Kotler
2. Marketing Imagination	Levit Theodore
3. The Strategy & Tactics of Pricing.	Thomas T. Nagle
4. Marketing Effectiveness	Stanley J. Shapiro & V.H. Kirpalani
5. Principles of Engineering Economic Analysis.	John, A. White, Martin, A. Agee, Kenneth, E. Case

Course No. & Title : MII 571 Product Design & Development

Semester : Spring

Contact Hours : L T P
2 2 2

Credits : 4

Objective of the Course :

To acquaint the students with the factors affecting the design of a product. Example cases will be taken up to explain the steps involved in the product development.

Syllabus :

Introduction :

Design, Product Design, Design Management, Product Management.

Design Process :

Traditional & Modern Design, Design process, Organisational objectives.

Need related intelligence, development of technological competence.

Organisational strength and weakness, criteria for a new product, New product Management, Forward planning, Coordination and communication.

Innovation, Creating and Diffusion, Techniques for creative ideas generation.

Evaluation of new product ideas, function, technology resources, ecological, legal.

Customer Driven Product Design :

Investing user behaviour - User habits, expectations, perception, Techniques for Investigating users behaviour.

Stating objectives, product formulation, Buy or develop analysis. Analysis for development, boundary search functional innovation.

Product design methods, Design stage and method selection.

Pre-Requisites : Nil

Suggested lecture distribution :

Topic	No. of Lectures
Introduction	4
Traditional & Modern Design	10
Innovation, Creating & Diffusion tool	6
Evaluation of new product idea	6
Investing user behavior	4
Product formulation approaches	4
Product design methods	6
Total	40

List of Recommended Books :

- | | | |
|-----------------------------------------------|--------------------|-------------------------------------|
| 1. Corporate Strategy and product Innovation. | Robert R. Rothberg | Free Press, 1976 |
| 2. Design Methods, Seeds of Human Future | J.C. Jones | John Wiley & Sons Ltd., 1970 |
| 3. The Science of Engineering Design, | H. Hill Percy | Holt, Rinehart & Winston Inc., 1970 |
| 4. Design Methods | J.C. Jones | Interscience 1970 |
| 5. Creative Engineering Design | H.R. Buhl | Iowa State Univ. Press |

Course No. & Title : MI 572 Design for X.
Semester : Autumn
Contact Hours : L T P
3 1 0
Credits : 04

Objectives of the Course :

The objective of this course is to teach students about inter-relationship among various organizational and manufacturing activities. Thrust will be on the concurrency among these activities.

Syllabus :

Introduction :

What is DFX? Why, where and when is DFX used? Brief introduction of Design for manufacturability, Design for assembly, Design for quality, design for reliability and maintenance, Design for serviceability, Design for environment.

Developing DFX tools :

DFX shell and its understanding: Requirement analysis, Modeling for product analysis, modeling for process analysis, Selecting performance measures, Compiling DFX manuals, Compiling DFX workbooks, Verification, Standard tools such as Hitachi assemblability evaluation method, Boothryd-Dewhurst design for assembly method, Lucas design for assembly method, Case studies.

Implementing DFX tools :

Macro BPR procedure, Micro DFX procedure: Product analysis, life cycle analysis, Performance measuring, Benchmarking, Diagnosing, Advising, and Prioritizing.

Pre-requisite : Nil

Suggested lecture distribution

Topic	No. of Lectures
Introduction	8
DFX shell understanding	4
DFX requirement analysis	4
DFX manuals & work book compilation	6
Hitachi & Boothryd design methods	6
Case studies	4
Implementing DFX tool	8
Total	40

List of recommended books :

Integrated product development	M.M. Andersen and L.Hein, IFS Publication
Product design for manufacture And assembly	G.Boothryd, P Dewhurst and W.Knight, Marcel Dekker
Design for X	G.Q.Huang, Chapman & Hill

Course No. & Title : M1 573 Concurrent Engineering
Semester : Autumn
Contact Hours : L T P
3 1 0
Credits : 4

Objectives of the Course :

Concurrent Engineering has emerged as a discipline, to help achieve the objectives of reduced cost, better quality, and improved delivery performance concurrent engineering is perceived as a vehicle for change in the way the product and processes are designed, manufactured and distributed. The objectives of this course is to make the learners aware on the importance, concept, tools and techniques of concurrent engineering.

Syllabus :

Concepts, Importance and Comparison :

Concurrent engineering concept; sequential versus concurrent engineering; importance of concurrent engineering.

Mathematical Modelling :

Design and manufacturing; material balance equation, cost equation, average manufacturing lead time, psuedo measure of product optimality.

Characterization of concurrent engineering environment :

Benefits of concurrent engineering :

Serial engineering approach, improvement in unit cost and quality of manufactured products; difficulties associated with performing concurrent engineering.

Life cycle costing:

Quality function deployment, case studies.

Pre-requisites :

Nil

Suggested Lecture Distribution :

Topic	No. of Lectures
1. Concept, importance and comparison	04
2. Mathematical modelling of design & manufacturing parameters	07
3. Characterisation of concurrent engineering environment	08
4. Benefits and difficulties associated with concurrent engineering	06
5. Life cycle costing	04
6. Quality function deployment	08
7. Case studies	04
Total =	41

List of Recommended Books :

1. A Concurrent engineering: Methodology and application	Gu P., and Kusiak A.	Elsevier, Amsterdam 1993
2. Design for manufacturability A system approach to concrete Engineering and ergonomics,	Halendes M, and Nagamachi, M.	Taylor & Francis, London 1992
3. Quality function deployment.	Sullivan, L.P.	ASQ, PP 39-50, 1986
4. Concurrent engineering: Automation, Tols & Techniques	ProgressKusiak, A.,	Wiley Interscience, NY, 1993
5. Concurrent engineering, London, contemporary issues and modern design tools	Parsaci, H.R. and Sullivan, W.G.	Chapman and Hall, 1993
6. Concurrent Engineering Vol. I & II	Prasad, Biren	Wiley

Course No. and Title : MI-588 Advanced Materials & Manufacturing

Semester : Spring

Contact hours : L T P
3 1 0

Credits : 4

Objective :

To expose the students to the basic aspects of advanced materials which find applications in space crafts, microelectronics, like making of chips, superconductors, and lasers etc.

Syllabus :

Introduction :

Brief review of fundamental principles of materials, ferrous materials, specially high alloy steels like heat resisting steels, low temperature steels, maraging steel. Non ferrous materials like high strength low density - Al-base alloys, lithium base alloys and Mg base alloys. Super alloys like NIMONICS.

Properties and application of space age alloys :

High temperature ductile ceramics, special high temperature and low temperature polymers, composites - metal matrix, ceramic matrix and polymer matrix and their processing, properties and use of rubber, ceramics and glass textiles, surface engineering.

Finishes, plating painting and heat treatment :

Special processing techniques like electron beam welding, laser welding, diffusion welding, single crystal growth, advanced moulding processes.

Suggested Lecture Distribution :

Topics	Hours
Brief review of fundamental principles materials,	4
Ferrous materials - stainless steels, low and high temperature steels,	4
Light metals-aluminium lithium and magnesium based alloys	4
Super alloys-nickel base, cobalt base etc.	4
High temperature ductile ceramics and their processing	4
High temperature and low temperature polymers & their processing	4
Composites - metal-matrix, ceramic matrix, polymer matrix	6
Their properties and processing.	
Surface energy-wear resistant and thermal resistant coating	4
Special processing techniques likes single crystal developments	6
For microelectronics, laser, wlectron beam welding, special moulding	
Processes etc.	
Total = 40	

Prerequisites : First course in materials science.

List of recommended books :

Materials science and Engineering An Introduction	William D-Callister, Jr	John Wiley
The Science and Engineering of materials	D.R. Askeland	
Material Science for Engineers	L.H. Van Vlack	
Engineering Design : A materials & processing approach	Dieter, G.E.	McGraw Hill
Materials and processes Manufacturing	De garmo, G.P. Black, J.T., Kosher, R.A.	MacMillan
Principles of Manufacturing Materials and processes	Campbell, J.S.	McGraw Hill

Course No. & Title : MI 589 Advanced Ergonomics

Semester : Autumn

Contact Hours : L T P
3 1 0

Credits : 4

Objective of the Course :

To create awareness & use of electrophysiology in product design. The course also includes a short project related to various human energy expenditure issues.

Syllabus :

Introductions & Electrophysiology and its application :

Use of eye movement recorder and Electro-oculography in visual analysis of product and design.

Human Energy Analysis :

Ergonomics of human energy expenditure and its application.

Project :

Research oriented work : Product analysis short paper communication.

Pre-requisite : Nil

Suggested Lecture Distribution :

Introduction	5
Eye movement recorder analysis	10
Electro-oculography tools	10
Comparative evaluation of ergonomic tools	5
Human Energy analysis	5
Project	7
Total	42

List of recommended books :

Ergonomics, man & his working environment	K.F.H.Murrell
Text of work physiology	P.O.Astrand & K.Rodhl
The Physiological basis of Medical Practice	C.H.Best & N.S.Taylor
Fundamental of Exercise Testing	K.L.Anderien
J.Applied Ergonomics, J.Ergonomics	Grays Anatomy
Industrial Design Magazine	
Human Factor Design Handbook	W.E. Woodson

Course Code MA - 692

DISCRETE MATHEMATICS

Course Objective:

To introduce the students to the fundamentals of discrete mathematics:

Course Content:

Logic and Connectives: Propositions, Complex propositions, Truth tables, Tautologies, Contradictions, Arguments and proofs.

Relations and Functions: Relations, Digraphs, Matrix of a relation, properties of relations Equivalence and partial order relations, Operations on Relations, Paths and closures. Functions, types of functions, Identity and invertible function.

Recursion and Recurrence Relations: Polynomials and their evaluation, Recursion, Induction, Iteration, Sequence and Discrete functions, recurrence relations, Generating functions.

Boolean Algebra and Combinatorial Circuits : Lattices, Sublattices, Isomorphism of lattices, Boolean algebra, Boolean expressions, Application of Boolean algebra to circuit theory, Circuit minimization and simplification.

Monoids and Automata : Definition and properties of monoids, Isomorphism, Free monoids, Grammars and their types, Languages, Finite state machines. Equipment finite state machines, monoid of a finite state machine and Machine of a monoid.

Graph Theory : Basic concepts, Isomorphism and subgraphs, Trees and their properties, Spanning trees, Directed trees, Binary trees, Planar graphs, Euler's formula, Multigraphs and Euler circuits, Hamiltonian graphs, chromatic numbers. The four colour theorem.

Pre-requisite : ---

Credits : 4

Contact Hrs. / Week : L T P

3 1 0

Autumn / Spring

Booked recommended :

1. Doerr, A and Levasseur, K - Applied Discrete structures for Computer Science, Galgotia Publication, New Delhi.
2. Kolman, B. Busbt, R. C. and Ross, S. Discrete Mathematical Structure for Computer Science (Prentice Hall).
3. Liu C. L. Elements of Discrete Mathematics, 2nd ed. McGraw Hill; New York, 1985.
4. Johnsonbaugh, Richard - Discrete Mathematics, Maxwell Macmillan International Edition (revised ed. 1989).
5. Discrete Mathematics for Computer Scientists & Mathematicians Joe. L. Mott, A. Kandel and Baker T. P., Prentice - Hall of India Pvt. Ltd. 200.

Topics	No. of Lectures
Logic and connectives	4
Relations and functions	10
Recursion and recurrence relations	4
Boolean Algebra and Combinatorial Circuits	8
Monoids and Automata	8
Graph Theory	8

Scheme of Teaching
Scheme of Teaching : M.C.A. Programme
Duration 3 Years (6 Semesters)

Semester - I (Autumn)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-501	Information Technology	4	3	1	--
CA-503	Programming Languages	4	3	1	--
CA-505	Computer Organisation & Architecture	4	3	1	--
CA-507	Management Concepts & Accounting	4	3	1	--
CA-509	Numerical Computation	4	3	1	--
CA-511	Practicals : Programming Lab. Office, C and C++	4	--	--	8
	Total	24	15	5	8

Semester - II(Spring)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-502	System Analysis & Design	4	3	1	--
CA-504	Operating Systems	4	3	1	--
CA-506	Data Structures	4	3	1	--
CA-508	Discrete Mathematics & Probability Theory	4	3	1	--
CA-510	Microprocessors & Their Interfacing	5	3	1	2
CA-512	Practicals : Operating Systems Lab., Data Structures	3	0	0	6
	Total	24	15	5	8

Semester - III(Autumn)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-601	Data Base Management System	4	3	1	--
CA-603	Design & Analysis Algorithms	4	3	1	--
CA-605	Operations Research	4	3	1	--
CA-607	Computer Communication Networks	4	3	1	--
CA-609	Elective I	5	3	1	--
CA-611	Practicals :Data Base Management System Lab., Computer Communication Lab.	4	--	--	8
	Total	24	15	5	8

Semester - IV(Spring)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-602	Network Programming	4	3	1	--
CA-604	Simulation & Modelling	4	3	1	--
CA- 606	Organisational Behaviour	4	3	1	--
CA-608	Software Engineering	4	3	1	--
	Elective-II	4	3	1	--
CA-612	Practicals : Lab. On Simulation & Network Programming	4	--	--	8
	Total	24	15	5	8

Semester - V(Autumn)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-701	Artificial Intelligence(A.I.) & Applications	4	3	1	--
CA-703	Parallel & Distributed Processing	4	3	1	--
CA- 705	Computer Graphics	4	3	1	--
	Course from some other programme	4	3	1	--
CA-707	Seminar & Project	6	--	--	--
CA-711	Practical : Lab. on Parallel Processing & Computer Graphics	2	--	--	4
	Total	24	12	4	4

Semester -VI(Spring)

Course No.	Course Title	Credits	Contact Hrs. Per Week		
			L	T	P
CA-720	Dissertation	20	--	--	--

Total Credits 140

NOTE : In addition students will have to take a non-credit course on Technical Communications in Second/Third Year.

List of Electives :

1. CA-631: Econometrics
2. CA-632: CASE Tools
3. CA-633: Computer Aided Design
4. CA-634: Multimedia Technology & Applications
5. CA-635: Internet Technology & Applications
6. CA-636: Image Processing
7. CA-637: Enterprise Resource Planning -I
8. CA-638: Current Trends and Emergent Issues in Information Technology
9. CA-639: GIS
10. CA-640: MIS
11. CA-641: E-Commerce
12. CA-642 : Principals of Compiler Writing
13. CA-643 : System Programming

Course No. & Title : BT101- FUNDAMENTALS OF BIOTECHNOLOGY

Semester : Spring/Autumn

Contact Hours :

L	T	P
2	0	0

Credits : 2

Objective of the Course:

The academic and scientific attitude to biological sciences has continuously changed with time. What was once only a study a structure and organization of living systems has now turned out to be of functional significance. Traditionally man has been trying to benefit from natural processes that have evolved over the ages and have stood the test of the time. We now have the means to engineer the biological systems to cater to our precise needs. This course provides a comprehensive and up-to-date review of the various concepts of modern biology. Particular emphasis is placed upon the basic biological functions, which facilitates a greater appreciation of their potential applications. This course should be of value to bright young engineering students who have the inclination to be innovative and creative.

Syllabus:

Introduction –General principles and concepts of modern biology –Tools and methods in biotechnology –Applications of biotechnology –Safety and ethics.

Pre -requisites: Nil

Suggested Lecture Distribution:

Topics	No of Lectures
1. An Introduction to Biotechnology	01
2. Organization of the cell	03
Structural components: Membranes-Mitochondria-Chloroplast- Endoplasmic reticulum-Nucleus.	

Chemical components: Lipids-Carbohydrates-Proteins-Nucleic acids.

3. Genetic mechanisms	05
DNA replication & heredity-RNA-Protein synthesis (Transcription & Translation)- Genetic code-Mutation and Genetic recombination.	
4. Microorganisms	02
Bacteria-Fungi-Viruses	
5. Genetics & Biotechnology	02
Protoplast and Cell Fusion Technology-Genetic Engineering-Polymerase Chain Reaction	
6. Bioprocess/Fermentation Technology	02
Principles of Microbial Growth-Bioreactor-scale up-Down Streaming	
7. Enzyme Technology	02
Nature of Enzymes- Applications- Immobilized Enzymes	
8. Biological Fuel Generation	02
9. Biotechnology and Medicine	02
10. Environmental Biotechnology	02
11. Plant and Animal Biotechnology	02
Forestry- Biological Control- Transgenic organisms	
12. Safety & Ethics	01

Total **26**

List of Recommended Books:

Biology: Audersirk, G and Audersirk, T, Macmillan Publishing Company, USA

Biotechnology: Smith J E, Cambridge University Press, UK

Molecular Biology and Biotechnology: Walker JM and Gingold EB, The Royal Society of Chemistry, UK/ Panima Publishing Corporation, New Delhi, India (Indian Edn)

BUILDING ECONOMICS
HUM-401

Unit: 4 L T P
 3 1 0

Objective: To acquaint the students of B.Arch. with the application of theory and practices of Economics in Building Construction.

1. **Introduction:** Meaning, Scope and Importance of Building Economics 2
2. **Housing Policies and Programmes:** Objectives and goals of housing policy, Govt. of India housing policy, Housing finance, housing cooperatives, housing programmes. 5
3. **Building Industry:** Need for building industry, role of building industry in national development economic and social factors of development, development process, factors affecting choice of technology in building industry, real estate, characteristics of real estate, determination of feasibility, land and estate management, real estate evaluation techniques. 5
4. **Theory of Demand:** Meeting of demand, types of demands, law of demand, factors affecting demand, elasticity of demand and its practical applications, marginal utility analysis, indifference curve analysis.-5
5. **Theory of Supply:** Meaning of Supply, law of supply, determinants of supply, elasticity of supply and its measurement, determinants of elasticity of supply. 3
6. **Production and Cost Functions:** Concept of production function, short run and long run production functions, production equilibrium, cost-concepts, cost curves and cost functions. 5
7. **Theory of Investment:** Meaning, types of investment, factors affecting investment, Investment theories, Multiplier and Accelerator. 3
8. **Land Economics:** Concept of land, land use, land use capacity, classification of land, physical characteristics of urban land, framework affecting land use, economic principles of land use, rural and urban land economics (land use characteristics, land use pattern, land value and factors affecting land value) 7
9. **Housing Project Management:** Project, characteristics of project, principal stages of project, project identification, project formulation, project implementation, project evaluation techniques- cost benefit analysis, social cost benefit analysis, net present value, internal rate of return, spread and backwash effect. 7

BUILDING ECONOMICS

HUM-401

1. A.Kantsoyiannis, "Modern Micro Economics, Macmillan Publication
2. Jack Harvey, "Modern Economics, Macmillan Publication
3. Brian Atkinson et al, "Applied Economics Macmillan
4. Rangarajan and Dholakia, " Principles of Macroeconomic" Tata-McGraw Hills
5. United Nations, 1972, "Guidelines for project evaluation", United Nations Publications, New York
6. "National housing & Habitat Policy", 1998, Akalank publication, New Delhi
7. Saini, N.S.Mahavir, 1984, "Urban development planning strategies & techniques" S.P.A., New Delhi
8. Raleigh Barlowe, 1986, "Land Resource Economics: the economics of real estate" Prentice-Hall Englewood claiiffs, N.J., USA
9. United Nations, 1974, "Housing policy guidelines for developing countries", New York
10. Bakshi D.Sinha, 1976, "Housing growth in India", Arnold Heinemann, New Delhi
11. Oktay Üral, Robert Kraptenbaurn, 1981, "Housing: Impact of economy & technology", Pergamon Press, New York
12. Joy, 1998, "Total project management", Mac Millan India Ltd, New Delhi
13. Prassanna Chandra Rao, "Project management"

Course No. & Title : BT-609 Gene Regulation**Semester : Spring/ Autumn****Contact hours : L T P**
3 1 0**Credits : 4****Objectives of the course:**

The level of gene expression in an organism can vary under different conditions. This course will provide information about the various mechanisms of gene regulation in bacteriophages, bacteria and eukaryotes. The application of gene regulation studies will also be discussed.

Syllabus:

Transcriptional, translational and post-translational controls of gene regulation in bacteria, gene regulation in bacteriophages, transcriptional and post-transcriptional controls of gene regulation in eukaryotes, applications of gene regulation studies.

Prerequisites: Nil**Suggested lecture distribution:**

S. No.	Topics	No. of lectures
1.	Transcriptional regulation in bacteria	6
2.	Translational and post- translational regulation in bacteria	2
3.	Gene regulation in bacteriophage life cycle	3
4.	Tissue specific expression of proteins and messenger RNAs	1
5.	Gene regulation by DNA loss, amplification and rearrangement	4
6.	Gene regulation at transcription in eukaryotes	3
7.	Post-transcriptional regulation in eukaryotes	4
8.	Transcriptional control- chromatin structure	4
9.	Transcriptional control- DNA sequence elements	4
10.	Transcriptional control- transcriptional factors	4
11.	Gene regulation and cancer	3
12.	Applications and future prospects of gene regulation studies	4
Total		: 42

List of Recommended Books :

1. Gene regulation- A Eukaryotic Perspective. Latchman D, Chapman & Hall, UK
2. Genetics: Analysis and Principles. Brooker RJ, Addison Wesley Longman Inc., USA
3. Genes VII: Lewis B, Oxford University Press, UK

Scheme of Teaching and Examination
M. Sc. (Industrial Mathematics & Informatics)
Duration 2 Years (4 Semester)

(to be operative on batches to be admitted from the Academic Year 2002-2003 onwards)

S. No	Course No. & Title	Credits	Contact Hrs.			Examination		% Weightage in Evaluation				
			L	T	P	THE.	PR.	THE	PE	MTE	CWS	PRS
<u>First Semester (Autumn)</u>												
1.	HS-501 : Technical Communication @	-	1	2	-	-	-	-	-	-	-	-
2.	MA-550 : Computer Applications	4	3	1	1	3	-	60	-	20	10	10
3.	MA-551 : Linear Algebra	4	3	1	-	3	-	60	-	20	20	-
4.	MA-553: Ord. & Partial Diff. Eqns.	4	3	1	-	3	-	60	-	20	20	-
5.	MA-555 : Numerical Analysis	4	3	1	1	3	-	60	-	20	10	10
6.	MA-559 : Real & Complex Analysis	4	3	1	-	3	-	60	-	20	20	-
7.	MA-561 : Discrete Mathematics	4	3	1	-	3	-	60	-	20	20	-
		24	19	8	2							
<u>Second Semester (Spring)</u>												
8.	MA-560: Mathematics ^{al} Modelling & Simulation	4	3	1	1	3	-	60	-	20	20	-
9.	MA-552 : Mathematical Methods	4	3	1	-	3	-	60	-	20	20	-
10.	MA-554: Operation Research	4	3	1	-	3	-	60	-	20	20	-
11.	MA-556 : Prob. & Statistics	4	3	1	-	3	-	60	-	20	20	-
12.	MA-566: Computer Lab.	2	1	-	2	-	2	-	60	20	-	20
13.	MA-568 : Data Structure Techniques	4	3	1	-	3	-	60	-	20	20	-
14.	Course from an Engg. Deptt. (as per enclosed list)	4	3	1	-	3	-	60	-	20	20	-
15.	MA-570 Practical Trg. with Industry During summer vacation	4*	-	-	-	-	-	-	-	-	-	-
		26	19	6	3							

* Credits to be added in third Semester.

@ to be given in Autumn / Spring Semester as per convenience of the concerned department.

Third Semester (Autumn)

16.	MA-611: Project & Seminar based on Pract. Trg. with Industry/Org.	4	-	-	-	-	60*	-	40**	-	-
17.	MA-613 : Applied Functional Analysis	4	3	1	-	3	60	-	20	20	-
18.	MA-615: Mathematical Modelling	3	2	1	-	2	60	-	20	20	-
19.	MA- : Departmental Elective - I@	4	3	1	-	3	60	-	20	20	-
20.	Course from an Engg. Deptt. - II (As per enclosed list) (From II Semester)	4	3	1	-	3	-	-	-	-	-
		+4									
		23	11	4	-						

Fourth Semester (Spring)

21.	Course from an Engg. Deptt. - III (As per enclosed list)	4	3	1	-	3	60	-	20	20	-
22.	MA- : Departmental Elective - II @	4	3	1	-	3	60	-	20	20	-
23.	Course from another Deptt. (Minor)	4	3	1	-	3	60	-	20	20	-
24.	MA-616 : Dissertation based on some specific problem form Industry/Org.	12	-	-	-	-	60*	-	40**	20	-
		24	9	3	-						

@ From amongst the list enclosed.

* Project

** Seminar

**Scheme of Teaching and Examination
M. Sc. (Applied Mathematics)
Duration 2 Years (4 Semester)
(to be operative on batches to be admitted from the Academic Year 2002-2003 onwards)**

S. No	Course No. & Title	Credits	Contact Hrs.			Examination		% Weightage in Evaluation				
			L	T	P	THE	PR	THE	PE	MTE	CWS	PRS
<u>First Semester (Autumn)</u>												
1.	HS-501 : Technical Communication @	-	1	2	-	-	-	50	-	-	50	-
2.	MA-550 : Computer Applications	4	3	1	1	3	-	60	-	20	10	10
3.	MA-551 : Linear Algebra	4	3	1	-	3	-	60	-	20	20	-
4.	MA-553: Ord. & Partial Diff. Eqns.	4	3	1	-	3	-	60	-	20	20	-
5.	MA-555 : Numerical Analysis	4	3	1	1	3	-	60	-	20	10	10
6.	MA-557 : Real Analysis	3	2	1	-	2	-	60	-	20	20	-
7.	MA-563: Abstract Algebra	3	2	1	-	2	-	60	-	20	20	-
8.	MA-565 : Mechanics	3	2	1	-	2	-	60	-	20	20	-
		25	19	9	2							
<u>Second Semester (Spring)</u>												
9.	MA-560: Mathematical Modelling & Simulation	4	3	1	1	3	-	60	-	20	20	-
10.	MA-552 : Mathematical Methods	4	3	1	-	3	-	60	-	20	20	-
11.	MA-554: Operations Research	4	3	1	-	3	-	60	-	20	20	-
12.	MA-556 : Prob. & Statistics	4	3	1	-	3	-	60	-	20	20	-
13.	MA-558 : Complex Analysis	3	2	1	-	2	-	60	-	20	20	-
14.	MA-562 : Fluid Dynamics	3	2	1	-	2	-	60	-	20	20	-
15.	MA-564: Theory of Elasticity	3	2	1	-	2	-	60	-	20	20	-
		25	18	7	1							

@ To be given in Autumn / Spring Semester as per convenience of the concerned department.

Third Semester (Autumn)

16.	MA-651: Topology & Functional Analysis	4	3	1	-	3	-	60	-	20	20	-
17.	MA- : Departmental Elective - I	4	3	1	-	3	-	60	-	20	20	-
18.	MA- : Departmental Elective - II	4	3	1	-	3	-	60	-	20	20	-
19.	MA- : Departmental Elective - III	4	3	1	-	3	-	60	-	20	20	-
20.	Elective from other Deptt. - I	4	3	1	-	3	-	-	-	-	-	-
21.	MA-661 : Project & Seminar	4	-	-	-	-	-	60*	-	40**	-	-
		24	15	5	-							

Fourth Semester (Spring)

22.	MA- : Departmental Elective - IV	4	3	1	-	3	-	60	-	20	20	-
23.	MA- : Departmental Elective - V	4	3	1	-	3	-	60	-	20	20	-
24.	Elective from other Deptt. - II	4	3	1	-	3	-	60	-	20	20	-
25.	Elective from other Deptt. III	4	3	1	-	3	-	60	-	20	20	-
26.	MA-670 : Dissertation	8	-	-	-	-	-	60*	-	40**	-	-
		24	12	4	-							

Note : List of Departmental Electives enclosed . Out of these a candidate has to choose 3 in 3rd semester and 2 in 4th Semester from amongst the electives which will be offered by the department in each semester.

* Project

** Seminars