

23rd MEETING OF
SENATE
Agenda



NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

TO BE HELD ON: 13th December, 2013

**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119**

Agenda	:	23rd Meeting of the Senate
Venue	:	Senate Hall, NIT, Kurukshetra
Date & Time	:	13th December, 2013 at 11.00 am.

Item No.	Agenda Item	Pages
23.1	To confirm the minutes of the 21 st and 22 nd meetings of the Senate held on 23.02.2013 and 10.04.2013 respectively	1-20
23.2	To note the action taken on the minutes of the 21 st and 22 nd meetings of the Senate held on 23.02.2013 and 10.04.2013 respectively	21-27
23.3	To note decisions taken in 43 rd , 44 th & 45 th meetings of Standing Committee on Senate Affairs (SCSA)	28-68
23.4	To consider and approve the generalized annual academic calendar	69-70
23.5	To consider scheme and syllabus for M.Tech. in Biomedical Engineering.	71-80
23.6	To consider scheme and syllabus for M.Tech. in Material Science and Nanotechnology	81-90

Item 23.1 To confirm the minutes of the 21st and 22nd meetings of the Senate held on 23.02.2013 and 10.04.2013 respectively

The minutes of the 21st and 22nd meetings of the Senate held on 23.02.2013 and 10.04.2013 respectively were circulated to all the members of the Senate on 27.02.2013 and 18.04.2013. No comments were received on the minutes. The minutes are enclosed as Annexure 23.1 from pages 2 to 20.

The Senate may confirm the same.

Annexure-23.1

MINUTES

OF 21st SENATE

MEETING



**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA**

HELD ON: 21st February, 2013

NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119

Minutes of the 21st meeting of the Senate of National Institute of Technology, Kurukshetra held on 23rd February, 2013 at 11:00 a.m. in the Senate Hall of the Institute.

The following were present:

- | | |
|---|----------|
| 1. Prof. Anand Mohan
Director
NIT, Kurukshetra | Chairman |
| 2. Prof. (Ms.) Shashikala Achyut Gangal
ISRO Chair Professor
Department of Electronics Science
University of Pune,
Pune-411 007 | Member |
| 3. Prof. V K Arora
Professor & Dean (P&D)
Civil Engineering Department
NIT, Kurukshetra | Member |
| 4. Prof. V K Sehgal
Professor & Dean (Faculty Welfare)
Civil Engineering Department
NIT, Kurukshetra | Member |
| 5. Prof. S K Sharma
Professor & Dean (Students' Welfare)
Mechanical Engineering Department
NIT, Kurukshetra | Member |
| 6. Prof. A K Gupta
Professor & Dean (Academic)
Electronics & Comm. Engg. Department
NIT, Kurukshetra | Member |
| 7. Prof. (Ms.) Minati Baral
Professor & Head
Chemistry Department
NIT, Kurukshetra | Member |

Call

8. Prof. D K Soni Professor & Head Civil Engineering Department NIT, Kurukshetra	Member
9. Prof. N K Gupta Professor Civil Engineering Department NIT, Kurukshetra	Member
10. Prof. S S Rattan Professor Mechanical Engineering Department NIT, Kurukshetra	Member
11. Prof. K S Sandhu Professor Electrical Engineering Department NIT, Kurukshetra	Member
12. Prof. Sudhir Kumar Professor & Head Mechanical Engineering Department NIT Kurukshetra	Member
13. Prof. Rajender Kumar Professor & Head Department of Humanities & Social Sciences NIT, Kurukshetra	Member
14. Prof. S K Madan Professor Civil Engineering Department NIT, Kurukshetra	Member
15. Prof. H K Sharma Professor Civil Engineering Department NIT, Kurukshetra	Member
16. Prof. (Ms.) Lillie Dewan Professor & Head Electrical Engineering Department NIT, Kurukshetra	Member
17. Prof. Dixit Garg Professor Mechanical Engineering Department NIT, Kurukshetra	Member

RSW

18. Prof. P J Philip Professor Department of Humanities & Social Sciences NIT, Kurukshetra	Member
19. Prof. J K Quamara Professor & Head Physics Department NIT, Kurukshetra	Member
20. Prof. R S Bhatia Professor Electrical Engineering Department NIT Kurukshetra	Member
21. Prof. G L Pahuja Professor Electrical Engineering Department NIT Kurukshetra	Member
22. Prof. K K Singh Professor & Dean (Estate & Con.) Civil Engineering Department NIT Kurukshetra	Member
23. Prof. Subodh Ranjan Professor Civil Engineering Department NIT Kurukshetra	Member
24. Prof. (Ms.) Ratna Dahiya Professor Electrical Engineering Department NIT Kurukshetra	Member
25. Prof. Anupam Mittal Professor Civil Engineering Department NIT, Kurukshetra	Member
26. Prof. Dinesh Khanduja Professor Mechanical Engineering Department NIT Kurukshetra	Member
27. Prof. R.K. Sharma Professor Electronics & Comm. Engineering Department NIT Kurukshetra	Member

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28. Prof. O.P Sahu Professor & Head Electronics & Comm. Engg. Department NIT, Kurukshetra	Member
29. Prof. S M Gupta Professor. & COE Civil Engineering Department NIT Kurukshetra	Member
30. Prof. Arun Goel Professor Civil Engineering Department NIT, Kurukshetra	Member
31. Prof. Dinesh Kumar Professor Chemistry Department NIT, Kurukshetra	Member
32. Prof. D.P. Singh Professor Chemistry Department NIT, Kurukshetra	Member
33. Prof. P.C. Tiwari Professor. Mechanical Engineering Department NIT Kurukshetra	Member
34. Prof. L.M. Saini Professor. & Prof. I/C (Academics & Senate Affairs) Electrical Engineering Department NIT Kurukshetra	Member
35. Prof. Hari Singh Professor. Mechanical Engineering Department NIT Kurukshetra	Member
36. Prof. S.K. Patidar Professor Civil Engineering Department NIT, Kurukshetra	Member
37. Prof. Ashwani Jain Professor Civil Engineering Department NIT, Kurukshetra	Member

Rash

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| 38. Dr. Jitender Chhabra
Associate Professor & Head
Computer Engineering Department
NIT, Kurukshetra | Special Invitee |
| 39. Dr. Paras Ram
Associate Professor & Head
Mathematics Department
NIT, Kurukshetra | Special Invitee |
| 40. Sh. G.R. Samantray
Registrar I/C
NIT, Kurukshetra | Secretary, Senate |

The following members could not attend the meeting

- | | |
|--|--------|
| 1. Prof. Chandra Shekhar
Director
Central Electronics Engg. Research Institute (CEERI)
Pilani (Raj.) | Member |
| 2. Prof. Rajendra Rai
Head of the Department
Department of Economics
Faculty of Social Sciences
Banaras Hindu University
Varanasi-221 005 | Member |
| 3. Prof. A Swarup
Professor & Dean (Research & Consultancy)
Electrical Engineering Department
NIT, Kurukshetra | Member |
| 4. Prof. Brahmjit Singh
Professor
Electronics & Comm. Engg. Department
NIT, Kurukshetra | Member |
| 5. Prof. Baldev Setia
Professor
Civil Engineering Department
NIT, Kurukshetra | Member |
| 6. Prof. Diwan Singh
Professor
Civil Engineering Department
NIT, Kurukshetra | Member |

Concl

7. Prof. S N Sachdeva
Professor
Civil Engineering Department
NIT, Kurukshetra Member
8. Prof. Surjit Angra
Professor
Mechanical Engineering Department
NIT Kurukshetra Member

- 21.1 To confirm the minutes of the 20th meeting of the Senate held on 10.05.2012.

The Senate confirmed the minutes of 20th meeting of the Senate held on 10.5.2012.

- 21.2 To note the action taken on the minutes of the 19th and 20th meetings of the Senate held on 28.02.2012 & 10.05.2012 respectively.

The Senate noted the action taken report on the minutes of 19th and 20th meetings of the Senate held on 28.02.2012 and 10.05.2012 respectively.

- 21.3 To note decisions taken in 41st and 42nd meeting of Standing Committee on Senate Affairs (SCSA)

The Senate noted the decision taken in its 41st and 42nd meetings of Standing Committee on Senate Affairs.

- 21.4 To note the approval of the Chairman, Senate to the procedures for assigning (i) roll nos. to the students and (ii) course nos. to various subjects offered in UG/PG/Ph.D programs.

The Senate noted the approval of the Chairman, Senate to the procedure of assigning i) Roll Nos. to the students and ii) Course Nos. to various subjects offered in UG, PG and Ph. D. programmes.

The HOD, Chemistry and HOD, (Humanities and Social Sciences) Departments pointed out that the Codes for courses offered by the Departments of Physics, Chemistry, Mathematics and HSS have not been included in the procedure. The Dean (Academics) assured to do the needful and communicate the same to the concerned Departments.

- 21.5 To note approval of the Chairman, Senate to Scheme and Syllabi of various M.Tech. programs.

The Senate noted the approval of the Chairman, Senate to Scheme and Syllabi of various M. Tech. Programmes.

RAM

- 21.6 To note the approval of the Chairman, Senate to the revised scheme & syllabi of B.Tech courses and the courses offered to Ph.D students by Departments of Physics, Chemistry and Mathematics.

The Senate noted the approval of the Chairman, Senate to the revised Scheme & Syllabi of B.Tech. courses and the courses offered to Ph. D. students by Departments of Physics, Chemistry and Mathematics.

The HOD, Mathematics Department pointed out that the course nos. of the subjects offered in the Department of Mathematics need to be modified in accordance with the new procedure for assigning the course numbers to the subjects. Dean (Academics) assured to do the needful and communicate the same to the concerned Departments.

- 21.7 To consider and approve the proposal of Mechanical Engg. Deptt. for change of name from B.Tech (Industrial Engg. & Management) to B.Tech (Production and Industrial Engg).

The Senate approved the proposal of Mechanical Engineering Department for change of name of B.Tech (Industrial Engineering & Management) to B.Tech (Production and Industrial Engineering).

Dr. K. K. Singh, Dean (Estate) pointed out that this change of name should be intimated to the Central Counselling Board (CCB). The Dean (Academics) assured to do the needful.

- 21.8 To consider and approve the scheme and syllabi of B.Tech (Production & Industrial Engg).

The Senate approved the Scheme and Syllabi of B. Tech. (Production & Industrial Engineering).

- 21.9 To consider the request of B.Tech./M.Tech./MBA/MCA students for awarding final degree with Honors.

The Senate considered the request of the students for awarding final degree with Honors. The Senate declined the request.

- 21.10 Approval to the list of students to be awarded degrees in 10th Convocation

The Senate approved the list of students to be awarded degrees in 10th Convocation of the Institute.

It was also decided that the Heads of the Departments may go through the respective list of Degree awardees and intimate the discrepancy observed, if any, to the Dean (Academics) within next three working days.

CSM

21.11 Approval for the students to be awarded Medals and Certificates.

The Senate approved the list of students to be awarded Medals and Certificates in 10th Convocation of the Institute.

It was also decided that the Heads of the Departments may go through the respective list of Medal awardees and intimate the discrepancy observed, if any, to the Dean (Academics) within next three working days.

The Senate has also decided to confirm the minutes of 21.10 and 21.11 items during the meeting itself.

21.12 To note the result of students passing out during academic year 2011-12

The Senate noted the result of students passing out during Academic year 2011-12.

21.13 To note the admission status of various UG / PG Courses in the Institute for the academic session 2012-13.

The Senate noted the admission status of various UG and PG Courses in the Institute for the Academic Session 2012-13.

21.14 Any other item.

No discussion under 'any other item' took place.

21.15 To consider Conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Suresh Rai, Professor Department of Electrical and Computer Engineering, Louisiana State University (USA).

The Senate approved the conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Suresh Rai, Professor, Department of Electrical and Computer Engineering, Louisiana State University (USA) at 10th Convocation of the Institute.

21.16 To consider Conferment of D.Sc. (Honoris Causa) on Dr. Rohit Sharma, CEO, Syfto Inc. (USA).

The Senate approved the conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Rohit Sharma, CEO, Syfto Inc.(USA) at 10th Convocation of the Institute.

CSA

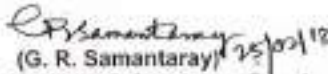
21.17 To consider Conferment of Honorary Degree of Ph.D. (Honoris Causa) on Prof. Inderjit Singh Lamba, distinguished alumnus of 1st Batch of REC, Kurukshetra.

The Senate approved the conferment of Honorary Degree of Ph. D. (Honoris Causa) on Prof. Inderjit Singh Lamba, distinguished alumnus of 1st batch of REC, Kurukshetra at 10th Convocation of the Institute.

21.18 To consider payment of remuneration to faculty members. for examination work.

The Senate approved the proposal of payment of remuneration to faculty members for examination work.

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


(G. R. Samantaray) 25/02/12
Registrar UC & Secretary, Senate
NIT, Kurukshetra

MINUTES

OF 22nd SENATE

MEETING



**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA**

HELD ON: 10th April, 2013

**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119**

Minutes of the 22nd meeting of the Senate of National Institute of Technology,
Kurukshetra held on 10th April, 2013 at 3:00 p.m. in the Senate Hall of the Institute.

The following were present:

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| 1. Prof. Anand Mohan
Director
NIT, Kurukshetra | Chairman |
| 2. Prof. (Ms.) Shashikala Achyut Gangal
ISRO Chair Professor
Department of Electronics Science
University of Pune,
Pune-411 007 | Member |
| 3. Prof. Rajendra Rai
Head of the Department
Department of Economics
Faculty of Social Sciences
Banaras Hindu University
Varanasi-221 005 | Member |
| 4. Prof. V. K. Arora
Professor & Dean (P&D)
Civil Engineering Department
NIT, Kurukshetra | Member |
| 5. Prof. V. K. Sehgal
Professor & Dean (Faculty Welfare)
Civil Engineering Department
NIT, Kurukshetra | Member |
| 6. Prof. S. K. Sharma
Professor & Dean (Students' Welfare)
Mechanical Engineering Department
NIT, Kurukshetra | Member |
| 7. Prof. A.K. Gupta
Professor & Dean (Academic)
Electronics & Comm. Engg. Department
NIT, Kurukshetra | Member |

SPM

8. Prof. A. Swarup Professor & Dean (Research & Consultancy) Electrical Engineering Department NIT, Kurukshetra	Member
9. Prof. Brahmjit Singh Professor Electronics & Comm. Engg. Department NIT, Kurukshetra	Member
10. Prof. (Ms.) Minati Baral Professor & Head Chemistry Department NIT, Kurukshetra	Member
11. Prof. D. K. Soni Professor & Head Civil Engineering Department NIT, Kurukshetra	Member
12. Prof. N. K. Gupta Professor Civil Engineering Department NIT, Kurukshetra	Member
13. Prof. S. S. Rattan Professor Mechanical Engineering Department NIT, Kurukshetra	Member
14. Prof. K. S. Sandhu Professor Electrical Engineering Department NIT, Kurukshetra	Member
15. Prof. Sudhir Kumar Professor & Head Mechanical Engineering Department NIT Kurukshetra	Member
16. Prof. Baldev Setia Professor Civil Engineering Department NIT, Kurukshetra	Member
17. Prof. Rajender Kumar Professor & Head Department of Humanities & Social Sciences NIT, Kurukshetra	Member

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18. Prof. H. K. Sharma Professor Civil Engineering Department NIT, Kurukshetra	Member
19. Prof. (Ms.) Lillie Dewan Professor & Head Electrical Engineering Department NIT, Kurukshetra	Member
20. Prof. S. N. Sachdeva Professor Civil Engineering Department NIT, Kurukshetra	Member
21. Prof. Dixit Garg Professor Mechanical Engineering Department NIT, Kurukshetra	Member
22. Prof. P. J. Philip Professor Department of Humanities & Social Sciences NIT, Kurukshetra	Member
23. Prof. J. K. Quamara Professor & Head Physics Department NIT, Kurukshetra	Member
24. Prof. Surjit Angra Professor Mechanical Engineering Department NIT Kurukshetra	Member
25. Prof. R. S. Bhatia Professor Electrical Engineering Department NIT Kurukshetra	Member
26. Prof. G. L. Pahuja Professor Electrical Engineering Department NIT Kurukshetra	Member

B.S.A.

27. Prof. K. K. Singh Professor & Dean (Estate & Con.) Civil Engineering Department NIT Kurukshetra	Member
28. Prof. Subodh Ranjan Professor Civil Engineering Department NIT Kurukshetra	Member
29. Prof. (Ms.) Ratna Dahiya Professor Electrical Engineering Department NIT Kurukshetra	Member
30. Prof. Anupam Mittal Professor Civil Engineering Department NIT, Kurukshetra	Member
31. Prof. Dinesh Khanduja Professor Mechanical Engineering Department NIT Kurukshetra	Member
32. Prof. R.K. Sharma Professor Electronics & Comm. Engineering Department NIT Kurukshetra	Member
33. Prof. O.P Sahu Professor & Head Electronics & Comm. Engg. Department NIT, Kurukshetra	Member
34. Prof. S. M. Gupta Professor. & COE Civil Engineering Department NIT Kurukshetra	Member
35. Prof. Arun Goel Professor Civil Engineering Department NIT, Kurukshetra	Member
36. Prof. Dinesh Kumar Professor Chemistry Department NIT, Kurukshetra	Member

CPH

37. Prof. D.P. Singh Professor Chemistry Department NIT, Kurukshetra	Member
38. Prof. P.C. Tiwari Professor, Mechanical Engineering Department NIT Kurukshetra	Member
39. Prof. L.M. Saini Professor. & Prof. I/C (Academics & Senate Affairs) Electrical Engineering Department NIT Kurukshetra	Member
40. Prof. Hari Singh Professor. Mechanical Engineering Department NIT Kurukshetra	Member
41. Prof. S.K. Patidar Professor Civil Engineering Department NIT, Kurukshetra	Member
42. Prof. Ashwani Jain Professor Civil Engineering Department NIT, Kurukshetra	Member
43. Dr. Jitender Chhabra Associate Professor & Head Computer Engineering Department NIT, Kurukshetra	Special Invitee
44. Dr. Paras Ram Associate Professor & Head Mathematics Department NIT, Kurukshetra	Special Invitee
45. Sh. G.R. Samantray Registrar/I/C NIT, Kurukshetra	Secretary, Senate

RAM

The following members could not attend the meeting

1. Prof. Chandra Shekhar Member
Director
Central Electronics Engg. Research Institute (CEERI)
Pilani (Raj.)

2. Prof. S. K. Madan Member
Professor
Civil Engineering Department
NIT, Kurukshetra

The Director and Chairman, Senate welcomed the two external members and other members of the Senate present in the meeting. He conveyed his ~~gratitude~~^{gratitude} and thanks to all the Senators to make the 10th Convocation a grand success. He told that it has now become a history for the Institute as the Hon'ble President of India graced the Convocation and blessed all of us with his kind words and encouraged to take this Institution to newer heights. He expressed his sincere thanks and gratitude to all the Chiefs, Conveners, Members, entire faculty, officers, office bearers and entire staff of the Institute for their meticulous cooperation, tireless efforts for the successful organization of 10th Convocation.

With the above opening remarks the Senate started deliberations on the agenda of the meeting.

22.1 To confirm the minutes of the 21st meeting of the Senate held on 21.02.2013.

It was observed that the Senate has approved the proposal in toto for payment of remuneration to faculty and non-faculty members for examination work.

The Senate approved the minutes of the 21st meeting of the Senate held on 21.02.2013 with the above observation.

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22.2 To consider and approve modified prospectus for Ph. D. program

The Senate deliberated on this item in detail and a number of suggestions were received from the members including the external members. Therefore it was decided to constitute the following committee to consider the various suggestions and points raised by the Senators:-

- | | | |
|------|---------------------------------|----------|
| i) | Prof. A. K. Gupta, Dean (Acad.) | Chairman |
| ii) | Prof. A. Swarup, Dean (R&C) | Member |
| iii) | Prof. Brahmjit Singh | Member |
| iv) | Prof. S. N. Sachdeva | Member |
| | | |
| v) | Prof. Dinesh Khanduja | Member |
| vi) | Prof. Ashwani Jain | Member |
| vii) | Prof. J. K. Chhabra | Member |

The above committee will submit its report to the Director by the end of this month. The said report will be placed before the SCSA and after the approval of SCSA the same will be noted by the Senate in its next meeting.

22.3 To consider grant of mercy chance to re-appear in the end semester examinations of B.Tech., M. Tech., M.B.A. and MCA after the expiry of maximum duration of the course.

In view of the Celebrations of the 'Golden Jubilee Year' by the Institute, the Senate decided as under:-

- i) Approved the proposal of granting mercy chance to appear in theory / practical / sessional exams to the students who could not pass their degree in the maximum duration of the course.
- ii) All the students who-so-ever is entitled to get degree from NIT, Kurukshetra will be eligible to get the mercy chance.
- iii) The Dean (Acad.) will identify all such students and get the approval of the Director.
- iv) Academic Section will inform all the students the decision of the Senate through Speed Post and e-mail with a copy to their parents.

BSA

- v) If need be the Controller of Examination may conduct a special supplementary exam for such students in September, 2013

22.4 Any other item

Under any other item, the matter of holding the practical exams before the theory papers was raised by Prof. (Mrs.) Lillie Dewan, HOD, Electrical Engineering Department. The matter was discussed and decided as under:-

The Senate decided that this time the practical exams will be organized as per the prevailing practice. However, the practical exams from next academic session 2013-14 will be organized before the theory examinations. The Dean (Academic) will prepare the Academic Calendar accordingly.

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


(G. R. Samantary) 17/09/13
Registrar VC & Secretary, Senate
NIT, Kurukshetra

Item 23.2: To note the Action Taken Report on the minutes of the 21st and 22nd meetings of the Senate held on 23.02.2013 and 10.04.2013 respectively

The Action Taken Report on the minutes of the 21st meeting of the Senate held on 23.02.2013 is as under:-

Item No.	Agenda Item	Minutes of the Item	Action
21.1	To confirm the minutes of the 20 th meeting of the Senate held on 10.05.2012	The Senate confirmed the minutes of 20 th meeting of the Senate held on 10.5.2012.	No further action is required
21.2	To note the action taken on the minutes of the 19 th and 20 th meetings of the Senate held on 28.02.2012 & 10.05.2012 respectively	The Senate noted the action taken report on the minutes of 19 th and 20 th meetings of the Senate held on 28.02.2012 and 10.05.2012 respectively	No further action is required
21.3	To note decisions taken in 41 st and 42 nd meeting of Standing Committee on Senate Affairs-(SCSA)	The Senate noted the decision taken in its 41 st and 42 nd meetings of Standing Committee on Senate Affairs	No further action is required
21.4	To note the approval of the Chairman, Senate to the procedures for assigning (i) roll nos. to the students and (ii) course nos. to various subjects offered in UG/PG/Ph.D programs.	The Senate noted the approval of the Chairman, Senate to the procedure of assigning i) Roll Nos. to the students and ii) Course Nos. to various subjects offered in UG, PG and Ph. D. programmes. The HOD, Chemistry and HOD, (Humanities and Social Sciences) Departments pointed out that the Codes for courses offered by the Departments of Physics, Chemistry, Mathematics and HSS have not been included in the procedure. The Dean (Academics) assured to do the needful and communicate the same to the concerned Departments.	The Senate noted the approval of the Chairman Chairman Senate. Necessary the modifications in course codes has been done.
21.5	To note approval of the Chairman, Senate to Scheme and Syllabi of	The Senate noted the approval of the Chairman, Senate to Scheme and Syllabi of various M. Tech. Programmes.	No further action is

	various M.Tech. programs		required
21.6	<p>To note the approval of the Chairman, Senate to the revised scheme & syllabi of B.Tech courses and the courses offered to Ph.D students by Departments of Physics, Chemistry and Mathematics.</p>	<p>The Senate noted the approval of the Chairman, Senate to the revised Scheme & Syllabi of B.Tech. courses and the courses offered to Ph. D. students by Departments of Physics, Chemistry and Mathematics.</p> <p>The HOD, Mathematics Department pointed out that the course nos. of the subjects offered in the Department of Mathematics need to be modified in accordance with the new procedure for assigning the course numbers to the subjects. Dean (Academics) assured to do the needful and communicate the same to the concerned Departments.</p>	<p>No further action is required</p> <p>Necessary modifications in the course code has been carried out.</p>
21.7	<p>To consider and approve the proposal of Mechanical Engg. Deptt. for change of name from B.Tech (Industrial Engg. & Management) to B.Tech (Production and Industrial Engg).</p>	<p>The Senate approved the proposal of Mechanical Engineering Department for change of name of B.Tech (Industrial Engineering & Management) to B.Tech (Production and Industrial Engineering).</p> <p>Dr. K. K. Singh, Dean (Estate) pointed out that this change of name should be intimated to the Central Counselling Board (CCB). The Dean (Academics) assured to do the needful.</p>	<p>Change of name from B.Tech (Industrial Engineering & Management) to B.Tech (Production and Industrial Engineering) has been implemented.</p> <p>Change of name has been intimated to CSAB.</p>
21.8	<p>To consider and approve the scheme and syllabi of B.Tech</p>	<p>The Senate approved the Scheme and Syllabi of B. Tech. (Production & Industrial Engineering).</p>	<p>The approved syllabi of</p>

	(Production & Industrial Engg).	B. Tech. (Production Industrial Engineering) has been implemented.
21.9	To consider the request of B.Tech./M.Tech./MBA/MCA students for awarding final degree with Honors	No further action is required
21.10	Approval to the list of students to be awarded degrees in 10 th Convocation	Degrees has been awarded as per approved list.
21.11	Approval for the students to be awarded Medals and Certificates.	Medals and certificates has been awarded by the Senate.
21.12	To note the result of students passing out during academic year 2011-12	No further action is required
21.13	To note the admission status of	No further

	various UG / PG Courses in the Institute for the academic session 2012-13.	PG Courses in the Institute for the Academic Session 2012-13.	action is required.
21.14	Any other item.	No discussion under 'any other item' took place.	-
21.15	To consider Conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Suresh Rai, Professor Department of Electrical and Computer Engineering, Louisiana State University (USA).	The Senate approved the conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Suresh Rai, Professor, Department of Electrical and Computer Engineering, Louisiana State University (USA) at 10 th Convocation of the Institute.	Degree awarded as approved by the Senate
21.16	To consider Conferment of D.Sc. (Honoris Causa) on Dr. Rohit Sharma, CEO, Syfto Inc. (USA).	The Senate approved the conferment of Honorary Degree of D.Sc. (Honoris Causa) on Dr. Rohit Sharma, CEO, Syfto Inc. (USA) at 10 th Convocation of the Institute.	Degree awarded as approved by the Senate
21.17	To consider Conferment of Honorary Degree of Ph.D. (Honoris Causa) on Prof. Inderjit Singh Lamba, distinguished alumnus of 1 st Batch of REC, Kurukshetra.	The Senate approved the conferment of Honorary Degree of Ph. D. (Honoris Causa) on Prof. Inderjit Singh Lamba, distinguished alumnus of 1 st batch of REC, Kurukshetra at 10 th Convocation of the Institute.	Degree awarded as approved by the Senate
21.18	To consider payment of remuneration to faculty members for examination work.	The Senate approved the proposal of payment of remuneration to faculty members for examination work.	Implementation of Senate decision is in process.

Action Taken Report on the minutes of the 22nd meeting of the Senate held on 10.04.2013

Item No.	Agenda Item	Minutes of the item	Action taken																					
22.1	To confirm the minutes of the 21 st meeting of the Senate held on 21.02.2013.	It was observed that the Senate has approved the proposal in toto for payment of remuneration to faculty and non-faculty members for examination work. The Senate approved the minutes of the 21 st meeting of the Senate held on 21.02.2013 with the above observation.	Minutes has been circulated to all the members																					
22.2	To consider and approve modified prospectus for Ph. D. program	<p>The Senate deliberated on this item in detail and a number of suggestions were received from the members including the external members. Therefore it was decided to constitute the following committee to consider the various suggestions and points raised by the Senators:-</p> <table border="0" data-bbox="941 735 1136 1302"> <tr> <td>i)</td> <td>Prof. A. K. Gupta, Dean (Acad.)</td> <td>Chairman</td> </tr> <tr> <td>ii)</td> <td>Prof. A. Swarup, Dean (R&C)</td> <td>Member</td> </tr> <tr> <td>iii)</td> <td>Prof. Brahamjit Singh</td> <td>Member</td> </tr> <tr> <td>iv)</td> <td>Prof. S. N. Sachdeva</td> <td>Member</td> </tr> <tr> <td>v)</td> <td>Prof. Dinesh Khandaia</td> <td>Member</td> </tr> <tr> <td>vi)</td> <td>Prof. Ashwari Jain</td> <td>Member</td> </tr> <tr> <td>vii)</td> <td>Prof. J. K. Chhabra</td> <td>Member</td> </tr> </table> <p>The above committee will submit its report to the Director by the end of this month. The said report will be placed before the SCSA and after the approval of SCSA the same will be noted by the Senate in its next meeting.</p>	i)	Prof. A. K. Gupta, Dean (Acad.)	Chairman	ii)	Prof. A. Swarup, Dean (R&C)	Member	iii)	Prof. Brahamjit Singh	Member	iv)	Prof. S. N. Sachdeva	Member	v)	Prof. Dinesh Khandaia	Member	vi)	Prof. Ashwari Jain	Member	vii)	Prof. J. K. Chhabra	Member	<p>The modifications suggested by all HODs in their meeting held on 26.04.2013 followed by the said committee in its meeting held on 01.05.2013 were placed in 43rd SCSA meeting held on 14.05.2013 were considered and approved by SCSA and modified Ph.D. prospectus was implemented w.e.f. academic session 2013-14</p>
i)	Prof. A. K. Gupta, Dean (Acad.)	Chairman																						
ii)	Prof. A. Swarup, Dean (R&C)	Member																						
iii)	Prof. Brahamjit Singh	Member																						
iv)	Prof. S. N. Sachdeva	Member																						
v)	Prof. Dinesh Khandaia	Member																						
vi)	Prof. Ashwari Jain	Member																						
vii)	Prof. J. K. Chhabra	Member																						

<p>22.3 To consider grant of mercy chance to re-appear in the end semester examinations of B.Tech., M. Tech., M.B.A. and MCA after the expiry of maximum duration of the course.</p>	<p>In view of the Celebrations of the 'Golden Jubilee Year' by the Institute, the Senate decided as under:-</p> <ol style="list-style-type: none"> i) Approved the proposal of granting mercy chance to appear in theory / practical / sessional exams to the students who could not pass their degree in the maximum duration of the course. ii) All the students who-so-ever is entitled to get degree from NIT, Kurukshetra will be eligible to get the mercy chance. iii) The Dean (Acad.) will identify all such students and get the approval of the Director. iv) Academic Section will inform all the students the decision of the Senate through Speed Post and e-mail with a copy to their parents. v) If need be the Controller of Examination may conduct a special supplementary exam for such students in September, 2013 	<p>Mercy chance has been granted to all the eligible students as approved by the Senate.</p>
<p>22.4 Any other item</p>	<p>Under any other item, the matter of holding the practical exams before the theory papers was raised by Prof. (Mrs.) Lillie Dewan, HOD, Electrical Engineering Department. The matter was discussed and decided as under:-</p>	<p>The end semesters examination of practical courses has been conducted as approved w.e.f. odd semester</p>

		<p>The Senate decided that this time the practical exams will be organized as per the prevailing practice. However, the practical exams from next academic session 2013-14 will be organized before the theory examinations. The Dean (Academic) will prepare the Academic Calendar accordingly.</p>	2013-14
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Item 23.3: To note decisions taken in 43rd, 44th & 45th meeting of Standing Committee on Senate Affairs (SCSA)

43rd, 44th & 45th SCSA meetings were held on 14.05.2013, 11.6.2013 and 29.8.2013 respectively. The minutes of these meetings have already been circulated to all members of SCSA. The minutes are enclosed as Annexure 21.3 from pages 29 to 68.

MINUTES

43rd MEETING OF

STANDING COMMITTEE

ON SENATE AFFAIRS



**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA**

HELD ON: 14th May, 2013

NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119

No. Acad./2013/43rd SCSA/

Dated: 27.05.2013

Minutes of the 43rd SCSA meeting held on 14th May, 2013 at 4:00 p.m. in the Board Room of the Institute

The following were present:-

1. Prof. Anand Mohan, Director In Chair
2. Prof. V.K. Arora, Dean (P&D)
3. Prof. VK Sehgal, Dean (Faculty Welfare)
4. Prof. S.K Sharma, Dean (Students' Welfare)
5. Prof. A.K. Gupta, Dean (Academic)
6. Prof. A Swarup, Dean (Research & Consultancy)
7. Prof. K.K. Singh, Dean (Estate)
8. Prof. Brahmjit Singh, Professor, ECE
9. Prof. N.K. Gupta, Professor, CED
10. Prof. D.K. Soni, Head, CED
11. Prof. Sudhir Kumar, Head, MED
12. Prof. Rajender Kumar, Head, HSS Deptt.
13. Prof. (Ms.) Lillie Dewan, Head, EED
14. Prof. (Ms.) Minati Baral, Head, Chemistry Deptt.
15. Prof. P.J. Philip, Head, Master of Business Administration
16. Prof. J.K. Quamara, Head, Physics Deptt.
17. Prof. S.M. Gupta, Controller of Exam.
18. Dr. Umesh Ghanekar, Head, ECE Deptt.
19. Prof. L.M. Saini, Professor, I/C Acad. Affairs & Senate
20. Dr. Jitender Kumar Chhabra, Head, Computer Engg. Deptt.
21. Dr. Paras Ram, Head, Mathematics Deptt.
22. Prof. Ashwani Jain, Special Invited, CED
23. Prof. S.N. Sachdeva, Special Invited, CED
24. Sh. G.R. Samantaray, Registrar I/C & Secretary, SCSA

The following decisions were taken:-

Item 43.1:

To consider and approve the modified prospectus of Ph. D. for the session 2013-14.


The modifications in the prospectus of Ph.D for the session 2013-14 were considered and approved as given in Annexure-I.

The minutes of the meeting were confirmed in the meeting.

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


(G.R. Samantaray)
Registrar I/C & Secretary, Senate & SCSA

Director & Chairman
Senate & SCSA


14/5/13

Annexure-I

**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA**

PROSPECTUS



Ph.D. PROGRAMS

(2013-2014)

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA

The National Institute of Technology, Kurukshetra, an "Institute of National Importance", offers through its departments, postgraduate programs leading to the award of the degree of M.Tech, and Ph.D.

The Institute undertakes sponsored research and development projects from various industrial and other organizations in public and private sectors. The Institute encourages research in inter-disciplinary areas also, and provides opportunities for such research programs.

The National Institute of Technology, Kurukshetra (NITK), formerly a Regional Engineering College, was conferred the deemed university status on 26.6.2002, and declared an "Institute of National Importance", on 15.08.2007. The Institute is now fully and directly funded by Central Government through the Ministry of Human Resource Development.

Kurukshetra, located on Delhi - Ambala section of Northern Railway at about 160 km from Delhi, is one of the premier Institutes engaged in technical education and research. It is the first Engineering Institute in the state of Haryana.

Kurukshetra is a place of great religious significance too, where Lord Krishna is said to have delivered the divine message of Shrimad Bhagwad Gita.

Fees & Deposits

The rates of fee payable by Ph.D. scholars are as under

(a)	Full-time scholars	Rs. 6000/- per semester
(b)	Part-time scholars from outside NITK	
	(i) Teachers	Rs. 4000/- per semester
	(ii) Non-teachers	Rs. 4000/- per semester
(c)	Part-time scholars from NITK	
	(i) First Semester	Rs. 1000/-
	(ii) Subsequent Semesters	Rs. 500/- per semester
(d)	NRIs/ Foreigner students	US \$ 2000/- per semester

Hostel

For staying in the hostel (subject to availability of seats), the room rent, fee and deposits etc. shall be charged as per the hostel rates applicable from time to time.

Specializations available for Ph.D. programs

The Ph.D. programs are offered by the following departments / Schools in the related areas of specializations. The research in interdisciplinary areas is encouraged.

- DEPARTMENT OF CIVIL ENGINEERING
- DEPARTMENT OF ELECTRICAL ENGINEERING
- DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
- DEPARTMENT OF COMPUTER ENGINEERING***
- DEPARTMENT OF MECHANICAL ENGINEERING *
- DEPARTMENT OF PHYSICS
- DEPARTMENT OF CHEMISTRY
- DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
- DEPARTMENT OF MATHEMATICS
- SCHOOL OF VLSI DESIGN AND EMBEDDED SYSTEMS
- SCHOOL OF RENEWABLE ENERGY AND EFFICIENCY
- DEPARTMENT OF BUSINESS ADMINISTRATION**
- DEPARTMENT OF COMPUTER APPLICATIONS**

* Includes Production and Industrial Engineering.

** Subject to availability of permanent staff

*** Includes Information Technology

Contacts:

The department-wise availability of tentative number of seats will be notified on the institute website by the academic section in the beginning of May/November every year. The contact numbers of the offices of Dean (Academics) and Heads of Departments are as listed below:

Office of Dean (Academics)			
Telephone No.			
(EPABX: 01744-233100, 233200)			
FAX NO.: 01744-238050			
Designation	Name	Deptt. Office	Office
Dean (Academics)	Prof. A. K. Gupta	233415	233223
Prof-in-charge (Academic & Senate Affairs)	Prof. L.M. Saini	233381	233223
D. R. (Academics)	-	233227	-
Academic Section	-	233228 233229	-

Heads/ Coordinators of Departments			
Department/ School	Name	Deptt. Office	Office
Civil Engg. Deptt.	Prof. D.K. Soni	233334	233338
Computer Engg. Deptt.	Dr. J.K. Chhabra	233479	233482
Electrical Engg. Deptt.	Prof. Lillie Dewan	233371	233379
Electronics & Communication Engg. Deptt.	Dr. Umesh Ghanskar	233414	233417
Mechanical Engg. Deptt.	Prof. Sudhir Kumar	233447	233453
Physics Deptt.	Prof. J K Quamara	233494	233497
Chemistry Deptt.	Prof. Minati Bani	233514	233544
Humanities & Social Sciences Deptt.	Prof. Rajender Kumar	233516	233523
Mathematics Deptt.	Dr. Paras Ran	233504	233509
School of VLSI design and embedded system	Prof. A. K. Gupta	233415	233223
School of renewable energy and efficiency	Prof. A. Swarup	233375	233221

Submission of Application

The applications for Ph.D., addressed to the Director NIT Kurukshetra, can be submitted from 1st May to 31st May, and from 1st November to 30th November in the prescribed application form (may be downloaded from the institute website).

**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA
ORDINANCES & REGULATIONS
for the
DEGREE OF DOCTOR OF PHILOSOPHY**

PREAMBLE

The National Institute of Technology, Kurukshetra offers through its Departments, postgraduate programs leading to the award of the Doctorate (Ph.D.) degree. The award of the Doctorate degree is in recognition of high academic attainments, quality research, and application of knowledge to the solution of technical and scientific problems in Science, Technology, and Humanities & Social Sciences.

The Institute undertakes sponsored research and development projects from industry and other organizations in public and private sector. The Institute also provides opportunities for research in inter-disciplinary areas through a system of co-supervision.

The research work is required to be an original work characterized either by the discovery of facts, or by a fresh approach towards the interpretation and application of facts, or development of equipment, making a significant and distinct advance in technology. It shall evince the scholar's capacity for critical examination and sound judgment and shall represent original contribution to the existing knowledge.

ORDINANCES

Note: 'He' & 'His' imply 'he' / 'she' and 'his'/'her' respectively in the whole of this document.

1. DEFINITIONS

- (i) "NITK" shall mean the National Institute of Technology, Kurukshetra.
- (ii) "Research Scholar" shall mean a person who is registered for the Ph.D. program in a department of NITK.
- (iii) "Part-time Research Scholar" shall mean a research scholar who in addition to devoting his time towards discharging his employment responsibilities also devotes his time towards the pursuit of his Ph.D. research program.
- (iv) "Full-time Research Scholar" shall mean a research scholar devoting full time in a Department / School at NITK towards the pursuit of his Ph.D. research program.
- (v) "Supervisor" shall mean a member of the academic staff of the NITK, appointed by the concerned Department Research Committee (DRC) to guide/supervise the Ph.D. research/ academic work of the scholar.

- (vi) **"Co-Supervisor"** shall mean additional supervisor as appointed by the DRC. The Co-supervisor(s) may be from NITK itself, or from any other reputed government laboratory / reputed research organization / reputed Institutes or Universities or industries. A Co-supervisor must have the academic and research qualifications as prescribed for a supervisor.
- (vii) **"Caretaker Supervisor"** shall mean a supervisor appointed to look after the scholar's research interests in the absence of the regular supervisor when the synopsis of the thesis has been submitted. The caretaker supervisor also must have the academic and research qualifications as prescribed for a supervisor.
- (viii) **"Educational Institute"** shall mean those institutes/colleges which run full-time Bachelor's or higher degree programs.
- (ix) **"ORG"** shall mean a PSU / Government Department / R&D Unit.
- (x) **"Registration Period"** shall mean the length of the time span for which a person remains a research scholar.
- (xi) **"Minimum Registration Period"** shall mean the minimum period for which a scholar must remain registered to complete the requirements for the degree of Ph.D.
- (xii) **"Degree"** shall mean the Degree of Doctor of Philosophy (Ph.D.) of NITK.
- (xiii) **"Dean"** shall mean the Dean (Academics) of NITK.
- (xiv) **"HOD"** shall mean Head of Department in which Research Scholar is registered/proposes to register.
- (xv) **"DRC"** shall mean the Department Research Committee of a Deptt. of NITK.
- (xvi) **"BOS"** shall mean the Board of Studies of a Department of NITK.
- (xvii) **"RAC"** shall mean Research Advisory Committee of the research scholar.

2. GENERAL

1. This ordinance / Ph. D. regulations shall be applicable to students taking admission in Ph. D. programs at NITK from academic session 2013-14 onwards.
2. All eligibility criteria must be satisfied on the last date of receipt of application, failing which application will be rejected. In case the result of qualifying degree is not declared by the concerned university at the time of submission of application (for admission in odd semester), the candidate may be considered for provisional admission. However, in such a case, the candidate must submit the proof of having completed the qualifying degree latest by September 15th (if recommended for admission), failing which the admission shall stand cancelled.
3. The qualifying degree as well as University of qualifying degree must be recognized by AICTE and / UGC, as the case may be. This will be verified by the Academic Section of NITK and its decision in this regard will be final.

4. The applicant, if employed, must send his application through the competent authority / proper channel.
5. The date of initial registration of a scholar shall normally be the date on which the scholar formally registers and deposits the fees for the first time for the Ph.D. program; which shall also be the date of joining the program for all intents and purposes.
6. In case of change of status from full-time to part-time, the time spent as a full-time scholar will be taken into account for the purpose of minimum registration period requirement. For change of status from full time to part time, the scholar must have completed a minimum of two years as full time scholar at the institute.
7. If a scholar withdraws from Ph.D. program or the registration is terminated due to any reason, the research scholar status ceases w.e.f. the date of such act.
8. Once de-registered from the Ph.D. program, the scholar cannot apply again for registration before the lapse of one year from the date of de-registration.
9. At the close of every semester, a scholar is required to submit semester progress report by 30th June for even semester and 31st December for odd Semester to the Chairman of the DRC. Semester progress report is to be submitted through research supervisor(s) with remarks of all the supervisor(s) duly recorded as Satisfactory/unsatisfactory by each supervisor. The progress shall be evaluated by the DRC and the result of evaluation recorded as satisfactory/unsatisfactory on the registration form of the scholar for the subsequent semester. The registration form shall be forwarded by the Chairman, DRC to the Dean (Academics).
10. The scholar should be present in the Department when a DRC meeting is held for evaluating the comprehensive examination / presentation.
11. If due to compelling adverse circumstances (as considered so by the DRC), a scholar is not able to submit the progress report by the stipulated date, or the progress of a scholar is adjudged by the DRC as unsatisfactory, the Research Scholar on his request, can be allowed an additional chance for the same. He is expected to improve his work and submit the report again at the close of the following semester (after six months). During this semester, he can be registered provisionally only (the normal semester fees, however, will have to be paid), and the minimum registration period requirement will automatically get extended by six months. Further, if he receives scholarship, his scholarship for these six months will be stopped.
If, even on having been granted extension, he does not submit the progress report within the stipulated time or on resubmission also, the progress is adjudged as unsatisfactory; his registration shall stand automatically cancelled. Only one such chance can be allowed to a scholar during his entire Ph.D. program.
12. A scholar must submit his research plan proposal and pass the comprehensive examination within 12-18 months of the initial registration.
13. If due to compelling adverse circumstances (as considered so by the DRC), a scholar is not able to submit his research plan proposal and appear in the comprehensive examination as stipulated above, or he is not able to pass the

- comprehensive examination within 12-18 months period, he, on his request, can be granted an extension of six months. During this semester, he can be registered provisionally only (the normal semester fees, however, will have to be paid), and minimum registration period requirement will automatically get extended by six months. Further, if he receives scholarship, his scholarship for these six months will be stopped. Only one such chance can be allowed to a scholar. If the research scholar fails to qualify the comprehensive examination after getting extension of six months his registration will be cancelled.
14. The scholar must inform the HOD well in time (at least fifteen days before the expiry of expected date), through his supervisor(s), about his plans to appear in the comprehensive examination, to deliver pre-synopsis seminar, or to submit the synopsis or the thesis - all as per regulations.
 15. The scholar shall be allowed to deliver his pre-synopsis seminar only after completing the course requirements and after publishing/getting acceptance for at least two research papers out of his research work in non-paid SCI journals **OR** such other reputed and peer reviewed journals as are recommended by the concerned DRC and approved by the Director.
 16. A research scholar is required to complete all the requirements for the award of the Ph.D. degree within the specified period as per the regulations failing which he will be de-registered.
 17. Every research scholar is to abide by all the regulations and the amendments made in regulations from time to time. However the eligibility conditions for submission of thesis shall remain same as existed at the time of admission.
 18. It is the responsibility of the research scholar himself to be in the knowledge of the amendments (if any) in the ordinances and the regulations. No scholar will be informed individually. The related circulars/amendments would be available in the office of the HOD / Dean. The amendments are incorporated in the prospectus and the amended version is put on the Institute website also. He should maintain frequent contact with the supervisor for the purpose.
 19. No TA/DA etc is admissible to any research scholar whenever he is to visit NITK, or any other place in connection with the Ph.D. research work.
 20. In case of a change in the contact telephone number / the correspondence address/e-mail, the scholar must immediately inform his supervisor, the HOD and the Dean.

REGULATIONS:

The following regulations shall apply to all categories of research scholars pursuing courses of study and research leading to the degree of Ph.D.

R-I:

CLASSIFICATIONS

The scholars shall be classified in the following ways

- (A) *On the basis of the time devotion to the Ph.D. program*

i) Full-time

ii) Part-time

(B) *On the basis of the occupation*

i) **Teacher**, a person on the faculty of a Department of a teaching institute.

ii) **Non-teacher**

iii) **Project staff**. A person working on a project undertaken by the Institute (NITK). The Ph.D. program of such a person should be related to his project work.

(C) *On the basis of the country he belongs to*

i) **Indian**

ii) **Foreign** nationals admitted through the Embassy of the respective Governments, after getting approval from the Ministry of External Affairs and 'No Objection Certificate' from the Ministry of Human Resource Development, Department of Education and Government of India or admitted under a MoU.

(D) *On the basis of the financial assistance*

i) **Self-financed** A scholar who does not receive financial help like scholarship/ assistantship from NITK, or from any other source during his Ph.D. program.

ii) **Fellowship / Scholarship Awardees**

(a) A research scholar getting NITK fellowship / scholarship.

(b) A research scholar receiving fellowship / scholarship from outside organizations such as CSIR, UGC, QIP, DST, AICTE etc.

(c) A research scholar receiving fellowship / scholarship from ICCR, Govt. of India.

R-2:

CONSTITUTION OF DEPARTMENT RESEARCH COMMITTEE:

The DRC shall consist of the following, provided each member qualifies to be a Ph.D. supervisor;

- (i) HOD
- (ii) All Professors of the Department
- (iii) Three Associate Professors of the department by rotation. The term of an Associate Professor will be about 2 years, the changeover taking effect on July 1.

Rotation Criteria: If a department has 4 Associate Professors (A,B,C,D) and A,B,C are present members, then during the subsequent two year periods, (B,C,D); (C,D,A); (D,A,B)... shall be the DRC members.

(iv) Supervisors of the scholars.

They do not, however, constitute the regular members (unless covered under (i) or (ii) or (iii)). They participate in DRC meetings only when the cases of their respective scholars are taken up. Also, the proposed supervisor from outside NITK² but from within the country (if any), is to be invited to participate in the DRC meeting when the case of his prospective / respective

candidate is taken up and he will be paid TA/DA by the Institute as per its rules.

*** NOTE:**

If a Co-Supervisor of the scholar is from outside NITK but from within the country, he will be invited for the DRC meeting whenever his scholar's comprehensive, pre-synopsis seminar and final defence is taken up. In all such cases, he will be paid TA/DA by the Institute as per rules.

The HOD shall be the Chairman of the DRC. If the HOD does not qualify to be a Ph. D. supervisor, the senior most qualifying faculty member of the Department will act as the Chairman of the DRC. Faculty members, qualified to be the supervisors, can only be members of DRC. If Chairman of the DRC is not able to attend a DRC meeting due to compelling reasons, senior most DRC member will work as Chairman. DRC Minutes of all DRC meetings will be sent to Dean (Academics).

R-3:

ELIGIBILITY

R-3.1 Educational Qualifications:

An applicant possessing the following qualification shall be eligible for admission to a Ph.D. Program of the Institute. Degrees obtained through distance education programs shall not be considered. The course as well as University of qualifying degree must be recognized by AICTE & UGC and will be verified by Academic Section before registration.

i) Engineering Stream

Master's degree (M.Tech./ M.E/ M.S.) or equivalent in relevant branch[#] of Engineering / Technology with a minimum CGPA of 6.75 (on 10-point scale) or 60% marks in aggregate, preceded by a minimum CGPA of 6.75 (on 10-point scale) or 60% marks in aggregate in Bachelor's degree in relevant branch[#] of Engineering / Technology.

OR

(a) Bachelor's degree in relevant branch of Engineering / Technology with a minimum of 70% marks in aggregate or equivalent CGPA and a minimum of 10 years of work experience (at the level of Assistant Professor or equivalent) in an engineering degree level technical institute or R & D organization / industry, and

(b) Evidence of Master's level R & D work completed.

ii) Sciences / Mathematics / Humanities & Social Sciences Streams

Master's degree or equivalent in the relevant discipline[#] with a minimum CGPA of 6.75 (on 10-point scale) or 60% marks in aggregate, preceded by a minimum CGPA of 6.75 (on 10-point scale) or 60% marks in aggregate, in Bachelor's degree in relevant discipline.

[#] as decided by the DRC

Om

R-3.2 Additional Eligibility Conditions for Part-Time Ph.D. Admission

(i) The applicant should be a regular faculty / employee in the sponsoring institute / organization and must have completed on the last day of receiving applications, a minimum of one year of service after obtaining Master's degree at the level of Assistant Professor or equivalent in an engineering degree level technical institute or R & D organization / industry.

The applicants, who are employed in an NTT on a regular / contract (including the project staff) for three years or more, are exempted from the above condition.

(ii) The candidate should satisfy the DRC that his official duties permit him to devote sufficient time to research.

(iii) He is required to visit NITK to discuss the research work with his supervisor in the Department. He may visit any number of times; but, must visit at least twice in each semester at intervals of not less than a month. All such visits shall be reported to the Chairman of the DRC for record.

R-3.3 Eligibility for Institute Scholarship

- (a) Only full-time Ph.D. research scholars are eligible for the award of the Institute scholarship.
- (b) A candidate/scholar is required to apply for scholarship through the supervisor and concerned Chairman, DRC. In a particular department, scholarships will be awarded only if these are available in that department.
- (c) The eligibility for scholarship & its amount will be as per the guidelines issued from time to time by the Ministry of Human Resources Development, Govt. of India, and / or funding agency.
- (d) Those who are awarded scholarship / fellowship or equivalent from any other source will not be eligible for the institute scholarship.
- (e) In case the semester research progress is unsatisfactory, the scholarship shall be discontinued / stopped.
- (f) Support for doctoral program by the MHRD would be termed as Research / Teaching Assistantship. Only GATE/NET qualified candidates are eligible. All scholars getting Research / Teaching Assistantship would be required to put in at least eight hours of research or teaching assigned to him in the institute.
- (g) A Ph.D. research scholar receiving institute scholarship will receive it for a duration of two years, which may be extendable to 3rd year if the research scholar has published at least one research paper before the start of 3rd year and can be extended / resumed in 4th year if the research scholar has published at least two / one research papers respectively before the start of 4th year. These research papers should be published from his research work in non-paid SCI journals OR such other reputed and peer reviewed journals as are recommended by the concerned DRC and approved by the Director.
- (h) Recommendation of extension / resumption of scholarship after second and third year will be done by DRC after considering the above criteria.

Extension / resumption of scholarship is subject to its availability on the date of receiving recommendation from the DRC. No institute scholarship will be given after 4th year.

R-4

RESERVATION/ RELAXATION

R-4.1

Fifteen percent (15%) scholarships (of the total sanctioned Institutional scholarships) shall be reserved for Scheduled Caste applicants and 7.5% for Scheduled Tribe applicants. A total of 3% scholarships, over and above the sanctioned strength, will be reserved for persons with disabilities (PwD) in all the Ph.D. programs of the Institute put together.

R-4.2

For the SC / ST / PwD applicants, the eligibility requirement of marks be relaxed by 5%, or by a CGPA of 0.56 (on a 10 point scale) at both the Bachelor's and Master's level.

R-5

SHORTLISTING and ADMISSION

- (a) The DRC will check and certify the eligibility of the applicant.
- (b) The Chairman DRC will call the eligible candidates for interview by placing notification on institute website and will also mention the reason for non-eligibility of rejected candidates.
- (c) The basic guidelines / instructions for short listing will be framed and issued by the DRC with a copy of the same to the Dean (Academics).
- (d) The short listing of applicants for the purpose of admission test/ interview will be done by the DRC.
- (e) The eligible applicants will be tested by the DRC through written test. Based on their performance in the written test, DRC can shortlist a number of candidates for interview as per the number of vacancies available in the department. The applicants, who are employed in an NET on a regular / contract (including project staff) for three years or more, are exempted from the above condition.
- (f) The DRC will recommend the selected candidates and their supervisors to the Dean (Academics) for registration. Dean (Academic) will approve the candidate for admission by considering candidate application, supervisor eligibility and recommendation of DRC.
- (g) After getting the certificates checked by the Academic Section and the Dean's approval, the candidate may deposit the fees etc. The candidate must deposit his fees within 15 days of the Dean's approval or as notified by Dean, failing which the candidature shall stand cancelled.
- (h) The registration process of fresh Ph.D. candidates shall be completed before the start of the semester.

R-6

REGISTRATION

R-6.1

A candidate is deemed to have been registered on completion of admission process for the 1st semester of the program. Every scholar is required to deposit the fees and renew the registration every semester till the submission of the thesis. The renewal of registration every semester shall be subject to the satisfactory progress in the preceding semester in his research work as recommended by the DRC. If a scholar's progress is adjudged as unsatisfactory, the DRC may recommend notional registration; however such a chance can be allowed only once during the whole period. A scholar should deposit his semester registration fees only after having been notified by the Academic section that the concerned DRC has recommended his registration for that semester.

R-6.2 Time Period Requirement for Thesis Submission

- a) The minimum period of registration for thesis submission shall be two years for a full-time scholar, and three years for a part-time scholar.
- b) The maximum time for the submission of the thesis for a full-time scholar is five years, and that for a part-time scholar is six years from the date of the initial registration for the Ph.D. Programme. However, candidate is eligible for extension beyond this period only if he has published / received acceptance of at least one research paper out of his research work in non-paid SCI journals OR such other reputed and peer reviewed journals as are recommended by the concerned DRC and approved by the Director.
- c) On the recommendation of the DRC and the Dem (Academics), this limit may be extended up to a maximum period of seven years on yearly basis for both the categories by the Director, beyond which the registration shall stand cancelled automatically.

R-7

THESIS SUPERVISOR(s)

R-7.1

Every registered scholar shall be assigned a research supervisor as approved by the DRC.

R-7.2

A regular, full-time, faculty member of the concerned Department of the NITK holding a Doctorate degree can be appointed as supervisor. A non - Ph.D. scientist / engineer having experience (in relevant area of research) of 15 years or more at the level of Associate Professor or higher may also be appointed as co-supervisor.

R-7.3

Depending on the problem, a scholar may be assigned not more than three supervisors, designated as supervisor and co-supervisor(s). In no case, the number of co-supervisor shall be more than one from NITK.

R-7.4 Appointment of alternative Supervisor

A faculty member appointed as Ph.D. supervisor is normally expected to be available to the research scholar in the institute till the thesis is submitted. However, under unavoidable circumstances, such as long leave, resignation, retirement, or death; an alternative supervisor may have to be appointed. In such special cases, the appointment of the alternative supervisor will be regulated as under:

R-7.4.1 A Supervisor proceeds on leave of six months or more

(i) If the synopsis of the thesis of the scholar has not yet been submitted,

a) And the supervisor proceeds on leave for six months or more but less than 12 months, then the supervisor shall immediately inform the chairman DRC whether he will continue to guide and supervise the research work of his scholar effectively during his leave period or not. In case he does not inform within five days of the commencement of his leave, or informs that he will not be able to guide effectively, then he ceases to be the supervisor of that scholar.

b) And if at any point of time, the total period of long leaves (six months, or greater) of the supervisor of a scholar equals or exceeds 12 months, that supervisor automatically ceases to be the supervisor.

c) And if a supervisor proceeds on leave for 12 months or more, he ceases to be the supervisor (after the expiry of 12 months on leave). In case there is a co-supervisor, he will take over as supervisor else a supervisor shall be appointed by the DRC.

d) Once a supervisor ceases to be the supervisor, he can not again become the supervisor of that scholar.

In cases a), b), c), when a supervisor ceases to be the supervisor, the other supervisor (of NITK) if already appointed, shall act as the supervisor; and if there is no such 'other' supervisor, the DRC shall immediately appoint alternative supervisor for the scholar.

(ii) If the thesis / synopsis of the thesis has been submitted before the supervisor proceeds on leave and the supervisor consents to continue to be the supervisor, then he can continue to be so. If he declines, and there is no co-supervisor (of NITK), a caretaker supervisor will be appointed by the DRC.

Further, if major revision becomes necessary, and the co-supervisor or the caretaker supervisor provides the required help in carrying out the major revision, he will automatically be treated as a supervisor of that candidate.

R-7.4.2 A Supervisor retires

A faculty member, who is due to retire within the next two years from the date the DRC meets to appoint a supervisor, can not be appointed a supervisor. If a faculty member on retirement informs that he shall continue effectively supervising the scholar(s) registered under him, can continue as a supervisor, if either reemployed, or appointed Emeritus Fellow, or the synopsis of the thesis has been submitted, or the Director is convinced of his availability/continued guidance to the scholar and permits him to continue. If necessary, alternative/ caretaker supervisor be appointed by the DRC.

R-7.4.3 A Supervisor resigns

If necessary, alternative/ caretaker supervisor shall be appointed by the DRC.

R-7.4.4 A Supervisor expires

Alternative / caretaker supervisor shall be appointed by the DRC.

R-7.5

At no point of time, there shall be more than eight research scholars including scholars from outside NITK being supervised by any faculty member. This number excludes the Ph. D. scholars who have submitted the Ph. D. thesis.

R-8

COURSES AND CREDITS

A research scholar will be required to pass at least four PG courses (minimum 12 credits) with a minimum CGPA of 7.0 out of maximum 10.0. The scholar can register for these courses after the approval of the research supervisor(s) only.

DRC may appoint a three member RAC, under intimation to Dean (Academics), for a research scholar and may delegate some or all of its functions to RAC. The members of RAC shall be (i) Supervisor (ii) A DRC member other than supervisors (iii) DRC member / Co-supervisor / Outside Expert (TA / DA will be paid by the Institute as per rules).

The scholar shall register for 20 credits in each semester including the credits for the course work. The thesis shall be evaluated as satisfactory / unsatisfactory. CGPA shall be computed on the basis of letter grades obtained in PG courses only.

The part time scholars shall have to complete the course work as full time resident scholar. However this condition can be relaxed / waived off by the Director on the recommendation of the DRC for candidates from R & D organization / industry on case to case basis.

The course work is required to be completed before the comprehensive examination.

R-9

EVALUATION OF COMPREHENSIVE EXAMINATION

R-9.1

Every scholar is required to submit his research plan proposal. The research plan proposal should include a brief account of the related work already reported in the literature. In the plan, the scholar should clearly spell out the investigation/work he intends to carry out and justify the need of the same. Subsequently, the research work should be carried out in accordance with the approved research plan. Any change in research plan can be indicated by research scholar in semester progress reports.

The following procedure is followed for conducting the comprehensive evaluation of the Ph.D. scholars.

- (a) The written examination should be conducted by the DRC.

(b) The result of the written examination should be declared within two weeks as passed / failed.

Every scholar is required to take comprehensive examination, which will test his comprehensiveness in his broad field of research, and his academic preparation and potential to carry out the research. The evaluation shall be a combination of written and oral examinations. The oral examination may be conducted along with the evaluation of research plan proposal, after the candidate has obtained at least 40% marks in written test. The written as well as the oral examination will be conducted by the DRC. Every scholar must pass the comprehensive examination within 12-18 months of his initial registration.

R-9.2

In case research plan is not approved by the DRC, the scholar will have to improve the research plan as per the suggestions of the DRC and get it re-evaluated.

R-9.3

If due to compelling adverse circumstances (as considered so by the DRC), a scholar is not able to submit his research plan proposal and appear in the comprehensive examination as stipulated above, or he is not able to pass the comprehensive examination within 12-18 months period, he, on his request, can be granted an extension of six months. During this semester, he can be registered provisionally only (the normal semester fees, however, will have to be paid), and minimum registration period requirement will automatically get extended by six months. Further, if he receives scholarship, his scholarship for these six months will be stopped.

Only one such chance can be allowed in a scholar.

R-9.4

A scholar will be allowed a maximum of two attempts to pass the comprehensive evaluation, failing which his registration will be cancelled.

R-10

PERFORMANCE MONITORING

R-10.1

The academic/research progress of each scholar will be monitored by the research supervisor. For this purpose, at the end of each semester, a scholar is required to submit the semester progress report to his supervisor. The progress report should cover (i) summary of the work done before the start of the semester under consideration (ii) the goals set for this semester, (iii) the methodology used in achieving the goals, and (iv) the extent of the fulfillment of the goal. The supervisor shall record his comments and the result of his evaluation as satisfactory / unsatisfactory. After recording his evaluation result, the supervisor shall forward the progress report to Chairman, DRC who will apprise the DRC of the same before forwarding it to Dean (Academics).

A part time scholar must submit his progress report to his supervisor personally and make himself available for necessary discussions with the supervisor. The reports submitted on file shall be ignored.

The scholars must submit their semester progress reports latest by Dec. 31st and June 30th every year.

All the scholars are required to present at least three seminars in addition to pre-submission seminars before DRC.

R-10.2

The Chairman DRC in the Department will coordinate, every semester, the collection of progress reports written and signed by the scholars and forwarded by the allotted supervisor(s).

R-10.3

If due to compelling adverse circumstances (as considered so by the DRC), a scholar is not able to submit his progress report by the stipulated date, or the progress of a scholar is adjudged by the DRC as unsatisfactory, he, on his request, can be allowed an additional chance for the same. He will improve his work and submit the report again at the close of the following semester (after six months). During this semester, he can be registered provisionally only (the normal semester fees, however, will have to be paid), and the minimum registration period requirement will automatically get extended by six months. Further, if he receives scholarship, his scholarship for these six months will be stopped.

Only one such chance can be allowed to a scholar during his entire Ph. D. program.

If, even on having been granted extension, he does not submit the progress report within the stipulated time or on resubmission also, the progress is adjudged as unsatisfactory by the research supervisor, his registration shall stand cancelled and he shall cease to be a research scholar of the Institute.

R-10.4

The cases where some punitive action is taken will be reported to the Director.

R-11

SEMINAR/ SYNOPSIS/ PANEL OF EXAMINERS.

R-11.1

Pre-synopsis Seminar

- (i) (a) A research scholar will be allowed to deliver his pre-synopsis seminar only after getting at least a CGPA of 7.0 / 10.0 in PG courses and after publishing / getting acceptance of at least two research papers out of his research work in non-paid SCI journals OR such other reputed and peer reviewed journals as are recommended by the concerned DRC and approved by the Director.

On research scholar's request for pre-synopsis seminar, DRC shall evaluate the journal publications of the scholar from his Ph.D. work and consider his performance in PG courses. If found satisfactory, DRC shall assess the scholar's work through a pre-synopsis seminar. Pre-synopsis seminar shall be held not

earlier than one year for full-time and 2 years for part-time scholars from the date of passing the comprehensive evaluation.

(b) The schedule of the pre-synopsis seminar shall be notified well in advance (at least three days in advance) so as to enable the interested staff members and the students to attend it.

R-11.2 Synopsis

The scholar will submit the synopsis only on research supervisor's and DRC's satisfaction on quality of the work. The synopsis should precisely reflect all aspects of the research work to be included in the thesis.

- (a) The scholars shall submit 9 copies of the synopsis in the same format as specified for the thesis to the Chairman, DRC. The DRC will examine the synopsis, and the Chairman DRC shall forward the synopsis with its recommendations to the Dean.
- (b) The synopsis should be submitted normally within 2 months after the presentation of pre-synopsis seminar. In case the synopsis is not submitted in the specified period, the scholar may be asked to present another pre-synopsis seminar.
- (c) The scholar can submit his thesis after a gap of at least one month after submission of the synopsis.
- (d) The scholar shall be required to submit fresh synopsis if he fails to submit his thesis within 8 months of the submission of the earlier synopsis. However, in case a scholar fails to submit his thesis within the stipulated time and has suitable justification for the same, the Director may on recommendations of the DRC and on individual merits of each case grant him/her extension in time of not more than two months, i.e., the scholar may be allowed to submit his thesis within a period not exceeding 10 months from the date of the submission of the synopsis. However, the thesis should be submitted within the prescribed time limit as per regulations.

R-11.3

Panel of Examiners

A panel of at least ten external experts, including foreign experts, and the authors of the recent papers in the references cited by the scholar in the area of his Ph.D. work would be suggested to the DRC by the Supervisor. The DRC will consider the suggested panel and will finally recommend to the Director (through Professor-in-charge, Examinations), a panel of ten external examiners, which will include five examiners from outside India, from advanced/developed countries and the rest from India, preferably from the Institutes of repute. The recommended panel will be considered and approved/modified by the Director.

R-12

BOARD OF EXAMINERS

On receipt of the title and synopsis of the thesis, the Director will appoint a Board of Examiners for each candidate from the list approved by the DRC. The Board of examiners will consist of two external examiners, one out of which would be from

within India, and the other from abroad. These external examiners shall be chosen normally from the panel of examiners recommended by the DRC as aforesaid. A person working in the same organization(s) / institute(s) where the research scholar is employed cannot, however, be appointed as External Examiner for that research scholar.

R-13

THESIS SUBMISSION

R-13.1

The scholar will submit a soft copy of the thesis in PDF format on CD, and four unbound copies with soft covers, typed in English, one and a half spaced, printed in Times New Roman 12 pt. or Arial 11 pt. on both sides of A-4 size papers. The margins on right page shall be 1.25" -left, 1" -right, 1" -top and 1" -bottom and the margins on left page shall be 1.25" -right, 1" -left, 1" -top and 1" -bottom. The thesis shall be submitted along with the examination form and examination fee of Rs.5,000/-.

R-13.2

The thesis shall contain a critical account of the research carried out by the scholar. It should be characterized by discovery of facts or fresh approach towards interpretation of facts and theories or significant contribution to knowledge or development or a combination of these. It should bear evidence of the scholar's capacity for analysis and judgment as well as ability to carry out independent investigation, design or development.

No part of the thesis or supplementary published work should have been submitted for the award of any other degree or diploma.

- (j) A research scholar can submit his thesis only on having published / acceptance of at least two research papers out of his Ph.D. research work in non-paid SCI journals OR such other reputed and peer reviewed journals as are recommended by the concerned DRC and approved by the Director.

R-13.3

A candidate can submit his thesis within the time period as stipulated in regulations provided that he has completed the minimum period of registration.

R-14

THESIS EVALUATION

All correspondence/ notifications in regard to thesis evaluation and viva-voce examination of the scholar (except where stated otherwise) shall be done by the Professor-in-charge, Examinations. Except for the correspondence with the candidate or general circulars/ notifications, the correspondence shall be confidential.

R-14.1

Each examiner will be requested to submit a detailed assessment report and his recommendation within six weeks of the date of receiving the thesis.

i) The examiners will examine the thesis individually with a view to judge whether the thesis is a piece of research work characterized by:

- a) The discovery of facts, or
- b) A fresh approach towards interpretation and application of facts or theories, or
- c) A distinct advancement in technology.

ii) Each examiner will give his opinion about candidate's capacity for critical examination and sound judgment. The examiner will submit the report to the Professor-in-charge, Examinations on the prescribed form supplied by him clearly recommending that:

- a) The thesis is accepted for the award of the Ph.D. degree subject to the candidate's giving satisfactory answer to the queries specifically mentioned in the report, at the time of Viva-Voce examination,

or

- b) The candidate be asked to resubmit his thesis in the revised form,

or

- c) The thesis be rejected.

R-14.2

In the event of the thesis report not being received from an examiner within a period of three months from the date of dispatch, the Director may approve alternate examiner in his place for evaluating the thesis from the approved list of examiners. Before corresponding with the alternate examiner, the original examiner must be informed by the Professor-in-charge, Examinations, of the cancellation of this appointment, stating the reason therein.

R-14.3

- (a) If both the examiners recommend acceptance / rejection the thesis be accepted / rejected respectively.
- (b) If one examiner recommends acceptance and other revision or rejection the thesis will be sent to the third examiner. If the third examiner recommends acceptance / rejection, the thesis will be accepted / rejected respectively. If he recommends revision, the scholar shall resubmit the revised thesis. The revised thesis will be sent to all the three examiners. If at least two examiners recommend acceptance, the thesis will be accepted else rejected.
- (c) If both the examiners recommend revision, then a third examiner will be appointed and the revised thesis will be sent to all three examiners. If at least two examiners recommend acceptance, the thesis will be accepted else rejected.
- (d) In all other cases the thesis will be considered as rejected.

Any doubt arising out of the procedure laid down above shall be referred to the Director for a decision.

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R-15

RESUBMISSION

When a thesis is to be revised and resubmitted, the scholar should be informed about the comments of the examiners. The revised thesis is to be submitted within one year, but not earlier than three months.

The revised version of the thesis will be sent to all the examiners for their fresh recommendations.

R-16

VIVA-VOCE EXAMINATION

On receipt of the thesis examination reports from the examiners, the Professor-in-charge, Examinations, shall send all such reports to the Director for further necessary action. The Director, on the basis of the reports will decide whether the candidate should be allowed to appear in the viva-voce examination or not. The Director will send back the reports, along with his decision to the Professor-in-charge, Examinations, for further action. The Director's decision on the thesis reports shall be communicated by the Professor-in-charge, Examinations, to the scholar, and the Chairman of the concerned DRC. The Professor-in-charge, Examinations, will intimate names and address of the external examiner for the candidate, and the examiners' reports to the Chairman. The Chairman DRC will form the examiner's committee for the viva-voce examination.

R-16.1

On having been allowed to appear in the viva-voce examination, the scholar is to defend his thesis orally before the Committee of examiners comprising supervisor (Chairman of the committee), one DRC nominee and one Indian external examiner. The Chairman DRC will coordinate with all the examiners and the scholar and will fix a date for holding the viva-voce examination. The questions / queries communicated by the thesis examiners in their reports shall be intimated to the candidate through his supervisor at least one week before the date of conduct of the viva-voce examination. The schedule of the viva-voce examination shall be adequately notified so as to enable interested staff members and students to attend it.

R-16.2

(i) In case of non-availability of the Indian external examiner for conducting the viva-voce examination, the Director may appoint alternate examiner to conduct the viva-voce examination from the existing panel.

If the need be, the DRC may suggest a fresh panel of examiners.

- (ii) The viva-voce examiners shall be provided with the reports of the thesis examiner before the viva-voce examination.
- (iii) The research supervisor shall assist the Chairman in arranging the viva-voce examination of the candidate as early as possible.
- (iv) In case of the inability of the research supervisor to have the viva-voce examination conducted due to any reason whatsoever, the Director may appoint another examiner (in place of research supervisor), to conduct the viva-voce examination, from amongst the faculty of the department

concerned who belongs to the particular field in consultation with Chairman DRC. In such cases also, the Ph.D. work will be deemed to have been carried out under the guidance of the supervisor (s) only.

- (v) After the viva-voce examination, the examiners will prepare a detailed joint report giving one of the following three recommendations.
- (a) recommended for the award of the degree
 - (b) The thesis be resubmitted after a minimum period of six months incorporating the suggestions of the examiners.
 - (c) not recommended for the award of the degree

The report shall be sent by the Chairman DRC in a confidential cover to the Professor-in-charge, Examinations.

- (vi) Any other matter not explicitly provided herein or of an exceptional nature, may be referred to the Director for his decision.

R-17

AWARD OF THE Ph.D. DEGREE

On the completion of all stages of the examination, a Committee consisting of the Director, the Dean (Academics) and the Chairman of the DRC concerned shall examine the reports of all the examiners (thesis and viva-voce) and decide as under: -

- a) that the degree be awarded;
- b) That the degree shall not be awarded.
 - i) The thesis is to be resubmitted.
 - ii) The thesis is rejected on the conclusion that the thesis is not genuinely the work of the candidate.

For (b) i) above, the Committee, if required, shall provide to the candidate a list of all corrections and modifications to be made in the thesis, including suggestions made by the examiners during the thesis evaluation, and the result of the candidate will be declared after the candidate submits two copies of the corrected thesis certified by the internal examiner that the necessary corrections and modifications have been made.

R-18

INSTITUTE SCHOLARSHIP

R-18.1

Those candidates who are admitted on full-time basis are considered on request, for the award of Institute scholarship of the amount as decided by the Board of Governors and directed by the Government of India from time to time. The scholar must submit a certificate to the effect that he is not in receipt of any financial aid from any other source for pursuing the Ph.D. research work. The scholars getting Institute scholarships are required to provide 8 hrs of work per week as directed by the Head of the Deptt/ Director.

CAW

A scholar is liable to refund whole of the financial assistance/scholarship received if he has joined as full time research scholar and abandons and leaves his Ph.D. work without completing it.

R-18.2

In addition, the scholars will be provided contingency grant in accordance with the rules of the Institute.

It is to be noted that admission to the programs and award of scholarship are not linked. Admission to a program does not guarantee the award of scholarship. Those who are not awarded scholarship can continue with the program as self-financed scholars. The Institute may provide fee waiver to the self-financed scholars subject to the final approval of Director on the recommendation of DRC & the Dean (Academics).

R-19

LEAVE AND ATTENDANCE

All full-time research scholars (with or without scholarship) are required to mark their daily attendance in the attendance register maintained by the Dept. The Chairman DRC shall also maintain a proper leave account of each such scholar. The leave of a scholar should be recommended by his Supervisor and shall be sanctioned by the Chairman DRC.

A full-time research scholar is entitled to avail leave as per Leave and Attendance Rules formulated and amended from time to time by the Senate. Presently these are as under:

- A full-time Ph.D. scholar during his stay at the Institute will be entitled to leave of 30 days including leave on medical grounds, per academic year. He will not be entitled to mid-semester breaks/vacations, summer and winter vacation.
- Leave beyond 30 days in an academic year may be granted to a Research Scholar in exceptional cases, subject to the following conditions:
 - the leave beyond 30 days will be without scholarship and
 - Such an extension of leave up to additional 30 days will be granted only once during the program of the scholar.

The woman research scholar will be eligible for Maternity Leave as per MHRD rules. However, the minimum registration period will be extended by the leave period.

R-20

CANCELLATION OF REGISTRATION

Registration of a candidate can be cancelled in any one of the following eventualities, with due approval of the Director.

- (i) if he absents himself/ herself for a continuous period of four weeks without prior intimation/ sanction of leave.
- (ii) if he resigns from the Ph.D. Programme
- (iii) if he fails to renew his registration within 4 weeks of the start of the semester as per provision contained in these Ordinances & Regulations.

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(iv) If he does not submit his semester progress report by the stipulated date or his academic progress is found unsatisfactory.

(v) If he does not clear the comprehensive evaluation as stipulated.

(vi) If he is found involved in an act of misconduct and/ or indiscipline and a competent authority has recommended termination. For all purposes, the conduct/ discipline rules applicable to B.Tech. / M.Tech. students of the Institute shall apply to Ph.D. research scholars also.

(vii) If at any stage, information furnished by the scholar in his application is found false or incorrect.

R-21

GENERAL

R-21.1

Notwithstanding anything contained in these Ordinances & Regulations, all categories shall be governed by the rules and procedures framed by the Senate, and in force from time to time.

R-21.2

Any doubt or dispute about the interpretation of these Ordinances and Regulations shall be referred to the Director whose decision shall be final.

R-21.3

Eligibility for admission to Ph.D. programs in different disciplines may, from time to time, be reviewed, approved by the Senate, and implemented.

R-21.4

All exceptions and issues not covered above may be decided by a committee consisting of the Director, Dean (Academics), Head of the Department concerned and the Supervisor(s) of the candidate concerned.

Dr

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
(Institution of National Importance)

Sr.No.....

APPLICATION FOR ADMISSION TO
THE DOCTORATE IN PHILOSOPHY (Ph.D.) PROGRAM

To
The Director,
National Institute of Technology,
Kurukshetra



Sir /Madam,

I hereby apply for admission to the Ph.D. program as a research scholar (full-time/part-time) in the Department of National Institute of Technology, Kurukshetra and submit the following particulars in support of my application. I have read the Ordinances & Regulations for this program and undertake to abide by them, and also to abide by the amendments made from time to time. I am not pursuing any Degree/Diploma program at any of the Institutes/ Universities, and also will not pursue such a program during the period of my Ph. D. program at this Institute. I hereby declare that all the statements made in this application are true, complete and correct to the best of my knowledge and belief. If at any stage, any information furnished by me in this application is found false or incorrect, the Institute may take any action against me and I will not have any claim whatsoever.

Yours faithfully

Place _____

Signature

Dated _____

Name ()

(Particulars to be filled in neatly by the Candidate)

1. Name (in block letters) Mr/ Ms
(As given in qualifying examination certificate)
2. Father's Name
3. Mother's Name
4. Date of Birth (as given in Matriculation Certificate)
5. Registration No. (if already registered with this Institute)
6. Permanent Address
7. Address for correspondence

57
2

8. Contact Telephone/ Mobile No.

9. Category to which you belong (state one of these- General / SC / ST / PwD)

10. Academic Qualifications:-

Examination Passed	Discipline/ Specialization	Full-time/ Part-time	Name of the University/ Institute	Year	Max. Marks	Marks/ Grade Obtained	%age of Marks
Bachelor's Degree							
Master's Degree							
National Test/GATE/NET etc.							
Any other Exam							

11. Dissertation Title of Master's program

12. Have you ever been disqualified from appearing in examinations or punished during your educational career?

(state Yes/No)

If yes, Class/Examination.....Session/Year.....

Name of the University.....Punishment awarded.....

13. Did you apply earlier also for Ph.D. program to this, or to any other Institute/ University? If yes, give full details.

14. Proposed area of research.....

15. To be registered as a Full-time, or a Part-time scholar?

16. If full-time: source of scholarship/ financial support, if any

17. Proposed supervisor(s) & his affiliation.....

18. Details of previous research experience, if any.....

19. Details of publications, if any (attach copies).....

20. If employed,

(a) Regular/Temporary.....

(b) Name of the employer.....

(c) Nature of work (Teaching/other).....

(d) Total experience.....years.....months

21. Email address of Candidate.....

22. Fee receipt / DD No. and Date.....

23. Remarks, if any.....

Date:

Signature of the applicant

Note: The applicant is required to submit one attested photocopy of each of the following (as applicable) Certificates/ Degrees with the application form.

1. Matriculation Certificate.
2. Bachelor's Degree Certificate and Marks Sheet.
3. Master's Degree Certificate and Marks Sheet.
4. GATE/ NET Score Card.
5. Scheduled Caste/ Scheduled Tribe / PwD Certificate.
6. Migration certificate (in the case of a student coming from other University/ Institute).
7. If employed, No-Objection-cum-Service Certificate from the employer.
8. Nature of employment, research experience, publications and other related details.
9. If seeking admission to Ph.D. program as part time candidate, please show a proof at the time of interview that you will be granted leave for a minimum period of six months.
10. The eligibility shall be determined on the basis of the documents received by the last day of receiving the applications.

INCOMPLETE APPLICATION IS LIABLE TO BE REJECTED SUMMARILY.

Note 1 - If applying on the form downloaded from the website, please attach a DD of Rs. 200/- in the name of the Director, NIT, Kurukshetra.

Note 2 - The applications for Ph.D. can be submitted from 1st May to 31st May, and from 1st November to 30th November all through.

NO OBJECTION-CUM-SERVICE CERTIFICATE*

**(CERTIFICATE TO BE SIGNED BY THE COMPETENT AUTHORITY/ HEAD OF THE
INSTITUTE, IF COMPETENT)**

I hereby certify that the application of Mr/ Ms..... for admission to the Ph.D. program as a part-time scholar at the National Institute of Technology, Kurukshetra, is being made with my consent and permission. He/ She has been serving in this Institute/ Department as since..... on..... basis, I also certify that the post on which he/she is working here is a **teaching/non-teaching** post.

Mr/ Ms..... shall be relieved for the period required to be spent at NIT Kurukshetra to complete his/ her Ph.D. requirements (including course work, if any).

Further certified that his/ her official duties permit him/ her to devote sufficient time for research.

*For part-time applicants only

Place.....

Signature of the competent authority/ Head of the
Institute, if competent

Dated.....

Name

Seal

PROPOSED SUPERVISOR'S CONSENT

I have read the Ph.D. Ordinances and Regulations of the Institute, and have examined this application. The applicant is eligible for Registration for Ph.D.

I hereby give my consent for supervising the Ph.D. work of the applicant provided that he / she is offered admission to the Ph.D. program.

Mr./ Ms. _____

in the proposed research area _____

for which he/she is applying in the Dept of _____

at NIT, Kurukshetra.

Signature _____

Name: _____ Designation: _____

Dept of _____

FOR OFFICE USE

I. Certificates

1. Whether Qualification / Migration/ Caste Certificate etc. checked (point out deficiency, if any)? _____
2. For employed applicants- whether no objection-cum-service/ study leave certificate attached? _____
3. Classification/ Category under which to be registered _____
4. Whether consent of Supervisor given? (Yes/ No) _____
5. Whether the present case is within the prescribed ceiling for the Supervisor (Yes/ No) _____
6. DRC approval? -Yes/ No; and the date of approval _____

Initial of DA/Supdt.

II. Registration

Category of scholar (for the purpose of fee payment) _____

Details of first fee paid (Rs.) _____ Allotted Regn No. _____

III. Scholarship Eligible/ Ineligible Scholarship amount per month- Rs.

Signature of DA/ Supdt.

DR (Acad.)

Dean (Acad.)

MINUTES
44th MEETING OF
STANDING COMMITTEE
ON SENATE AFFAIRS



NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

HELD ON: 11th June, 2013

NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136119

No. Acad./2013/44th SCSA/ 8) o 3

Dated: 09-07-2013

16-9 -

Minutes of the 44th SCSA meeting held on 11th June, 2013 at 6:00 p.m. in the Board Room of the Institute

The following were present:-

1. Prof. Anand Mohan, Director in Chair
2. Prof. V.K. Arora, Dean (P&D)
3. Prof. VK Sehgal, Dean (Faculty Welfare)
4. Prof. S.K Sharma, Dean (Students' Welfare)
5. Prof. A.K. Gupta, Dean (Academic)
6. Prof. A Swarup, Dean (Research & Consultancy)
7. Prof. K.K. Singh, Dean (Estate)
8. Prof. Brahmjit Singh, Professor, ECE
9. Prof. N.K. Gupta, Professor, CED
10. Prof. D.K. Soni, Head, CED
11. Prof. Sudhir Kumar, Head, MED
12. Prof. Rajender Kumar, Head, HSS Deptt.
13. Prof. (Ms.) Lillie Dewan, Head, EED
14. Prof. J.K. Kapoor, Acting Head, Chemistry Deptt.
15. Prof. P.J. Philip, Head, Master of Business Administration.
16. Prof. J.K. Quamara, Head, Physics Deptt.
17. Prof. S.M. Gupta, Controller of Exam.
18. Prof. L.M. Saini, Professor, IC Acad. Affairs & Senate
19. Dr. S.K. Jain, Acting Head, Computer Engg. Deptt.
20. Dr. Paras Ram, Head, Mathematics Deptt.
21. Sh. G.R. Samantary, Registrar IC & Secretary, SCSA

The following decisions were taken:-

- 44.1 To consider the request of B. Tech. final year students for conducting re-appear end semester examination in respect of B.Tech. 1st year to B. Tech. 3rd year subjects.**

The SCSA considered the request of B.Tech. final year students and declined the same

- 44.2 To consider the proposal of Controller of Examination regarding re-evaluation of answer sheets by external faculty.**

The SCSA approved the proposal with the following observations:-

- i) The evaluated answer sheets will be kept under the custody of Subject Coordinator under intimation to the HOD of the respective Department. In no case the contract Faculty should be allowed to retain the evaluated answer sheets.
- ii) The HOD of the concerned Department will send a list of external experts (specialization wise) to the Controller of Examinations for carrying out the

re-evaluation from external faculty. Such external faculty should be from NIT's or equivalent institute.

- ii) The Exam Cell will prepare the answer sheet with coding, concealing the original marks before sending the same to the external faculty for re-evaluation.
- iv) The external faculty will be paid minimum Rs. 500/- or as per actual rates which-ever is higher on account of re-evaluation of answer sheets.

44.3 To consider and approve scheme and syllabi of I – IV semester M. Tech. (Biomedical Engineering)

The SCSA observed that the BOS in the School of Bio-medical Engineering and School of Material Science & Nanotechnology are yet to be constituted.

In view of the above the SCSA approved the scheme and syllabi of 1st semester only for M. Tech. in Biomedical Engineering. After the constitution of BOS, the scheme and syllabi for the remaining 2nd to 4th semester duly approved by the BOS will be placed before the Senate at its next meeting.


The SCSA also considered the scheme and syllabi of I – IV semester in respect of M. Tech. in Material Science & Nano Technology and decided to approve the scheme and syllabi of 1st semester only as above. It was also decided that after the constitution of BOS in the School of Material Science & Nano Technology, the scheme and syllabi for the remaining 2nd to 4th semester duly approved by the BOS will be placed before the Senate at its next meeting.

44.4 To consider and approve the modified prospectus of M. Tech. for the Session 2013-14.

The SCSA approved the modified prospectus of M. Tech. for the session 2013-14 with some minor modifications.

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


Director & Chairman
Senate & SCSA 13/9/13


(G.R. Samantaray)
Registrar / C & Secretary, Senate & SCSA

MINUTES

45th MEETING OF

STANDING COMMITTEE

ON SENATE AFFAIRS



**NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA**

HELD ON: 29th August, 2013

NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA-136 119

No. Acad./2013/45th SCSA/ 7897

Dated: 29.08.2013
9-9-13

Minutes of the 45th SCSA meeting held on 29.08.2013 at 12.30 p.m. in the Board Room of the Golden Jubilee Administrative Building

The following were present:

1. Prof. Anand Mohan, Director
2. Dr. V.K. Arora, Dean (P&D)
3. Dr. V.K. Sehgal, Dean (Faculty Welfare)
4. Dr. S.K. Sharma, Dean (Students' Welfare)
5. Dr. A.K. Gupta, Dean (Academics)
6. Dr. A Swarup, Dean (R&C)
7. Dr. K.K. Singh, Dean (Estate)
8. Dr. Brahmjit Singh, Professor, ECE Deptt.
9. Dr. N.K. Gupta, Professor, CED
10. Dr. D.K. Soni, Head, CED
11. Dr. Sudhir Kumar, Head, MED
12. Dr. R.S. Bhatia, Head, EED
13. Dr. P.J. Philip, Head, BA Deptt.
14. Dr. J.K. Quamara, Head, Physics Deptt.
15. Dr. S.M. Gupta, Controller of Exams.
16. Dr. Umesh Ghaneekar, Head, ECE Deptt.
17. Dr. L.M. Saini, Professor I/C (Acad. Affairs & Senate)
18. Dr. J.K. Chhabra, Head, Computer Engg. Deptt.
19. Dr. Paras Ram, Head, Maths. Deptt.
20. Dr. Shyam Narayan, Registrar & Secretary, SCSA

in Chair

The following decisions were taken:

Item 45.1: To decide the policy for permitting M.Tech students to do their dissertation work at Central/State Govt. labs. Institutions

The SCSA considered the matter and decided as under:-

The M.Tech students may be permitted to do their dissertation work at Central/State Govt. laboratories/Institutions/R&D sections of reputed companies

preferably multi-nationals (henceforth referred as external organizations) subject to the following conditions:

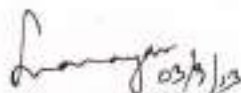
1. The concerned HOD shall ensure that for the research topic for dissertation chosen by the candidate, the department has some facilities to support the research work.
2. The candidate will be allowed to work at the external organization for six months in the 4th semester only. However, during 3rd semester, the candidate shall be allowed to work at the external organization for 30 days typically in the stretches of two weeks each. Not more than 25% of the students in the concerned M.Tech program will be allowed to do their dissertation at the external organization.
3. There will be one Co-guide from the proposed institution where the dissertation work is to be done. A written consent of the Co-guide for guiding the dissertation work at his/her organization should be submitted to the Academic Section through research Supervisor(s) and concerned HOD along with tentative title of the dissertation.
4. The GATE qualified candidates may be allowed to draw scholarship subject to the following conditions:
 - The student shall submit a certificate from his Co-guide to the effect that he has worked satisfactorily for his dissertation work at the organization with details of leaves availed, if any, every month.
 - The GATE qualified candidate shall submit a monthly Progress Report signed by Co-guide/Guide. The IPR, if any, shall be shared by the guides and the student.
5. The student shall abide by all rules and regulations for evaluation of his dissertation work as stipulated in the M.Tech scheme/syllabi as approved by the Senate.

Any other item:

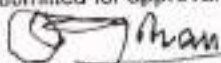
The Chairman, Senate formed the following committee to frame a proposal for M.Tech dissertation evaluation and submit the same within 3 weeks, for consideration of Senate:

1. Prof. L.M. Saini, Professor I/C (Academic Affairs & Senate)
2. Prof. J.K. Chhabra, Head, Computer Engg. Deptt.
3. Prof. Umesh Ghanekar, Head, ECE Deptt.

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


(SHYAM NARAYAN)
Registrar & Secretary, SCSA

Submitted for approval please


Director & Chairman
Senate & SCSA 09/9/13

Item 23.4: To consider and approve the generalized annual academic calendar

The present practice is to prepare the academic calendar every year afresh keeping in view the festivals, gazetted holidays, cultural activities etc. The preparation of the academic calendar thus depends upon prior knowledge of all such related events. It is proposed to delink the academic calendar from non-academic activities and freeze the schedule of academic activities in accordance with the relevant decisions taken by the senate. A general academic calendar proposed on the above lines is given in Annexure 23.4. Once approved, the academic calendar can be prepared and communicated to all concerned as a routine matter.

The senate may consider for approval.

ANNEXURE 23.4

General Academic Calendar

ODD SEMESTER	
Activity	Day
Registration	Thursday of 3 rd week to Friday of 4 th week of July
Late registration*	Upto Friday of 2 nd week of August
Teaching commences	4 th Monday of July
Class Test #1	7 th Thursday, Friday & Saturday of the semester
Mid semester break	9 th week of the semester
Class Test #2	14 th Thursday, Friday & Saturday of the semester
Teaching closes	17 th Friday of the semester
End semester exams. begin	19 th Monday of the semester
End semester exams. end	22 nd Monday of the semester
<i>Winter vacations – Last two weeks of December</i>	
EVEN SEMESTER	
Activity	Day
Registration	1 st Monday to 1 st Friday of January
Late registration*	Upto 3 rd Friday of January
Teaching commences	1 st Tuesday of January
Class Test #1	7 th Thursday, Friday & Saturday of the semester
Mid semester break	9 th week of the semester
Class Test #2	14 th Thursday, Friday & Saturday of the semester
Teaching closes	17 th Friday of the semester
End semester exams. begin	19 th Monday of the semester
End semester exams. end	22 nd Monday of the semester
<i>Summer vacation – Monday of 1st week of June to Friday of 3rd week of July</i>	

Item 23.5: To consider scheme and syllabus for M.Tech. in Biomedical Engineering.

The Board of Studies of School of Biomedical Engineering in its meeting held on 18.11.2013 has approved the scheme for M.Tech. (Biomedical Engineering) for 2nd, 3rd & 4th Semesters and syllabus for 2nd Semester. The scheme and Syllabus as approved by the BOS are enclosed as Annexure-23.5 from pages 72 to 80.

The Senate may consider for approval

SCHOOL OF BIOMEDICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

Annexure-23.5

No. BME/2013/73

Dated: 18.11.2013

Minutes of the meeting of Board of Studies in Biomedical Engineering

The meeting of the Board of Studies in Biomedical Engineering was held on 18.11.2013 at 11:00AM in the office of the undersigned.

Following members were present:

- | | | |
|----|------------------------|------------------------|
| 1. | Dr. L.M.Saini | (In Chair) |
| 2. | Dr. R.P.Chauhan | Member |
| 3. | Dr. Minati Raut | Member |
| 5. | Dr. Sumit | Member |
| 9. | Prof. (Ms.) Sneh Anand | External Expert Member |

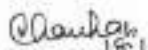
Dr. A.K.Ray (external expert member) and Dr. Rajoo Pandey (internal member) could not attend the meeting

Following items were discussed and approved:

1. The scheme of M. Tech. Biomedical Engineering (2nd, 3rd & 4th) semesters were approved
(Annexure-I)
2. The syllabus for M.Tech. Biomedical Engineering (2nd semester) was approved.
(Annexure-II)

The meeting ended with thanks to the members.


(Sneh Anand)
External Member
18/11/13


(R.P. Chauhan)
Member
18/11/13


(Minati Raut)
Member
18/11/13


(Sumit)
Member
18/11/13


(L.M.Saini)
Coordinator
18/11/13

Dean (Academic) for n.a. please.

Shashi
for senate
agenda item
18/11/13

18/11/13
26/11/13

ANNEXURE -I

**SCHOOL OF BIOMEDICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
MASTER OF TECHNOLOGY (BIOMEDICAL ENGINEERING)
(W.E.F. 2013-14)**

SECOND SEMESTER

Course No.	Title	Schedule of Teaching		Credit Point
		L-T-P	Total	
BME 502T	Medical imaging & processing	3-0-0	3	3
BME 504T	Diagnostic & therapeutic equipment	3-0-0	3	3
BME 506T	Tissue engineering	3-0-0	3	3
BME 508T	Biological effects of radiation	3-0-0	3	3
BME 510T	Bio-nanosystems	3-0-0	3	3
BME 512P	Lab.-I)*	0-0-4	4	2
BME 514S	Seminar-II	0-0-2	2	1
	Total	15-0-6	21	18

Weightage for Theory Courses:

During Semester Evaluation Weightage – 50%

End Semester Examination Weightage – 50%

Weightage for Lab. Courses:

During Semester Evaluation Weightage – 60%

End Semester Examination Weightage – 40%

*One week practical training regarding Diagnostic & therapeutic equipment in Govt. Medical College hospital during mid semester break as a part of Lab-II.

THIRD SEMESTER

Course No.	Title	Schedule of Teaching			Credit Point
		L-T-P	Total		
BME 515P	Industrial/ Hospital training (after 2 nd semester)	4 week			2
BME 517P	Preparatory Work for Dissertation	0-0-16	16		8
			16		10

NOTE: The Preparatory work for dissertation shall be evaluated by a committee comprising the following (on the basis of one mid semester seminar and one end semester seminar presented and one end semester report submitted by the candidate).

1. HOD or faculty nominee proposed by HOD.
2. Dissertation Supervisor (and co-supervisor).
3. Two senior most faculty members of the department.

FOURTH SEMESTER

Course No.	Title	Schedule of Teaching				Credit Point
		Lecturer	Tutorial	Practical	Total	
BME 516P	Dissertation	0	0	32	32	16
					32	16

NOTE:

- I. The Dissertation shall be evaluated by a committee comprising the following through presentation cum viva-voce examination.
 1. HOD or faculty nominee proposed by HOD.
 2. Dissertation Supervisor (and co-supervisor).
 3. One external expert appointed by the department.
- II. For award of grade, following criteria to be used.

Grade	Conditions to be fulfilled
A+	One paper accepted/published in SCI Journal
A	One good quality paper accepted/published in non-paid journal or two good quality papers presented in International/National Conference.*
B	One good quality paper presented in International Conference
C/D	In other cases

* Conference organized by IIT/NIT/a premier R & D organization.
Non-Credit Based Dissertation Evaluation

ANNEXURE-II

MASTER OF TECHNOLOGY BIOMEDICAL ENGINEERING (W.E.F. 2013-14) MEDICAL IMAGING & PROCESSING

Course No. BME 502T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

Basic Medical Imaging Modalities- X-ray, CT, Ultrasound, MRI, PET-CT, SPECT-CT, Gamma Camera, Catheterization Lab. Aspects of light imaging, convolutions and transforms, photometry lenses and depth of field, Image perception and 3D Imaging, Image acquisition, Display, Image processing operations, scanning & segmentation.

CT: Basic concepts of CT, Non Spiral CT technology, Concepts of Spiral CT Scanner, Multi Slice spiral technology, Various Peripheral devices, Applications: Multiplanar Reconstruction, Maximum Intensity Projection, 3D, CT Arthro, Osteo, Dental, Perfusion (Body & Neuro), Virtual Endoscopy, Cardiac CT (Calcium scoring, Coronary Angiography, Lesion Quantification).

Magnetic Resonance Imaging: Permanent & Super conducting magnets, Signal generation and detection, signal characteristics, signal localization, Fourier transforms in MRI, Imaging Reconstruction, Image artifacts, Coil technology, Parallel acquisition techniques, Various peripheral devices, Applications: Functional Imaging, Perfusion & Diffusion imaging (Echo planar imaging), Multi direction diffusion tensor imaging, Single & Multi Voxel Spectroscopy, MR Angiography, MRCP, Cardiac MRI (Myocardium viability, Valve function etc.,)

Gamma Camera: Physics of Gamma camera, basic Instrumentation, Imaging techniques, SPECT & Whole Body studies, Applications of Gamma camera in Cardiology, Nephrology, Neurology etc., Ultrasound Scanner: Principles of Ultrasound, Basic Ultrasound Instrumentation, Imaging techniques (A mode, B Mode, 2D, B/M, 4D, Gated Mode, 3D, 4D, M-Mode, Echocardiography), Image recording devices, Image artifact, Biological effects.

Digitized image functions, Dirac distributions, convolution, Fourier transforms, Images as linear system, Image digitization, sampling, Quantization, color images, Digital image properties, Metric and topological properties, Histogram visual perception, Image quality, Noise, Data structures for image analysis, data representation, traditional and hierarchical data structures.

Thresholding and Segmentation, Detection methods, optimal thresholding, multi-spectral thresholding, Edge based segmentation, Region based segmentation, Matching, Advanced optimal border and surface detection approaches.

Restoration, Deterministic, geometric linear filtering, inverse filtering, power spectrum equalization, stochastic, Wiener filtering, Registration, anatomy based, object based, scene based, Diffusion Tensor Imaging.

Suggested Reading:

1. John C Russ, *The image processing handbook*, CRC and IEEE press -1999.
2. Milan Sonka, Vaclav Hlavac, Roger Boyle, *Image processing, analysis and machine vision*, 2nd edition, Brooks/Cole publishing Co., 1999.
3. Jayaram, Kudapa and Gabor, T Herman, *3D imaging in medicine*, 2nd edition, CRC press, 2000.
4. Craig A. Hindley, *Practical image processing in C*, John Wiley and Sons 1991.

5. Hykes, Heerick, Stachman, *Ultrasound physics and instrumentation MOSBY year book*, 2nd Ed., 1992.
6. Stewart C. Bushong, *Magnetic Resonance Imaging- physical and biological principles*, MOSBY, 2nd Ed., 1995.
7. Zhi-Pei Liang and Paul C. Lauterbur, *Principles of Magnetic Resonance Imaging - A signal processing perspective*, Metin Akay (Editor), IEEE press, New York, 2000.

**MASTER OF TECHNOLOGY
BIOMEDICAL ENGINEERING
(W.E.F. 2013-14)
DIAGNOSTIC AND THERAPEUTIC EQUIPMENT**

Course No. BME 504T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

Analytical Instrumentation: UV/Visible Spectrophotometer, Atomic Absorption Spectrophotometer, Mass Spectrophotometer, Radio Chemical Instruments, Automated biochemical Analysis system, Gas Chromatography – Liquid Chromatography, Blood Gas Analyzer, Blood Cell Counter, Auto Analyzer, CO₂ incubators, Cryo Centrifuges, Non Invasive diagnostics.

Cardiac Valves, different types – Mechanical and Tissue types, Angioplasty, Balloon and Stent Angioplasty, Stents, different types – coil, slotted tubular, drug eluting stents, Sterilization techniques: Autoclave, Gas, Dry Heat, Radiation, Dry Steam sterilization, Lithotripsy Systems, Techniques and Equipment

Intensive Coronary Care UNITs: Central Monitoring system, Drug Delivery Systems, Intelligent Drug Delivery, Neurological Instrumentation, Respiratory Care UNIT Equipment, Nebulizers, Mechanical Ventilators, CPAP, Advanced Life Support Systems: Cardiac Life Support Equipment, Pediatric Advanced Life support & Neonatal Resuscitation.

Operation Theatre Equipment : Surgery Equipments, Electrosurgical UNITs, Laser Surgery, CO₂, Nd YAG, Ruby, Argon, Krypton, Lasers, Endoscopy Types, Rigid, Flexible, Illuminations and Image transmission systems Laparoscopy, Keyhole surgery, Perfusion Equipment, Anaesthesia, Ventilators, Heart Lung machine, Funigators

Radio Therapy, Cobalt UNIT, Ionization Chambers, Geiger Muller Counters, Gas proportional counters, Scintillation Counters, Solid State Radiation Detectors, Linear Accelerators, Radiation Therapy Stimulator, Treatment planning system.

Suggested Reading :

1. John G. Webster (Editor-in-Chief), *Encyclopedia of Medical Devices and Instrumentation* Vol.1 to Vol.4, John Wiley and Sons, 1988.
2. Khandpur R. S., *Handbook of Bio-Medical Instrumentation*, Tata McGraw Hill, 2nd Ed., 2003.
3. Joseph Benzino (Editor-in-Chief), *Handbook of Biomedical Engineering*, CRC Press, 1995.
4. Harry Bronzino E, *Handbook of Biomedical Engineering and Measurements*, Reston, Virginia.

**MASTER OF TECHNOLOGY
BIOMEDICAL ENGINEERING
(W.E.F. 2013-14)**

TISSUE ENGINEERING

Course No. BME 506T

L T P Total

3 0 0 3

Credits: 3

Sessional-50 Theory-50

Duration of Exam- Three hours

The cell, its organelles and their respective functions, control of microbial growth by physical and chemical methods, DNA as genetic material-Structure and function, RNA-Structure and function. Proteins, Protein Structure & Function.

Organisation of cells into higher ordered structures, Dynamics of cells- ECM interactions, Matrix molecules and their ligands, Inductive Phenomena, Cell Determination and Differentiation, Mechanical and Chemical determination of Tissue Development, Regulations of cell Behaviours cellular proteins, Growth factors.

Organotypic and Histiotypic Models of Engineered Tissues, Quantitative aspects of Tissue Engineering: Basic Issues in Kinetics, Transport and Mechanics, Patterning of cells and their environment, Cell Interactions with Polymers, Matrix Effects, Polymer Scaffold Processing, Biodegradable Polymers.

Approaches to transplanting Engineered cells and Tissues, Cryopreservation, Immunomodulation, Immuno isolation, Engineering challenges in immune isolation, Fetal tissue Engineering, Pluripotent stem cells, Gene Therapy.

Applications: Breast Reconstruction, Cardiovascular Systems-Blood Vessels, Small diameter Vascular Grafts, Cardiac Prosthesis, Cornea, Endocrinology and Metabolism-Bioartificial Pancreas, Parathyroid.

Musculoskeletal System-Structural Tissue Engineering, Bone Regeneration through Cellular Engineering, Gastrointestinal System -Alimentary tract, Liver, Hepato Assist liver support system, Limb Biology and liver, Hematopoietic Systems-Red Blood Cell Substitutes, Lymphoid Cells, Hemopoietic Stem Cells, Kidney and Genitourinary system-Renal Replacement Devices, Genitourinary System.

Suggested Reading :

1. Robert P. Lanza, Robert P. Langer, Joseph P. Vacanti, *Principles of Tissue Engineering*, Academic Press, 2nd ed. 2000.
2. Farshid Gullak, David L. Butler, Steven A. Goldstein, *Functional Tissue Engineering*, Springer Verlag, 2004.
3. Frederick H. Silver, *Biomaterials, and Medical Devices & Tissue Engineering: An integrated approach*, Chapman & Hall, London, 1994.

**MASTER OF TECHNOLOGY
BIOMEDICAL ENGINEERING
(W.E.F. 2013-14)**

BIOLOGICAL EFFECTS OF RADIATION

Course No. BME 508T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

Electromagnetic Spectrum, Exposure and absorption parameters, International guidelines, Currents induced in standing human being for vertically polarized plane wave exposure conditions, contacts hazards in VLF to HF band, thermal implications of high SARs. Coupling of human body to RF magnetic fields, Radio Frequency protection guide(RFPG).

EM bio engineering: Extremely LF,EM fields, dielectric heating, broadcast radiation, MW ovens, EM fields in medicine, electrical properties of biological substances, Interaction mechanisms. Application of the finite-differences time domain and the SINC-function Fast Fourier Transform method of moments.

Role of Experimental Techniques and Instrumentation in bioelectromagnetics: Irradiation systems for bioeffects experiments, Far-field exposure techniques, Instrumentation, Measurements of internal fields and radiofrequency absorption in biological systems, Instruments for measuring Specific Absorption Rates.

EM energy absorption in human and animals: Measurement techniques, Free space irradiation conditions, Ground effects, SAR exposure assessment and safety guidelines. Biological effects and Health implications: Effects due to extremely LF and 60 Hz fields.

Biological effects of millimeter wave radiation: Experimental approaches, frequency specific effects, genetic systems, cellular and sub cellular effects. Electromagnetic methods for medical applications.

Review of atomic structure and atomic particles : electrons, protons, neutrons, positrons, neutrinos, etc.; Classification of elements as per the periodic table; Atomic transitions - electron transitions and the generation of x-rays; Nuclear transitions and radioactive decay of nuclei. Characteristics of X-ray beams; Interaction with matter; Attenuation and interaction of X-rays in the human body.

Suggested Reading:

1. Gandhi Om.P, Biological effects and medical applications of Electromagnetic Energy Biophysics and Bioengineering series, Prentice Hall Advanced reference series, Englewood cliffs, New Jersey, 1990
2. Franceschetti G, Om P Gandhi and Malini Grandfo, Electromagnetic biointeraction, Plenum Press, New York, 1989.

**MASTER OF TECHNOLOGY
BIOMEDICAL ENGINEERING
(W.E.F. 2013-14)
BIO-NANOSYSTEMS**

Course No. BME 510T
L T P Total
3 0 0 3

Credits: 3
Sessional-50 Theory-50
Duration of Exam- Three hours

INTRODUCTION TO NANOTECHNOLOGY: Nanomaterials, Fullerenes and carbon forms. Nanoparticles and Colloids, structure and bonding in nanoparticles, Nanomaterials fabrication by Bottom-up and Top down approaches, Classification of nanodevices based on the characteristics, Quantum dots and their properties.

MEMS & NEMS: Definition of MEMS, materials for MEMS (Silicon, Polymers and metals) and their properties, Deposition processes, Photolithography, and etching processes, Limitations of MEMS, NEMS, difference between MEMS and NEMS, properties of NEMS, fabrication processes, applications.

NANO-AND MICRO SYSTEMS: Biomimetics, Biological analogies, and design-Biomimetics Fundamentals, Biomimetics for NEMS and MEMS, Nano-ICs and Nanocomputer architectures, Biomimetics and nervous systems.

NANOMEDICINE: Medical use of Nanomaterials, Drug delivery systems. Cancer treatment, Surgery. Drug tracking systems. Targeted drug delivery systems. Applications of Nanomaterials in Medical imaging.

BIO MOLECULAR NANOTECHNOLOGY: Nanorobots and their application, nanosensors based on biomolecules, nanoparticles for gene delivery systems, Biosensors, Optical biosensors and their application.

Suggested Books:

1. Micro-Electro Mechanical and Nano-Electro Mechanical Systems, Fundamental of Nano-and Micro-Engineering, Sergey Edward Lyshevski, Lyshevski Edward Lyshevski, CRC Press
2. Nanomaterials: Synthesis, Properties and Applications, A.S. Edelstein and R.C. Cammarata (eds), Institute of Physics
3. Micro-Electro Mechanical and Nano-Electro Mechanical Systems, Sergey Edward Lyshevski, CRC Press
4. Lynn E. Foster, Foreword by George Allen, Foreword by Joe Lieberman, Nanotechnology: Science, Innovation, and Opportunity, Nanomedicine: Basic Capabilities, Vol. 1 by Robert A. Freitas Jr. 1999 Rev
5. Neelina Malsch, Biomedical nanotechnology by CRC press release, Malsch TechnoValuation, Utrecht, The Netherlands

Item23.6: To consider scheme and Syllabus for M.Tech. in Material Science and Nanotechnology

The Board of Studies of School of Material Science and Nanotechnology in its meeting held on 22.11.2013 has approved the scheme for M.Tech. (Material Science and Nanotechnology) for 2nd, 3rd & 4th Semesters and syllabus for 2nd Semester. The scheme and Syllabus as approved by the BOS are enclosed as Annexure-23.6 from pages 82 to 90.

The Senate may consider for approval

Annexure-23.6

SCHOOL OF MATERIAL SCIENCE & NANOTECHNOLOGY
NATIONAL INSTITUTE OF TECHNOLOGY
KURUKSHETRA

No. School MSN/2013/48

Dated: 22.11.2013

Minutes of the meeting of Board of Studies in Material Science & Nanotechnology

The meeting of the Board of Studies in Material Science & Nanotechnology was held on 22.11.2013 at 5.00PM in the office of the undersigned.

Following members were present:

- | | | |
|-----|----------------------------|------------------------|
| 1. | Dr. J. K. Quamara | (In Chair) |
| 2. | Dr. Ashvani Kumar | Member |
| 3. | Dr. Neena Jaggi | Member |
| 4. | Dr. R.P. Chauhan | Member |
| 5. | Dr. Anurag Gaur | Member |
| 6. | Dr. Ashok Kumar | Member |
| 7. | Dr. C.R. Mariappan | Member |
| 8. | Dr. Rajiv Prakash | External Expert Member |
| 9. | Dr. A.K. Srivastava | External Expert Member |
| 10. | Dr. Yashashchandra Dwivedi | Special invitee |

*Support
S.R.K / Ms. Sankhvi
for next senate
meeting
22/11/13*

*We may ask the
dept. to send
agenda item.*

Following item was discussed and approved:

1. The syllabus for M.Tech. Material Science & Nanotechnology (2nd semester) was approved. The following suggestions were made for second semester syllabus:

- i) The title of MNT502T be revised to Nanostructured Materials and Carbon Allotropes
- ii) In MNT504T the title be changed to Nanosensor & Actuators and some topics like electrochemical sensor and oxide based sensor should added.
- iii) The title of MNT508T be revised to Nano-Electro Mechanical systems (NEMS)
- iv) The title of MNT510T be revised to Bio-Nanosystems and topic Bioinformatics be added in the syllabus.

2. Under any other items, the following suggestions were made :

- i) For Scheme of 3rd & 4th semesters the conditions for awarding A & B Grades should be relaxed from publishing paper in International/National Conference, as the Institute is not a position to pay conference expenses to all the students.
- ii) The committee also feels that there should be provision of contingent grant for the students of M.Tech, to the tune of rupees ten thousands per year.
- iii) The following elective papers are suggested to be introduce:
 - a) Energy Harvesting Materials and Systems
 - b) Nanophosphors and Display Devices

The meeting ended with thanks to the members.


(Rajiv Prakash) 22/11/13


(A.K. Srivastava) 22/11/13


(Ashvani Kumar) 22/11/13


(Neead Jaggi)


(R. P. Chauhan) 22/11/13


(Anurag Gaur) 22/11/13


(Ashok Kumar)


(C.R. Mariappan)


(J.K. Quamara)
Coordinator

copy to: Dean (Acad)

**SCHOOL OF MATERIAL SCIENCE & NANOTECHNOLOGY
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA**

MASTER OF TECHNOLOGY (MATERIAL SCIENCE & NANOTECHNOLOGY)

(W.E.F. 2013-14)

SECOND SEMESTER

Course No.	Title	Schedule of Teaching		Credit Point
		L-T-P	Total	
MNT502I	Nanostructured materials and Carbon Allotropes	3-0-0	3	3
MNT504T	Nanosensor & Actuators	3-0-0	3	3
MNT506T	Nano Electronics	3-0-0	3	3
MNT508T	Nano-Electro Mechanical Systems (NEMS)	3-0-0	3	3
MNT510T	Bio-Nanosystems	3-0-0	3	3
MNT 512P	Lab-II	0-0-4	4	2
MNT 514S	Seminar-II	0-0-2	2	1
	Total	15-0-6	21	18

Weightage for Theory Courses:

During Semester Evaluation Weightage – 50%

End Semester Examination Weightage – 50%

Weightage for Lab. Courses:

During Semester Evaluation Weightage – 60%

End Semester Examination Weightage – 40%

**MASTER OF TECHNOLOGY
MATERIAL SCIENCE & NANOTECHNOLOGY (W.E.F. 2013-14)**

Nanostructured materials and Carbon Allotropes

Course No. MNT502T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

Carbon Allotropes: Structures, Single and Multiwalled CNTs, Vertically aligned CNTs, Chemically modified nanotubes, CNTs composites, Dispersible carbon nanotubes, Carbon nanotube array based smart materials, Electrical, Mechanical, Optical and Thermal properties of CNTs, Spectroscopic analysis, Applications of CNTs, Inorganic nanotubes.

Nanowires: Vapor phase and solution based growth of nanowires, Growth control and integration, Elemental nanowires, Metal oxide nanowires, Metal Nitride nanowire, Metal carbide nanowire, semiconductors nanowires, Useful properties and potential applications.

Graphene: Synthesis and structure of graphene different forms and physicochemical properties of graphene. Graphene based nanomaterials and their applications.

Nanosheets: Fabrication, structure and characterization of nanosheets and their applications.

Reference Books

1. Physical properties of Carbon Nanotube-R Satio
2. Applied Physics Of Carbon Nanotubes : Fundamentals Of Theory, Optics And Transport Devices - S. Subramony & S.V. Rokins
3. Carbon Nanotubes: Properties and Applications- Michael J. O'Connell
4. Carbon Nanotechnology- Liming Dai
5. Nanotubes and Nanowires- CNR Rao and A Govindaraj RCS Publishing

MASTER OF TECHNOLOGY
MATERIAL SCIENCE & NANOTECHNOLOGY (W.E.F. 2013-14)
Nanosensor & Actuators

Course No. MNT504T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

General concepts & terminology of Transducers, Fundamentals of nano-sensors, sensors and actuators, Static and dynamic characteristic of measurement systems.

Sensor Classification: Primary sensors, interference, internal Perturbations and compensation techniques.

Resistive sensors: Strain gauges, Resistive temperature detectors, Thermistors, Magneto-resistors, Light dependent resistors, resistive hygrometers, Applications of resistive-sensors.

Reactance and electromagnetic sensors: Capacitive sensors, inductive sensors, reluctance-variation sensors, magneto elastic sensors.

Oxide Based Sensors: Thermoelectric sensors, Photovoltaic sensors, Design of nanotransducers, nano-mechanical, Chemical and magnetic transducers, Nanoactuators, Biosensor, micro fluids, Polymer based sensor, Electrochemical Sensors, optical sensors, Carbon Nanotube Sensors

Actuators: Cantilever sensors, Nano structured optical actuators, Multiferroic materials and their applications as sensors and actuators, Piezoelectric sensors, Pyroelectric sensors, Integration of sensor with actuators and electronic circuitry.

Reference Books:

1. Sensors and Signal Conditioning (Raman Pallas-Areny & J.G. Webster: John Wiley & Sons,
2. Process Instruments and Controls Handbook(Considine DM (ed): McGraw-Hill
3. Instrument Science & Technology (Jones B.I): Adam Hilger)
4. Instrument Transducers: An introduction to their performance and design (Neubert H.K.P: Oxford)
5. Sensors and Analyzer Handbook (Norton H.N Prentice Hall)
6. Sensors and Transducers (Usber M.J: Macmillan)
7. Measurement Systems: Application and design (Doebelin E.O: McGraw-Hill)
8. Principles of Measurement and Instrumentation (Marris A.S. Prentice Hall)
9. Nanotechnology (Wiley-VCH Verlag GmbH & Co. KGaA) by M. Köhler and W. Fritzsche

MASTER OF TECHNOLOGY
MATERIAL SCIENCE & NANOTECHNOLOGY (W.E.F. 2013-14)
Nano Electronics

Course No. MNT506T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

High Electron Mobility Transistors, Quantum Interference Transistors, Carbon Nanotube/Graphene Transistors, Quantum Corrals in Electronics, Electrical contacts and nanowires.

Quantum Dot Devices, Electron Wavefunction Effect Devices, Single Electron Effect Devices, Nanotransistors-Vertical Transport Nanotransistor Designs: Lateral Transport Nanotransistor Designs; and devices, Superlattices, Wavefunctions and Density of States for superlattices, Nano Motors.

Molecular electronics, molecular switching, Schottky devices, Quantum Structures and Devices, Quantum layers, wells, wires and dots, Mesoscopic Devices, Single Electron Transistors, MOSFET and NanoFET, Resonant Tunneling Devices, optical devices, Connection with quantum dots, quantum wires, and quantum wells.

Spin tunneling devices, Magnetic tunnel junctions, Tunneling spin polarization, Tunnel-based spin injectors - Spin injection and spin transport in hybrid nanostructures.

Reference Books:

1. Sensors: Micro & Nanosensors, Sensor Market trends (Part 1&2) by H. Meixner.
2. Between Technology & Science : Exploring an emerging field knowledge flows & networking on the nanoscale by Martin S. Meyer.
3. Nanoscience & Technology: Novel structure and phenomena by Ping Sheng (Editor)
4. Nano Engineering in Science & Technology : An introduction to the world of nano design by Michael Rieth.
5. Enabling Technology for MEMS and nano devices -Balles, Brand, Fedder, Hierold.
6. Optimal Synthesis Methods for MEMS- G. K. Ananthasuresh
7. MEMS & MOEMS Technology and Applications- P. Rai Choudhury
8. Processing Technologies- Gandhi
9. From Atom to Transistor- Supriyo Datta
10. Nanotechnology-Basic Science and Emerging Technologies, Mick Wilson et al,Overseas Press.
11. Carbon Nanotubes:Science and Applications, Laurie Kelly, Meyyappan Meyyappen,CRC Press
12. Nanomaterials:Synthesis,Properties and Applications , A.S.Edelstein and R.C.Cammarata(eds),Institute of Physics
13. Molecular Electronic Devices: F.L.Carter et al(Ed);New York:North Holland

MASTER OF TECHNOLOGY
MATERIAL SCIENCE & NANOTECHNOLOGY (W.E.F. 2013-14)
Nano-Electro Mechanical Systems(NEMS)

Course No. MNT508T	Credits: 3
L T P Total	Sessional-50 Theory-50
3 0 0 3	Duration of Exam- Three hours

Nano-and Microscience, Engineering and Technology: Introduction and overview, MEMS and NEMS definitions, Taxonomy of Nano-and Microsystems-Synthesis and Design

Modeling of Micro-and Nanoscale Electromechanical Systems: Introduction to modeling, analysis and simulation, basic electro-magnetic with application to MEMS and NEMS, modeling developments of micro and nanoactuators using electromagnetic Lumped parameters, mathematical models of MEMS, energy conversion in NEMS and MEMS.

Design and Fabrication of NEMS: Introduction, Microfabrication of microcoils/windings through copper, nickel and aluminium, Electrodeposition, Micromachined polymer magnets, Axial Electromagnetic Micromotors, Micromachined polycrystalline SiC micromotors.

Reference Books:

1. Micro-Electro Mechanical and Nano-Electro Mechanical Systems, Fundamental of Nano-and Micro-EngineeringSergey Edward Lyshovski, Lyshovski Edward Lyshovski,CRC Press
2. Nanomaterials:Synthesis,Properties and Applications
(A.S.Edelstein and R.C.Cammarato(eds)),Institute of Physics
3. Micro-Electro Mechanical and Nano-Electro Mechanical Systems
Sergy Edward Lyshovski,CRC Press

**MASTER OF TECHNOLOGY
MATERIAL SCIENCE & NANOTECHNOLOGY (W.E.F. 2013-14)
Bio Nanosystems**

Course No. MNT510T

Credits: 3

L T P Total

Sessional-50 Theory-50

3 0 0 3

Duration of Exam- Three hours

Nano-and Micro Bio Systems: Biomimetics, Biological analogies, and design- Biomimetics Fundamentals, Biomimetics for NEMS and MEMS, Nano-ICs and Nanocomputer architectures, Biomimetics and nervous systems, Nanorobots and their application, Bioelectromagnetism.

Nanomedicine: Medical use of Nanomaterials, Drug delivery systems, Cancer treatment by nanomaterials, Drug tracking systems, Targeted drug delivery systems, Hyperthermia, Applications of Nanomaterials in Medical imaging.

Bio Sensors: Nano-Bio sensors, Nanoparticles for gene delivery systems, Optical biosensors and their application, Spintronic Biosensors, Bioinformatics.

Reference Books:

1. Micro-Electro Mechanical and Nano-Electro Mechanical Systems, Fundamental of Nano-and Micro-Engineering, Sergey Edward Lyshevski, Lyshevski Edward Lyshevski, CRC Press
2. Nanomaterials: Synthesis, Properties and Applications, A.S. Edelstein and R.C. Cammarata (eds), Institute of Physics
3. Micro-Electro Mechanical and Nano-Electro Mechanical Systems, Sergey Edward Lyshevski, CRC Press
4. Lynn F. Foster, Foreword by George Allen, Foreword by Joe Lieberman, Nanotechnology: Science, Innovation, and Opportunity, Nanomedicine: Basic Capabilities, Vol. 1 by Robert A. Freitas Jr. 1999 Rev
5. Neelina Malsch, Biomedical nanotechnology by CRC press release, Malsch Technovation, Utrecht, The Netherlands

THIRD SEMESTER

Course No.	Title	Schedule of Teaching			Credit Point
		L-T-P	Total		
MNT 515P	Industrial/Central Laboratories Training	8 weeks	–		2
MNT517P	Preparatory Work for Dissertation	0-0-16	16		8
			16		10

NOTE: The Industrial/Central Laboratory training and preparatory work for dissertation shall be evaluated by a committee comprising the following (on the basis of one mid semester seminar and one end semester seminar presented and one end semester report submitted by the candidate):

1. HOD or faculty nominee proposed by HOD.
2. Dissertation Supervisor (and co-supervisor).
3. Two senior most faculty members of the department.

FOURTH SEMESTER

Course No.	Title	Schedule of Teaching				Credit Point
		Lecturer	Tutorial	Practical	Total	
MNT516P	Dissertation	0	0	32	32	16
					32	16

NOTE:

- I. The Dissertation shall be evaluated by a committee comprising the following through presentation cum viva-voce examination.
 1. HOD or faculty nominee proposed by HOD.
 2. Dissertation Supervisor (and co-supervisor).
 3. One external expert appointed by the department.
- II. For award of grade, following criteria to be used.

Grade	Conditions to be fulfilled
A+	One paper accepted/published in SCI Journal
A	One good quality paper accepted/published in non-paid journal or two good quality papers presented in International/National Conference.*
B	One good quality paper presented in International Conference
C/D	In other cases

* Conference organized by IIT/NIT/a premier R & D organization.
Non-Credit Based Dissertation Evaluation