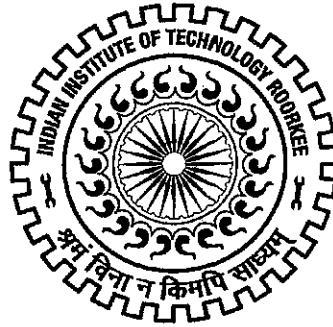


सीनेट की ग्यारहवीं बैठक का कार्यवृत्त  
MINUTES OF THE  
11<sup>TH</sup> MEETING OF THE SENATE

**31<sup>ST</sup> DECEMBER 2004**



**भारतीय प्रौद्योगिकी संस्थान रुड़की**  
**रुड़की - 247 667 (भारत)**

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

**MEETING SECTION  
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE  
ROORKEE - 247 667**

No.IITR/MS/11<sup>th</sup> Senate (12/2004)/466

Dated 24<sup>th</sup> January 2005

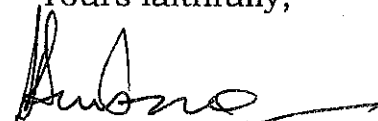
**ALL MEMBERS OF THE SENATE**  
**Indian Institute of Technology, Roorkee**

**Subject: Minutes of the 11<sup>th</sup> meeting of the Senate held on 31<sup>st</sup>  
December 2004 in the Senate Hall of the Institute.**

Sir,

Enclosed herewith please find a copy of the Minutes of the 11<sup>th</sup> meeting of the Senate of this Institute held on 31<sup>st</sup> December 2004 at 11.00 A.M. in the Senate Hall, for your perusal. Your comments, if any, on the minutes may please be sent within 15 days.

Yours faithfully,



(A.K.Srivastava)  
Lt. Col. (Retd)  
Registrar

Encl: as above

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



**Minutes of the 11<sup>th</sup> Meeting of the Senate held on 31<sup>st</sup> December 2004  
at 11.00 A.M. in the Senate Hall of the Institute.**

**I N D E X**

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11.3.2	To report that the Director has approved the Academic Calendar for the Spring Semester of the Session 2004-2005.	8
11.3.3	To report the decision of the Executive Committee of the Senate (ECS) on recommendations of the enquiry committee constituted to enquire into the case of manipulating, tampering and copying of answer books by Shri Vikas Bisla, a student of the Electrical Engineering Department, during the III year Spring Semester examination for the Session 2003-2004.	9
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Minutes of the 11<sup>th</sup> Meeting of the Senate held on 31<sup>st</sup> December 2004  
at 11.00 A.M. in the Senate Hall of the Institute.

The following were present: -

1. Prof. Prem Vrat, Director - Chairman
2. Prof. R. Shankar
3. Prof. S.Y.Kulkarni
4. Prof. (Mrs) Ritu Barthwal
5. Prof. G. S. Randhawa
6. Prof. B. M. J. Periera
7. Prof. H.S.Dhaliwal
8. Prof. I.M.Mishra
9. Prof. Bikash Mohanty
10. Prof. Shri Chand
11. Prof. G. Bhattacharjee
12. Prof. R.N.Goyal
13. Prof. Ravi Bhushan
14. Prof. A.N.Garg
15. Prof. V.K.Gupta, (Chemistry)
16. Prof. A.K.Singh
17. Prof. Krishna Kumar
18. Prof. M. K. Mittal
19. Prof. Arvind Kumar
20. Prof. H. C. Mehndiratta
21. Prof. G.L.Asawa
22. Prof. V.K.Gupta, (Civil Engg.)
23. Prof. U.C.Kothyari
24. Prof. Ashwani Kumar
25. Prof. H. R. Wason
26. Prof. H.Sinvhal
27. Prof. V.N.Singh
28. Prof. A. K. Awasthi
29. Prof. S.S.Srivastava
30. Prof. A.K.Pachauri
31. Prof. A.K.Pant
32. Prof. R.N.Mishra
33. Prof. S.P.Gupta
34. Prof. R.P.Agarwal
35. Prof. D.K.Mehra
36. Prof. R.C.Joshi
37. Prof. A.K.Sarje
38. Prof. (Ms) Kum Kum Garg
39. Prof. D.C.Singhal
40. Prof. Pashupati Jha
41. Prof. M.C.Bansal
42. Prof. A.K.Ray

43. Prof. J.S.Upadhyay
  44. Prof. Satish Kumar
  45. Prof. H.G.Sharma
  46. Prof. G. S. Srivastava
  47. Prof. T.R.Gulati
  48. Prof. (Ms.) Rama Bhargava
  49. Prof. R. C. Mittal
  50. Prof. Roshan Lal
  51. Prof. J. S. Saini
  52. Prof. H.S.Shan
  53. Prof. S.C.Jain
  54. Prof. Pradeep Kumar
  55. Prof. Satish C. Sharma
  56. Prof. Satya Prakash
  57. Prof. S. Ray
  58. Prof. Sushil Auluck
  59. Prof. Jagdish Rai
  60. Prof. Vir Singh
  61. Prof. Gopal Chauhan
  62. Prof. S.K.Tripathi
  63. Prof. G.C.Mishra
  64. Prof. Ram Pal Singh
  65. Prof. R.M.Manikavasgam
  66. Prof. Ashwani K. Chaudhary
  67. Mr. Arun Kumar, Head, AHEC
  68. Mr. Yogendra Singh, Librarian
  69. Mr. S. N. Singh, S.S.O., AHEC (Warden, Rajendra Bhawan)
  70. Dr. Praveen Kumar
  71. Dr. S.P.Srivastava
  72. Dr. Anjan Sil
  73. Lt.Col. (Retd.) A.K.Srivastava, Registrar
- Secretary

The Chairman (Director) welcomed the members to the 11<sup>th</sup> Meeting of the Senate. He requested all the Senators to join him in expressing their grief for the victims of the Tsunami that had hit the Andaman and Nicobar Islands and the eastern coast of Southern India. He added that the damage caused to life and property was unparalleled in recent times and the Institute, as a whole should offer condolence for the unfortunate victims. The Director further stated that he had received a phone call for assistance from Mr. Naresh Kumar who is an alumnus of this Institute and is presently the Secretary, PWD and Roads, Andaman & Nicobar Islands Administration, and had immediately got in touch with the Department of Earthquake Engineering, which went into action: a team of three experts consisting of Prof. D.K.Paul, Dr. R.P.Dubey and Dr. Yogendra Singh quickly reached Port Blair. It was further brought out that the Institute has always responded promptly to National emergencies and requirements. The Senators then observed two minutes silence in memory of those who had lost their lives.

The Director also apprised the Senate that an appeal would be circulated to the entire campus community to donate one-day's salary towards this cause. The Finance & Accounts Office would send the money so collected, to the Prime Minister's National Relief Fund, at the earliest.

The Director further informed the Senate that the HUDCO Board of Directors had approved a HUDCO Chair in Urban Transport Infrastructure at IIT Roorkee.

The Director (Chairman) also desired that henceforth, the Senate meetings should begin with the Institute Kulgeet. A Cassette of the Kulgeet accompanied by the BEG Band may be prepared by the Cultural Society (Music Section).

Before taking up the agenda items, the Senate thanked the under-mentioned outgoing members and recorded its appreciation for their valuable contribution in the meetings of the Senate.

1. Prof. S.K.Upadhyay, Department of Earth Sciences
2. Prof. S.C.Gupta, Department of Chemical Engineering
3. Prof. M.P.Jain, Department of Electrical Engineering  
(Proceeded on voluntary retirement from 31.12.2004)

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

1. Prof. S.C.Solanki, Department of Mechanical & Industrial Engineering.
2. Prof. S.N.Sinha, Department of Electronics & Computer Engineering.
3. Dr. (Mrs.) Sunita Gakkhar, Department of Mathematics.
4. Prof. S.S.Jain, Department of Civil Engineering.
5. Prof. N. Puri, Department of Civil Engineering.
6. Prof. H.O.Gupta, Department of Electrical Engg.
7. Prof. Anil Kumar, Department of Chemistry.
8. Prof. C.S.P. Ojha, Department of Civil Engineering.

**11.1.1 To confirm the minutes of the 10<sup>th</sup> Meeting of the Senate held on 13<sup>th</sup> September 2004.**

The minutes of the 10<sup>th</sup> Meeting of the Senate held on 13<sup>th</sup> September 2004 were confirmed as circulated.

- 11.1.2 To receive a report on the actions taken to implement the decisions taken by the Senate in its 8<sup>th</sup> Meeting held on 13<sup>th</sup> February 2004.

The Senate noted the actions taken on the decisions taken by the Senate in its 10<sup>th</sup> meeting held on 13<sup>th</sup> September 2004 with the under-mentioned observations:

**Item No. 10.2.2 To consider the recommendations of the committee constituted for Distinguished Alumni Awards.**

The under-mentioned panel of eminent personalities outside IIT Roorkee be identified on the committee constituted for Distinguished Alumni Awards:

1. Prof. R.A.Mashelkar
2. Prof. V.K.Gaur
3. Mr. Narayan Murthy
4. Prof. P.Rama Rao
5. Dr. Kasturirangan
6. Prof. S.K.Joshi
7. Prof. Jagdish Narain
8. Prof. O.P.Goel, President, Institution of Engineers.
9. Mr. R.K.Singh, Chairman, Railway Board

**ITEMS FOR CONSIDERATION:**

- 11.2.1 To consider the revision in the various qualifications for admission to M. Tech. Programmes in Electronics & Computer Engineering Department.

The Senate resolved that as considered and recommended by the Board, PGS&R in the meeting held on 28.10.2004, the under-mentioned revision in the various qualifications for admission to M. Tech. Programmes in Electronics & Computer Engineering Department be approved.

S. No.	Name of Programme	Approved qualifications
1.	M.Tech. Communication Systems	Bachelor's degree in Electronics & Communication Engg. or its equivalent with valid GATE score in EC
2.	M.Tech. R.F. & Microwave Engineering	Bachelor's degree in Electronics & Communication Engg. or its equivalent with valid GATE score in EC



3.	M.Tech. Semiconductor Devices and VLSI Technology	Bachelor's degree in Electronics & Communication Engg. or its equivalent with valid GATE score in EC
4.	M.Tech. Control & Guidance	Bachelor's degree in Electronics and Communication / Electrical Engineering or its equivalent and with valid GATE score in any one of the following: EC, EE, IN
5.	M.Tech. Computer Science & Engineering	Bachelor's degree in any branch of Engineering/ Tech. Or M.Sc. in Electronics/ Computer Science/ Physics / Mathematics/ Statistics or MCA and with valid GATE score in any one of the following: CS, EC, EE, IT
6.	M.Tech. Information Technology	Bachelor's degree in any branch of Engineering /Tech. or M.Sc. in Electronics/Computer Science or MCA and with valid GATE score in any one of the following: CS, EC, EE, IT

**11.2.2 To consider the deletion of B.Tech. (Computer Science) from the list of minimum qualifications prescribed for admission to the M.Tech. (Solid State Electronic Materials), course.**

The Senate resolved that as considered and recommended by the Board, PGS&R in the meeting held on 28.10.2004, the under-mentioned minimum qualifications for admission to the M.Tech. (Solid State Electronic Materials) be approved:

S. No.	Programme	Approved Eligibility Criteria
1.	M.Tech. Solid State Electronic Materials	M.Sc. (Physics)/Bachelor's Degree in Electrical/Electronics/Metallurgical Engineering, or its equivalent.

**11.2.3 To consider registration of Ph.D. candidates and their eligibility requirement in IIC.**

The Senate decided that a proposal for Joint Faculty/Joint Professors in cognate Departments for faculty members who are working in Academic Service Centres may be prepared and placed before the Board of Governors for approval. Once the proposal is approved by the Board, additional Ph.D.

Assistantships would be made available to the concerned Department from the MHRD grant.

**11.2.4 To consider allowing the full time Ph.D. students to take up jobs/assignments after fulfilling the stipulated conditions of minimum residence and candidature for the Ph.D. programme.**

The Senate decided that as considered and recommended by the Board, PGS&R in the meeting held on 28.10.2004, the proposal for allowing the full time Ph.D. students to take up jobs/assignments after fulfilling the stipulated conditions of minimum residence and candidature for the Ph.D. programme be approved as under:-

- (a) Candidates who joined after M.Tech. - 02 years
- (b) Candidates who joined after B.Tech/M.Sc. - 03 years

Their status would be converted to part-time from full time.

**11.2.5 To consider the modified Syllabus of course PH-521 and to add Syllabi of four courses in the list of Major Electives of M.Sc. (Physics)**

The Senate resolved that as considered and recommended by the Board, PGS&R in the meeting held on 28.10.2004, the modified syllabus of course PH-521 (Mathematical Physics) given at **Appendix 'A'** be approved, and the Syllabi of the under-mentioned four courses be added in the list of "Major Electives" of M.Sc. (Physics), as per the details given at **Appendix 'B'**.

- (a) PH-671: General Theory of Relativity
- (b) PH-674: Advanced Mathematical Physics
- (c) PH-684: Quantum Field Theory
- (d) PH-694: Advanced Quantum Field Theory

**11.2.6 To consider the "Standing Orders for Students and Procedure for Enquiries & Punishments".**

After discussion, the Senate decided that the Senators may send their comments/suggestions to the Dean, UGS within one week on the issue. The Dean, UGS may incorporate the comments/suggestions, sent by the members. The Senate authorised the Director to approve the same. The "Standing Orders for Students and Procedure for Enquiries &

Punishments" as approved by the Chairman, Senate are given at Appendix 'C'.

**11.2.7 To discuss the Annual Report on the working of the Institute for the year 2003-2004.**

Noted. Prof. J.S.Saini, Dean, SRIC was felicitated by the Senators for the excellent Annual Report. The Chairman/Senators also gave the under-mentioned suggestions:

1. The activities for compiling the Annual Report should be started from 1st July and the same should be submitted to the MHRD duly approved by the Chairman of the Board of Governors, by 30<sup>th</sup> November every year.
2. A presentation should be made to the Senate on the contents of the Annual Report, which should also include comparable data of the other IITs.

**11.2.8 To consider framing additional regulations for withdrawal from the PG Programme.**

The Senate resolved that the Regulation: 30 for PG Admissions be revised as under:

- 30(a) A student who wants to withdraw from a course shall apply through the Chairman, DRC/CRC, to the Dean, PGS&R, on a prescribed form within one week from the end of the first Mid-Term Examination under the advice of his/ her Faculty Advisor. If his request for withdrawal is granted, it will be recorded in the registration record of the student and the concerned Course Coordinator will be informed about it. The student will be awarded a withdrawal grade at the end of the semester.
- 30(b) A student, who is admitted and registered for a postgraduate programme at the Institute but leaves after completing the programme, or discontinues his studies for any reason whatsoever, including withdrawal from the programme for not achieving the required SGPA/CGPA for continuation of his registration in the said programme, shall not be admitted to a programme at the same level, that is to say that a student who has/is withdrawn from the M.Sc. programme cannot be admitted to any other M.Sc. programme; a student who has/is withdrawn from the M.Tech. programme cannot be admitted to any other M.Tech. programme, of the Institute.

- 11.2.9 To consider the proposal of the Department of Biotechnology to start the B.Tech. (Biotechnology) Degree Programme from the session 2005-2006.

After discussion, the Senate decided that the proposal of the Department of Biotechnology to start the B.Tech. (Biotechnology) Degree Programme as given in the Agenda Note be approved. The proposal be placed before the Board of Governors for specific approval. The intake of the students will be 30 and the course will commence from July 2006.

- 11.2.10 To consider the Syllabus of Institute Elective IHS-72: Economics of Industrial Structure and Strategy.

The Senate resolved that as considered and recommended by the Board, UGS in the meeting held on December 2004, the Syllabus of Institute Elective IHS-72: Economics of Industrial Structure and Strategy be approved with the provision that the title of the Institute Elective IHS-72, be suitably worded.

The title of the Institute Elective IHS-72 as suggested by the Head, Department of Humanities & Social Sciences be read as **"IHS-72: Economics of Industrial Strategy"**.

- 11.3.1 To report that the Director has approved the award of the academic, research awards and other prizes to the students and others for the year 2004. The prizes/ awards to the passed out students and others were given in the Convocation/ Prize Distribution Function for the year 2004 held on September 30, 2004). The Prizes/Medals to the other students who are still studying will be given separately.

Noted.

- 11.3.2 To report that the Director has approved the Academic Calendar for the Spring Semester of the Session 2004-2005.

Noted.

- 11.3.3 To report the decision of the Executive Committee of the Senate (ECS) on recommendations of the enquiry committee constituted to enquire into the case of manipulating, tampering and copying of answer books by Mr. Vikas Bisla, a student of the Electrical Engineering Department, during the III year Spring Semester examination for the Session 2003-2004.

Noted with the under mentioned observation:

- (a) Serial No. 4 of the agenda note be read as under:
  - 4. Mr. Vikas Bisla be rusticated from the Institute with immediate effect and he may be allowed to rejoin the Institute in July 2005.
- (b) Mr. Vikas Bisla will continue to be a student of the Institute till the above decision is implemented.

11.3.4 **To report;**

- (a) Nominees for the Senate from outside the Institute.**
- (b) The period of the membership of nominees for the Senate from outside the Institute.**

Senate noted the nomination of the under-mentioned three eminent educationists in the fields of Engineering, Science & Humanities as members of the Senate of the Institute w.e.f. 1<sup>st</sup> January 2005. However, the period of membership of the said members will be **two** years:

**(a) Engineering:**

Padmashri Prof. N.K.Gupta, Deptt. of Applied Mechanics, IIT Delhi

**(b) Science:**

Prof. Karmeshu, Prof. & Head, School of Systems & Computer Science, Jawaharlal Nehru University, New Delhi.

**(c) Humanities:**

Prof. Devi Singh, Director, Indian Institute of Management, Lucknow.

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

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. / CENTRE : PHYSICS DEPARTMENT

1. Subject Code: PH-521 Course Title: Mathematical Physics
2. Contact Hours: L; 3 ; T; 1 ; P; 0 ;
3. Examination Duration (Hrs.): Theory 

0	3
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 Practical 

0	0
---	---
4. Relative Weightage: CWS 

2	0
---	---

 PRS 

0	0
---	---

 MTE 

3	0
---	---

 ETE 

5	0
---	---

 PRE 

0	0
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5. Credits: 

0	4
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 6. Semester: 

<input checked="" type="checkbox"/>
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 Autumn 

<input type="checkbox"/>
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 Spring 

<input type="checkbox"/>
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 Both
7. Pre-requisite: Bachelor's degree in Physics or Mathematics 8. Subject Area: PG-13
9. **Objective of Course:** The main objective of this course is to familiarize the students with the existing standard techniques in modern mathematical physics, and to review topics that are already covered as part of the undergraduate syllabi, with some careful addenda.

10. Details of Course:

S.No.	Particulars	Contact Hours
1.	Integral transforms: Fourier and Laplace transforms, their applications to solutions of differential equations.	3
2.	Complex analysis: analytic functions, contour integration, residue calculus, conformal mapping and its applications.	6
3.	Green's functions: Green's functions and solutions to inhomogenous differential equations, applications.	4
4.	Tensor calculus: Covariant and Contravariant tensors, covariant derivatives, affine connections Christoffel symbols.	4
5.	Group Theory: Definition, classification and examples of (finite) groups, isomorphisms, homomorphisms, representation theory for finite groups, reducible and irreducible representations, Schur's Lemma and orthogonality theorem, Characters, Continuous groups, Lie groups and Lie algebras; vector spaces, Hilbert spaces and operators.	10
6.	Topology: topological spaces, connectedness and compactness of spaces, continuous functions, homeomorphisms.	4
7.	Real Manifolds: definition, vector fields, differential forms, frames, connection, curvature, torsion, integration of differential forms, Stokes theorem, Laplacian on forms.	5
8.	Homology and Cohomology: Simplicial Homology and De-Rham Cohomology.	6

11. Suggested Books:

S.No.	Name of Books/Authors	Year of Publication
1.	Mathematical Methods for Physicists by George B. Arfken and Hans J. Weber, Academic Press, Fourth Edition.	1995
2.	Introduction to Topology, Differential Geometry and Group Theory for Physicists, by Mukhi S. and Mukunda N., Wiley Eastern, New Delhi.	1990
3.	Lie Algebras in Particle Physics, by H. Georgi, Benjamin-Cummings, New York.	1982

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. / CENTRE : PHYSICS DEPARTMENT

1. Subject Code: PH-671 Course Title: General Theory of Relativity
2. Contact Hours: L; 3 ; T; 1 ; P; 0 ;
3. Examination Duration (Hrs.): Theory 

0	3
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 Practical 

0	0
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4. Relative Weightage: CWS 

2	0
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 PRS 

0	0
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 MTE 

3	0
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 ETE 

5	0
---	---

 PRE 

0	0
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5. Credits: 

0	4
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 6. Semester: 

Autumn
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Spring
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Both
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7. Pre-requisite: Bachelor's degree in Physics or Mathematics.
8. Subject Area: PG-14
9. **Objective of Course:** The main objective is to teach the students the basics of non-Euclidean Geometry and at the same time the basics of Einstein's general theory of relativity and its applications.

10. Details of Course:

S.No.	Particulars	Contact Hours
1.	Lorentz transformation, representation of the Lorentz group, tensors, conserved currents and energy momentum tensor.	7
2.	Principle of equivalence, metric tensor and the affine connection, geodesics.	5
3.	Covariant differentiation, analogy with electromagnetism, p-forms, generalized Stoke's theorem.	5
4.	Curvature tensor, parallel transport, algebraic properties of the curvature tensor, Bianchi identities.	8
5.	Einstein's field equations and some of their solutions: Robertson-Walker metric, Schwarzschild metric, black holes, deflection of light by Sun, precession of perihelia of planets.	10
6.	Tetrad formalism, Killing vectors, maximally symmetric spaces.	3
7.	Kaluza-Klein theories (an approach towards unification of, e.g., electromagnetism and gravity).	4

11. Suggested Books:

S.No.	Name of Books/Authors	Year of Publication
1.	Gravitation and Cosmology : Principles and Applications of the General Theory of Relativity, by Steven Weinberg, Wiley Text Books.	1972
2.	Introduction to the Theory of Relativity by Peter G. Bergmann, Dover Publications.	1976

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

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

1. Subject Code: **PH-674** Course Title: **Advanced Mathematical Physics**
2. Contact Hours: L: 3 ; T: 1 ; P: 0 ;
3. Examination Duration (Hrs.): Theory 

0	3
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 Practical 

0	0
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4. Relative Weightage: CWS 

2	0
---	---

 PRS 

0	0
---	---

 MTE 

3	0
---	---

 ETE 

5	0
---	---

 PRE 

0	0
---	---
5. Credits: 

0	4
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 6. Semester: 

—
Autumn

—
Spring

—
Both
7. Pre-requisite: PH-521 passed
8. Subject Area: PG-14
9. **Objective of Course:** The main objective of this course is to familiarize the students with techniques that are part and parcel in a variety of fields in theoretical physics, e.g., conformal field theory, string theory, high energy phenomenology, etc.

10. Details of Course:

S.No.	Particulars	Contact Hours
1.	Homotopy: loops and homotopies, fundamental and higher homotopy groups.	5
2.	Fiber Bundles: the concept, tangent and cotangent bundles, vector and principal bundles.	6
3.	Complex Manifolds and Cohomology: definition, Dolbeault Cohomology of complex forms, harmonic analysis.	2
4.	Kähler manifolds: Concepts of Hermitian and Kählerian metrics and manifolds, (Complex) Projective Space.	2
5.	Calabi-Yau manifolds: Holonomy, definition of Calabi-Yau manifolds, Chern classes and their evaluation, Yau's theorem, Hodge diamond, moduli spaces, Kähler and complex structure deformations, basic idea of mirror symmetry.	8
6.	Toric Geometry: basic ideas, "M" and "N" lattices, singularities and resolutions, hypersurfaces in toric varieties, holomorphic quotients, toric geometry of Kähler and complex structure moduli spaces, mirror manifolds and toric geometry, monomial-divisor map.	8
7.	Mirror Symmetry: basic strategy of the Greene-Plesser construction, Minimal model, construction of mirror manifolds and examples.	6
8.	Period integrals in algebraic geometry and applications of mirror symmetry in evaluating the same, Picard-Fuchs equation and Meijer basis of solutions.	5

11. Suggested Books:

S.No.	Name of Books/Authors	Year of Publication
1.	String Theory on Calabi-Yau Manifolds, by Brian R. Greene, Lectures given at Theoretical Advanced Study Institute in Elementary Particle Physics (TASI 96) Published in *Boulder 1996, Fields, strings and duality* 543-726	1996
2.	Mirror Symmetry and Algebraic Geometry (Mathematical Surveys and Monographs, 68) by David A. Cox, Sheldon Katz, American Mathematical Society	1999
3.	Mirror Symmetry, Vol I by K.Hori, S.Katz, A.Klemm, R.Pandharipande, R.Thomas, C.Vafa, R.Vakil and E.Zaslow, Clay Mathematics Monographs.	2003



# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

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

1. Subject Code: **PH-684** Course Title: **Quantum Field Theory**
2. Contact Hours: L; 3 ; T; 1 ; P; 0 ;
3. Examination Duration (Hrs.): Theory 

0	3
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 Practical 

0	0
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4. Relative Weightage: CWS 

2	0
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 PRS 

0	0
---	---

 MTE 

3	0
---	---

 ETE 

5	0
---	---

 PRE 

0	0
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5. Credits: 

0	4
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 6. Semester: 

Autumn
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Spring
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Both
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7. Pre-requisite: PH-541, PH-522 passed
8. Subject Area: PG-I4
9. **Objective of Course:** The main objective of this course is to prepare students to become self-dependent in terms of their capability to follow research literature in diverse topics in particle theory, nuclear theory, condensed matter theory and astrophysics.

## 10. Details of Course:

S.No.	Particulars	Contact Hours
1.	Spin-0, 1/2 field theory : Klein-Gordon Scalar Field and charged scalar field, Dirac spinor field, quantization of fields.	6
2.	C, P, T invariances, CPT theorem, LSZ reduction, Wick's theorem, Feynman rules, S-matrix, cross sections.	6
3.	Quantum Electrodynamics (quantization of Abelian gauge theories with fermions): quantization of Maxwell's field, Gupta-Bleuler quantization, Compton effect, pair annihilation, radiative corrections, Lamb shift.	6
4.	Quantum Chromodynamics (quantization of non-abelian gauge theories with fermions): Local symmetry, Faddeev-Popov gauge fixing, Feynman rules, Spontaneous symmetry breaking, Higgs mechanism, Weinberg-Salam electroweak theory, asymptotic freedom, confinement, chiral symmetry, current algebra.	10
5.	Path integral formalism: Derivation of Schrodinger equation, Loop expansion, Grassman variables, Schwinger-Dyson equations.	6
6.	Renormalization: Counterterms, Dimensional regularization, Renormalization group, Callan-Symanzik relation.	6
7.	Ward-Takahashi identities, Taylor-Slavnov identities, BRST quantization, (non-abelian) anomalies, $\pi^0 \rightarrow 2 \gamma$ , Fujikawa's method of studying anomalies	3

## 11. Suggested Books:

S.No.	Name of Books/Authors	Year of Publication
1.	Quantum Field Theory by Claude Itzykson, Jean Bernard Zuber, McGraw Hill College Div.	1980
2.	Quantum Field Theory: A Modern Introduction by Michio Kaku, Oxford University Press.	1993

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. / CENTRE : PHYSICS DEPARTMENT

1. Subject Code: PH-694 Course Title: Advanced Quantum Field Theory
2. Contact Hours: L; 3 ; T; 1 ; P; 0 ;
3. Examination Duration (Hrs.): Theory 

0	3
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 Practical 

0	0
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4. Relative Weightage: CWS 

2	0
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 PRS 

0	0
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 MTE 

3	0
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 ETE 

5	0
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 PRE 

0	0
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5. Credits: 

0	4
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 6. Semester: 

Autumn
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Spring
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Both
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7. Pre-requisite: PH-684 passed 8. Subject Area: PG-14
9. **Objective of Course:** The main objective of this course is to prepare the student in terms of techniques extremely useful, especially in areas such as theoretical high energy physics and string theory in particular, and condensed matter physics and cosmology.

10. Details of Course:

S.No.	Particulars	Contact Hours
1.	Solitons, e.g. in $\phi^4$ theory; 'tHooft-Polyakov monopoles; WKB, tunneling and instantons, e.g., Yang-Mills instantons, theta-vacua and CP problem.	3
2.	General Theory of relativity and quantum gravity: equivalence principle, covariant action, vierbeins and spinors in GTR, inflation, cosmological constant problem, Kaluza-Klein theory, quantizing gravity, counterterms in quantum gravity.	5
3.	Supersymmetry, superspace formalism: supersymmetry and supersymmetric actions, superspace formalism, supersymmetric Feynman rules, Nonrenormalization theorems, Supergravity.	8
4.	Conformal field theory: Operator product expansion, Ward identities, Noether's theorem, conformal invariance, free CFT's, Virasoro algebra, vertex operators, operator-state correspondence.	5
5.	<b>Superstrings</b>	
(i)	Perturbative: free bosonic string in Minkowski space, commutation relation and mode expansion, Virasoro algebra, Light-cone gauge Quantization and no-ghost theorem, analysis of spectrum. World-sheet supersymmetry, boundary conditions and mode expansions, light-cone gauge quantization, [no-ghost theorem, GSO condition], extended world-sheet supersymmetry [N=2, 4], super Yang-Mills theory. Space-time supersymmetry, superparticle and superstring, type I and II superstrings, Light-cone quantization and analysis of open and closed-string spectra. SO(32) and $E_8 \times E_8$ heterotic string.	15
(ii)	Nonperturbative: dualities, basic ideas of M- and F-theories, compactifications, dualities, examples and their tests and interrelation between different duality conjectures, M-theory in 11 dimensions and its compactification, F-theory in 12 dimensions and its compactifications, nonperturbative D-branes and open strings in closed string theories.	6

11. Suggested Books:

S.No.	Name of Books/Authors	Year of Publication
1.	Quantum Field Theory: A Modern Introduction by Michio Kaku, Oxford University Press	1993
2.	Superstring Theory: Volume 1, Introduction by Michael B. Green, John H. Schwarz, Edward Witten Cambridge University Press	1988
3.	An Introduction to Nonperturbative String Theory, By Ashoke Sen, In *Cambridge 1997, Duality and supersymmetric theories* 297-413	1997

**STANDING ORDERS**  
**FOR STUDENTS**  
**And**  
**PROCEDURE FOR**  
**ENQUIRIES & PUNISHMENTS**



**INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE**  
**ROORKEE – 247667, UTTARANCHAL**

## SO 1: STANDING ORDERS FOR THE STUDENTS

### GENERAL

SO 1-1.1 In exercise of the powers vested in the Senate under Statute 25, the Senate lays down the following Standing Orders for the students including Research students, residing in the Bhawans/Hostels and those living outside the Institute campus.

SO 1-1.2 These standing orders shall come into force with effect from 31<sup>st</sup> December 2004.

SO 1-1.3 The students of the Institute must study the **Standing Orders** carefully and also make themselves familiar with the regulations, rules and other instruction issued from time to time pertaining to their academic, co-curricular and other activities. When in difficulty or requiring assistance, they should contact the Officer(s) concerned as indicated in these orders.

SO 1-1.4 Any amendment and additions to these Standing Orders made by the Senate, will be notified through Notices displayed on Notice Boards and circulated in the usual manner. The plea of **ignorance** will not be entertained for any breach of the orders in force from time to time.

SO 1-1.5 The schemes for all academic work and for the examinations are notified to the students in the usual manner after their enrolment. Apart from their academic work they are also expected to take full part in games, N.C.C., N.S.S. and other extra curricular activities.

SO 1-1.6 Proficiency grades are awarded to the undergraduate students for games and to the PG students for extra curricular activities. The assessment also covers their general behaviour and discipline. Proficiency should, therefore, receive the same attention as the academic work.

SO 1-1.7 The welfare and discipline of the students is looked after in their respective fields by various Officers, viz. the Heads of Department/Academic and Service Centres, Dean of Students' Welfare (DOSW) and Associate Dean of Students' Welfare (ADOSW), Proctor, Foreign Students' Advisor (FSA), Faculty Advisor, SC/ST Students, Chief Wardens, Wardens, Chief Advisors of various student activities and any other Officer(s) or Body or Council setup from time to time for specific purposes. The duties and responsibilities of the Officers/Body/Council have been defined and notified separately and suitable powers have been given to them for carrying out their responsibilities.

SO 1-1.8 The Head of Department/Academic Centre/Service Centre is in charge of the academic work including attendance and leave of students. Any complaint within the Jurisdiction of the Academic Department/Centre concerned will be dealt with by the Head of the Department/Centre. The Head of the Department/Centre may nominate teachers/scientists as required for assisting him in the different spheres of academic work.

SO 1-1.9 The Dean of Students' Welfare(DOSW) will deal with the welfare and discipline of the students including research students and exercise jurisdiction over the rest of the campus of the Institute including the Bhawans and, to the extent it is necessary, outside the campus also. He will also maintain liaison with the Chief Advisors of the various student activities who also have full authority concerning the welfare and maintenance of good conduct in their respective spheres.

SO 1-1.10 The Dean of Students' Welfare will be assisted by Associate Deans of Students' welfare (ADOSW), Proctor, Foreign Student Advisor (FSA), Faculty Advisor, SC/ST Students, Chief Wardens and Wardens of various Bhawans.

SO 1-1.11 The Proctor's jurisdiction will cover all places other than academic Departments/Centres. His main duties pertain to rendering assistance and looking after the welfare and discipline of students within his jurisdiction. In all these functions, the proctor will freely draw upon the assistance of the Disciplinary Committee of the Students' Affairs Council (SAC). The Proctor is delegated adequate powers to deal with disciplinary matters.

SO 1-1.12 The Chief Warden is the executive head in all matters concerning the management of the Bhawan and its Mess. He will work directly under the Dean of Students' Welfare to whom he is responsible for the welfare and discipline of the Bhawan inmates. He will be assisted in his work by the Warden, the Bhawan Council and the Mess Council.

## **ACADMIC WORK**

SO 1-2.1 The student standing first in order of merit will be designated as the class senior of his class. He is responsible for reporting promptly to the Teacher or Officer concerned any unusual occurrences or events connected with his class and if necessary bring it to the notice of the Head of the Department /Centre/ Proctor and/or the Dean of Students' Welfare. He will be the leader of the class in all academic matters and should exercise such control over his class fellows as is necessary in the interest of good conduct and healthy academic life.

SO 1-2.2 All the students should remain present in all their classes, lectures, tutorials, practical or drawing classes, seminars, etc. They should like wise carry out other outdoor and extra-curricular duties assigned to them. Their attendance and leave from attending classes, etc are governed by the appropriate regulations of a particular academic program.

SO 1-2.3 Students must give their undivided attention to their academic work and must be respectful to their teachers, advisors and research/dissertation supervisors.

SO 1-2.4. Students must conduct themselves with due decorum in the classes, laboratories, workshop, fieldwork etc. and move about in an orderly and disciplined manner. They must conduct themselves in a manner worthy of the great traditions of this Institute. Smoking is prohibited in public places and where ever instructions are imparted.

SO 1-2.5. Students who fail to make sufficient progress in their studies and do not maintain the required attendance in the classes, are liable to be debarred from appearing at the semester examination in accordance with the regulations.

SO 1-2.6. Students are prohibited from writing and drawing on black boards and walls and pasting unauthorized notices etc. thereon. Circulating unauthorized notice is improper and is **strictly prohibited**.

SO 1-2.7. If in a particular class/period more than 60% students are absent, it would be regarded as mass abstention from studies and an act of indiscipline. Disciplinary action will be taken on the students indulging in mass abstention in accordance with the following clauses 2.8.and 2.9.

SO 1-2.8. A fine of 5 marks per class of undergraduate students and equivalent monetary fine in case of postgraduate students, out of the discipline group will be imposed by the Head of the Department/Centre on each student who absents himself in any class where there is mass abstention. The maximum fine for a day would be limited to 15 marks or, in case of postgraduate students, its monetary equivalent.

For B.Tech/B. Arch I year students such fine shall be imposed by the Coordinator of I year classes. All such fines shall be communicated to Proctor/DOSW for necessary notification and record.

SO 1-2.9. In case of undergraduate students, if the disciplinary marks are exhausted, additional fine of marks would be converted into monetary fine on the basis of clause D1-2.10 below.

SO 1-2.10. For the purpose of calculating equivalent monetary fine from marks or vice-versa, one mark shall be treated as Rs.100/- or the amount approved by the Director from time to time on the recommendation of a committee comprising of DOSW, ADOSW, FSA and Proctor.

SO 1-2.11. The Institute reserves the right to cancel the admission and withhold the results of examination of a student at any time during his studies at this Institute, if the Institute finds that any material fact or information had been suppressed while seeking admission at this Institute and / or it is in the interest of the Institute / fellow students to do so.

SO 1-2.12. The students should not indulge in adopting any kind of unfair means during before or after the examination(s), tests, quizzes, etc. They should not list some one else's work(s) and insert it in their class work, homework, projects, seminar reports, dissertation, thesis, etc. without proper acknowledgement, credit and reference. They should not plagiarize any dissertation, thesis, project, class work submission, report etc.

SO 1-2.13 The appropriate regulation dealing with cases of unfair means, plagiarism, etc are given in the ordinances/regulations of the Undergraduate, Postgraduate and Ph.D.

(Doctoral) programmes Suitable disciplinary action shall be taken in such cases by the Institute in accordance with the regulations in force from time to time.

## CONDUCT AND BEHAVIOUR

SO 1-3.1. Students must carry their **identity cards with them**, especially when they move out of their Bhawan/place of stay.

SO 1-3.2. No student shall disobey any order issued by the Institute, Head of Department/Centre, DOSW, ADOSW, Proctor, FSA, Faculty Advisor SC/ST Students, Coordinator First Year B.Tech/B.Arch classes, Chief Wardens, Wardens and Teachers. They must behave with due decorum towards their Teachers and fellow students. Girl students must be shown due consideration in this respect.

### SO 1-3.3

(a) No student shall indulge in **any form of ragging** the fresh students causing mental or physical agony or inflict monetary loss to them, harass them or indulge in any kind of obscenity, vulgarity or violence with them. Students found involved in any form of ragging are liable to **strict disciplinary action**.

(b) Students have no right to **deny mess, club and other facilities** to other students. The use of any such facility can be withdrawn only by the proper authorities.

(c) Students should not **indulge in any type of unkind behaviour towards** new entrants in the Bhawans, the messes, the clubs or any other place or during receptions arranged for them. Students indulging in any unseemly behaviour towards new entrants will render themselves liable to **strict disciplinary action**.

### SO 1-3.4

(a) Students should **not indulge in violence** of any kind with fellow students, employees including teaching staff of the Institute, and outsiders within or outside the Institute.

(b) Students must not take the law in their own hands but must report any grievance to the teacher, Head of Department/Centre, the Wardens, the Proctor, the Dean of Students' Welfare or other Officers as the case may be. Indulgence in violence by any student or group of students will render them liable to **strict disciplinary action**.

SO 1-3.5. Students are not allowed to become members of outside societies or allowed to join discussions of a political nature or to take part in any political activity without prior permission of the Institute.

SO 1-3.6. Students are not permitted to consume or take alcoholic drinks and harmful drugs like L.S.D., Charas etc. within the Institute campus including their Bhawans or outside in any restaurant/bar in Roorkee or Saharanpur or on outside official visits such as training/tour/camp/field work etc. Any infringement of this order or visiting any places declared out of bounds to students will result in **disciplinary action** against the students concerned.

SO 1-3.7. Students are warned against incurring debts or committing irregularities in money matters. In all such cases, which tend to bring discredit to the Institute, disciplinary action will be taken. The Institute, however, will in no way be responsible for such debts or irregularities.

SO 1-3.8

(a) No meeting of the students, other than those organized under the aegis of the various recognized students activities, shall be called and held without the prior permission in writing from the DOSW.

(b) No meeting/function within the Institute campus at Roorkee or Saharanpur to which any outsider is invited shall be organized nor shall any outsider be allowed to address the students without the prior permission in writing from the DOSW/Head of the Department/Centre.

SO 1-3.9. No theatrical performance, dance or show of any kind shall be allowed either within or outside the Institute Campus/Bhawan in the name of any society of the students except with the prior permission in writing from the Dean of Students' Welfare, who may prescribe the terms and conditions for such performance.

SO 1-3.10. No student shall

(a) by words spoken or written or by sign or visible representation or through internet or website or SMS offend or insult a fellow student or any Teacher of the Institute or any employee or Officer of the Institute. (Any form of ragging will also constitute an act of insult or offence on the person who is ragged).

(b) misappropriate, prefer false claim for financial assistance of any kind (indulge in financial irregularity of any kind), mutilate, disfigure or otherwise destroy or damage any property of the Institute including furniture, books, equipment, apparatus, building etc.

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

(d) indulge in plagiarism of any kind in the Project, Dissertation, Class Work submission, reports etc.



## **INSTITUTE DUES AND PROPERTY**

SO 1-4.1. Students must pay all Institute, Mess, Club, Bhawan and other dues on or before the stipulated dates. If they do not do so, they render themselves liable to various penalties mentioned in the relevant instructions.

SO 1-4.2. Students must take care of and protect all Institute property. Any damage to Institute property due to improper use or negligence will have to be made good by the students concerned. Students must use the Institute furniture and fittings with due care and must not deface buildings, roads, furniture, fittings etc. in any manner. Not only the cost of the damaged Institute property will be recovered from the student (s) concerned, but disciplinary action shall also be taken.

SO 1-4.3. Students must handle with great care the laboratory equipment and any instrument and machinery that they have to use in the course of their work. Any damage or breakage of such equipment etc. due to improper use or negligent handling will have to be made good by the students concerned.

## **BHAWANS**

SO 1-5.1. There are a number of students' hostels called Bhawans. Each Bhawan has a Bhawan Council of its elected inmates. The Council looks after the Bhawan activities. A new student, on arrival, will report to the Dean of Students' Welfare who will permit him to take a room/seat in one of the Bhawans after the student has paid his dues and got himself/herself registered. He/she must then report to the Chief Warden of the Bhawan for allotment of the room.

All students will be required to vacate their rooms as and when required by the Institute or before they proceed on summer vacation.

SO 1-5.2. When occupying a room a student should check the room, fixtures, fittings, electrical fittings, the furniture and any other article issued to him. He will be required to sign a receipt for these and will be responsible for their proper upkeep during his stay. He will be required to compensate the shortage found when he hands over the charge of the room. He will also be charged for any damage caused to the fittings and the articles issued to him.

SO 1-5.3. The Chief Warden of a Bhawan is assisted by the Bhawan Secretary and other Councillors in day-to-day working of the Bhawan. The Bhawan inmates will refer their difficulties of a minor nature to the Bhawan Secretary or other Councillor who will take necessary action. They will bring to the notice of the Assistant Warden, Warden or Chief Warden matters requiring their attention and invariably report all offences connected with discipline to them. Minor offences will be dealt with by the Chief Warden himself. Offences of a major nature will be referred by him to the Proctor, and the Dean of Students' Welfare, who will take suitable action in the matter.

SO 1-5.4. Furniture should not be removed from the rooms and used elsewhere either inside or outside the Bhawan without the permission of or under the orders of the Chief Warden.

SO 1-5.5. Electrical appliances like heaters, T.V., V.C.P. and V.C.R are not to be used in Bhawan rooms. However, their use may be permissible in the common room with the written permission of the Chief Warden. Interference with the electric connections and fittings and unauthorized use of electrical appliances will be severely dealt with.

SO 1-5.6. Electricity meters have been installed for each wing of rooms in the Bhawans. The charges for consumption of electricity will be equally divided amongst the occupants in each wing.

SO 1-5.7. Lights, fans, etc. should be switched on only when needed and must be switched off when not required or when going out of the room. Similarly water taps must be closed promptly after use.

SO 1-5.8. No student is allowed to engage a private servant. Also no pets such as dogs/cats/monkeys etc. are allowed in the Bhawans.

SO 1-5.9. Students are cautioned to be very careful about the safety of their belongings. They should **close their rooms** securely when they leave the room even for short periods or when they are sleeping. Any theft either of a student's personal property or of the Institute property should be reported promptly to the Chief Warden.

SO 1-5.10. Students should not keep **large sums** of money or valuable articles with them or in their rooms. They are advised to open a Savings Bank Account in a Bank/Post Office.

SO 1-5.11. Cycles must be kept in cycle stands or at other places earmarked for the same. They must be properly locked.

SO 1-5.12. Students should not indulge in such acts which may **disturb** others at study or work in the Bhawans like loud playing of musical instruments or radios or loud singing or dancing etc. Students are not permitted to keep **fire-arms** or any lethal weapon with them even if they possess a license for it.

Students are advised to keep their mobile phones very carefully and safely. Institute shall **not entertain any complaint** of loss / theft of mobile phones.

SO 1-5.13. Guests are not permitted to **stay overnight in the rooms of the students**. Students should apply to the Chief Warden for the permission to accommodate them in the guest rooms earmarked in each Bhawan for the purpose. However, female members in the boy's hostel and male members in the Girls' hostel are not allowed to stay over night in their guest room respectively.

SO 1-5.14. Parents, guardians, near-relatives and friends may occasionally visit the students in their Bhawans. The only ladies permitted in a Boys' Bhawan are the mother and real sisters of the student concerned.

SO 1-5.15. In the Girls' hostels, the only male member permitted to visit a student's room is her father. They may be permitted to visit the room of the student during specified hours only with the prior permission of the Chief Warden. In exceptional emergent cases permission may be given to visit the room at other hours also.

Fellow students and other guests will be permitted to meet the inmates in the Girls' hostel at the discretion of the Chief Warden during specified hours and in the visitors' room only.

SO 1-5.16. Students are prohibited from giving shelter to any other student/outsider in their rooms. In case of any unauthorized shelter, the student will be liable to disciplinary action. Unauthorized occupation/shelter to any outsider will be reported to local civil administration for suitable action.

SO 1-5.17. For the proper management of Bhawan life, a Bhawan Council will be constituted for various Bhawans with the Chief Warden as the Chairman and members to assist him. The main activities of the Bhawan Council will be to look after Bhawan upkeep. The welfare, recreational, cultural and disciplinary activities shall be entrusted to it.

SO 1-5.18. All purchases by the students from the Cafeterias/Canteens should be strictly on cash payment/coupon basis. The Institute will not accept any responsibility for the debt incurred by the students with Cafeteria/Canteen Contractor.

SO 1-5.19. Students, unless specially permitted, will be allowed to occupy the rooms allotted to them in their Bhawan only 03 days prior to commencement of their academic session. Likewise they must vacate their rooms within 05 days of the closure of their academic session. They will render themselves liable to disciplinary action and payments at enhanced rates for any unauthorized occupation beyond the stipulated period mentioned above.

SO 1-5.20. Before proceeding on summer vacation students must handover the charge of their rooms, the furniture and the fittings etc. to the Bhawan Supervisor/Caretaker and get a receipt from him. If any student fails to do so, the Chief Warden/Warden is authorized to break open a locked room and make an inventory of the articles found therein. The student concerned will be fully responsible for any shortage found in the Institute property handed over to him. No responsibility will be accepted by the Institute for the private belongings of the students found in such rooms.

SO 1-5.21. Students are prohibited from screening / keeping obscene literature/video films in their possession. Any violation in this regard will result in disciplinary action.

## STUDENTS' MESSSES

SO 1-6.1. There are a number of messes in the Institute. Each mess is run by a Mess Working Committee with Warden as its Chairman and consisting of Mess Secretary, Bhawan Secretary and other Councillors as members. Students must follow the mess rules and observe the highest traditions of dignity, decency and cleanliness in the mess. The Warden is authorized to deal with any act of indiscipline on the part of the students in the mess.

SO 1-6.2. A Coordinating Committee of Bhawans (CCB) under the chairmanship of DOSW/ADOSW is the apex body for the management of all Bhawans and messes.

SO 1-6.3. Membership of the mess connected to each Bhawan is compulsory for the students, residing in the Bhawans unless exempted to the extent permitted by the instructions in force. Prior permission must be obtained for any exemption by applying to the Dean of Students' Welfare.

SO 1-6.4. Any student exempted from dining in the mess, if found there dining without permission, will be liable to pay the mess charges for the full month and will also be liable to disciplinary action.

SO 1-6.5. The students are required to pay the Institute dues and the subsidiary dues including mess advance immediately on the opening of the Institute after summer/ winter break on the day of registration to be fixed by the Institute. The other two mess advances, along with any balance of dues are to be paid immediately after the mid-semester break during the Autumn and Spring Semesters.

SO 1-6.6. The mess establishment is regulated and controlled by the Chief Warden. In case of any complaint arising out of the behaviour of mess staff, a student should not deal with the matter himself but report it to the Warden who will initiate necessary action in the matter.

SO 1-6.7. Parties on behalf of an individual member or a group may be arranged to a limited extent only, with the prior permission of the Chief Warden. The cost of such parties including service charges will be paid in advance by the member arranging the party.

## CLUBS

SO 1-7.1. Each of the students' club is an organization of the students mainly run by them under the guidance of the Chief Club Advisor. Membership of the club is compulsory.

SO 1-7.2. Club activities are managed by the Club Council.

SO 1-7.3. Students must be well dressed and must conduct themselves with decency and decorum in the club. They must follow the Standing Orders and other instructions/orders and maintain a disciplined conduct in the club. Lapses on their part will be dealt with by the Chief Club Advisor.

SO 1-7.4. Members must use the club property with great care. Any damage should be promptly reported. The member concerned shall have to pay for the damage as assessed by the Club Council.

SO 1-7.5. The club establishment will be regulated and controlled by the Secretary, Club Council under the guidance of the Chief Club Advisor and through the decisions of the Club Council. In case of any complaint arising out of the behaviour of a student, any member should not deal with the matter himself, but report it to Chief Advisor of the Club Council who will take necessary action in this matter.

### **INSTITUTE LIBRARY**

SO 1-8.1. Students must strictly follow the library rules for borrowing books. They must show their Identity Cards when asked for. The book must be returned on or before the date stamped on the date slip of the book.

SO 1-8.2. Library books should be used with great care. Tearing and folding or cutting of pages of library books or making any mark on them is not permitted. Any defect noticed at the time of borrowing of the books must be brought to the notice of the library staff immediately. Otherwise the borrower may be required to replace the book by a new copy or pay double the cost of the book.

SO 1-8.3. In open access libraries like ours, replacement or misplacement of books on the shelves by the readers is not desirable. The reader should leave the book on the table after use.

SO 1-8.4. Library cards are non-transferable and they should be kept securely otherwise the borrower shall be held responsible for the books issued against his cards.

SO 1-8.5. Before leaving the library, a student should make sure of getting the library books properly issued at the counter against his card. Also, he should not forget to show his belongings to the Janitor while leaving the library.

SO 1-8.6. Personal property or books other than those belonging to the library must be deposited at the entrance gate with the Janitor and should not be taken inside the library.

SO 1-8.7. The loss of library books or borrower's card must be immediately brought to the notice of the Librarian in writing.

SO 1-8.8. Polite and courteous behaviour inside the library is expected from all the users and silence must be observed inside the reading rooms.

NOTE: Detailed library rules are given in the publication "Know your Library" guide to library users. This will be available for consultation in the library.

#### **N.C.C. & N.S.S.**

SO 1-9.1. Enrolment to National Cadet Corps (N.C.C.)/National Service Scheme (N.S.S.) /National Sports Organization (NSO) is compulsory for the B.Tech./B.Arch. I Year students. Girls and Foreign students and any other student exempted from N.C.C./N.S.S./N.S.O. on medical grounds will be required to join Ranging, Hindi or any other prescribed proficiency, respectively. Appropriate regulations and instructions in force from time to time should be carefully studied and acted upon.

SO 1-9.2. A student must maintain 75% attendance (physical presence on parades) of the total required attendance in the N.C.C. /N.S.S. classes. Any shortfall of attendance below this limit will lead to the removal of the student from N.C.C./N.S.S. and imposition of a heavy fine of marks from the discipline group. No extra parades/classes will be held to make up for the shortage of attendance.

SO 1-9.3. NCC cadets, while on parade or at any other time when in uniform, are governed by the NCC Act. They must be properly dressed and must pay due respect to all Officers and should behave in a manner worthy of their status, as required by the Act.

SO 1-9.4. All cadets must attend the prescribed number of N.C.C. Camps. They must follow the rules and regulations of the camp as laid down by the Officer Commanding.

SO 1-9.5. Those students, who pass the 'B' Certificate examination any time during their first or second year course of study, will be given special credit in proficiency marks.

SO 1-9.6. Proficiency marks in N.C.C. are allotted to the students concerned on the basis of their attendance, performance in parades etc. and the camp attended by them. The marks form part of total marks for the session and have the same importance as the marks scored by them for their academic performance.

SO 1-9.7. The main objective of the N.S.S. is to train the students in community service through (a) participation in community projects (b) lectures, discussions, seminars and (c) organized weekend camps as well as annual camps.

#### **RECREATIONAL ACTIVITIES**

SO 1-10.1. Elaborate facilities for games, sports and other recreational activities under the Cultural Society, Sport Association and Hobbies Club exist for all the students.

Students are expected to actively participate in these activities. They must abide by the instructions framed for their participation in these activities.

SO 1-10.2. Use of swimming pool at hours outside the prescribed time is dangerous and is forbidden. Likewise **swimming in Ganga Canal** passing through the Roorkee town and **visiting Solani aqueduct** is also **strictly prohibited**.

SO 1-10.3. Students desiring to enroll with the Hobbies Club must apply on the prescribed form available in the office of the Hobbies Club. A student may opt for only one activity of the Hobbies Club.

SO 1-10.4. Instructions issued by the Chief Advisors of the Sports Association, Hobbies Club and Cultural Society must be strictly followed.

SO 1-10.5. The Chief Advisor is authorized to deal with any complaints by or against any student member of the Sport Association, Hobbies Club and Cultural Society.

## **HEALTH**

SO 1-11.1. Cases of illness must be immediately reported to the Institute Medical Superintendent whose advice must be followed. If so advised, the student who is ill, must move to the hospital or the segregation ward.

SO 1-11.2. All students requiring medical attention are expected to attend the Institute Hospital during the prescribed hours. Emergency cases will be attended to in the hospital at all hours.

SO 1-11.3. If a student is too ill to attend the Hospital, he should notify his illness to the Chief Warden/Warden or in an emergency, to the Chief Medical Officer of the Institute. Arrangements will be made for shifting him/her to the hospital or for medical attendance in his/her Bhawan by the Chief Warden.

SO 1-11.4. No private doctor should be consulted by a student on his/her own initiative. If there is a genuine need for consulting an outside doctor, the matter should be reported to the Warden / Chief Warden who will take further action in consultation with the Chief Medical Officer of the Institute and the Dean of Students' Welfare.

SO 1-11.5. Students are entitled to medical facilities to the extent available in the Institute Hospital. The Institute for any treatment taken outside will make no reimbursement of the medical expenses to the students.

SO 1-11.6. Students should enroll themselves for a Mediclaim policy as per arrangements made by the Institute, with the Insurance Company as notified by the Institute from time to time.

## CHARACTER CERTIFICATE

SO 1-12.1. The Dean of Students' Welfare only shall issue a character certificate to a student. A student may be issued the same in accordance with the guidelines approved by the Board of Governors from time to time (BOG).

SO 1-12.2. The guidelines for the award of discipline marks and issue of character certificate are as under:-

(i) An Undergraduate student in a session will get 100% of the discipline marks if he has not been fined any marks from the discipline group by any of the officer/authorities competent to do so.

(ii) The award of discipline marks in a session will be based on the records of the discipline of the students during that particular session only. Records of punishments etc. of previous sessions will not count for the award of discipline marks during the session under consideration.

For this purpose a session will be counted from the day next to the end of the spring semester examination to the last day of the spring semester examination of the next year.

(iii) Those fined 50 marks or more or equivalent cash fine or those awarded more severe punishments than this will not be allowed to contest election for any post or be nominated to any post. The equivalence of cash fine will be calculated as per clause SO1.2.10

(iv) Character Certificate with entry 'GOOD' shall be given to all students who have not been fined a total of more than 50 marks or equivalent monetary fine during their entire period of stay for a particular course of study in the Institute.

(v) Students who have been fined between 51 and 100 marks or equivalent monetary fine or have been put on conduct probation during their period of stay for a particular course of study shall be given a certificate with the entry 'SATISFACTORY'.

(vi) A student who has been fined 51 marks or more or equivalent monetary fine or who has been put on conduct probation during the period of his stay for a particular course study in the Institute may, in exceptional circumstances, be awarded a certificate with entry "GOOD" based on the recommendations of a committee consisting of the DOSW and the Proctor. The committee will examine the offence of the student, which led to the punishment, the year in which the offence was committed and the general impression of the Head of the Department/Centre, Chief Warden, Chief Advisors etc. about the student.



(vii) A student who has been fined a total of more than 100 marks or equivalent monetary fine during his stay in the Institute will be given an 'UNSATISFACTORY' character certificate. However, his appeal requesting for a certificate with entry "SATISFACTORY" may be considered by the same committee as given in sub-clause (vi) above and on similar grounds.

(viii) A student who has been rusticated during his stay in the Institute or expelled from the Institute may be issued a character certificate with entry "UNSATISFACTORY" along with details of the period of rustication / expulsion etc.

## **SO 2: PROCEDURE FOR ENQUIRIES AND PUNISHMENTS**

General orders for the conduct of students are contained in the Standing Orders, SO-1, a copy of which is given to each student at the time of admission. Students must also conform to all other regulations, instructions and guidelines issued from time to time and/or prescribed for their studies, conduct and other activities.

SO 2-1. A student shall be guilty of misconduct and breach of discipline if he/she violates any of the provisions of **Section SO: 1** or is guilty of indecorous and/or immoral behaviour or has been involved in any offence under the Indian Penal Code in respect of which an F.I.R or a complaint is filed, allegedly committed either in the Institute Campus or outside.

SO 2-2.

(a) The Dean of Students' Welfare may suspend a student for a maximum period of 15 days if the student in the presence of DOSW/ADOSW/Proctor commits an act of indiscipline, which is detrimental to the maintenance of healthy atmosphere and law and order in the campus.

(b) The Director may suspend a student if in the judgment of the Director, the student has committed a breach of discipline or if in the opinion of the Director, a prima facie case exists against the student, and institute an enquiry by such committee or enquiry officer as the Director may constitute/appoint for the purpose.

Normally a suspended student will have to vacate the Bhawan, and the campus will be placed out of bounds for him. However, the discretion in this regard will rest with the competent authority or the Officer or the competent person in the event of powers being delegated under Clauses SO 2-3 and SO 2-4.

SO 2-3. For a breach of discipline committed by a student or a group of students, the Director or the Head of Department or the Dean/Associate Deans of Students' Welfare or Proctor or Chief Warden or the Chief Advisors of various recognized students activities may award the following punishments simultaneously on the student(s) subject to the

provision of the clauses SO 2-4 & SO 2-7 or regulations for the academic programmes in force from time to time.

(a) Warning or imposition of suspended fine and warning. (A suspended fine becomes operative if the concerned student is found guilty of another act of indiscipline during the remaining period of that academic session)i.e. July to June next

(b) Imposition of monetary fine.

(c) Deduction of marks from proficiency group of marks under the head of discipline.

(d) Imposition of a monetary or/and marks fine and putting on conduct probation for the rest of the stay in the Institute. (refer further to clause SO 2.8 for the implication of conduct probation.)

(d) Expulsion from the hostel.

(e) Rustication from the Institute for a specified period.

(f) Expulsion from the Institute.

SO 2-4. The competent authorities/officers to award the various punishments specified in SO 2-3 (a to g) are as follows:

**Punishments**

Under SO2-3

(a), (b), (c),(d) & (e)

**Competent Authority**

The Director or the Head of Department or the Dean of Students' Welfare or the Associate Dean of Students' Welfare or the Proctor or The Chief Advisors of various recognized student activities, as the case may be. However, the powers of Associate Dean of Students' Welfare, Proctor, Chief Advisors of various recognized students activities and Chief Wardens shall be limited to warning and/or imposing a marks fine up to 50 marks or its monetary equivalent (as per SO 1-2.10)

(f) & (g)

The Director

The Director may delegate any of the powers with regard to the imposition of any punishment specified in clause SO 2-3 to any competent person in service with the Institute.

When the punishment is awarded to a student under clause SO 2-3(f) or (g), the matter shall be reported to the Executive Committee of the Senate/the Senate and the Board of Governors (BOG) of the Institute at its meeting immediately following the award of punishment.

SO 2-5. A student who has been expelled from the Institute under regulation SO 2-3 but desires to continue his studies in some other college/Institute, may apply to the Director for necessary permission who may allow the student to continue his studies in any other college/Institute.

SO 2-6.

(a) If a student commits a breach of discipline under regulation SO2-1 at any time after he has appeared in Institute Examination, the matter shall be reported to the Director and/or the Standing Committee of the Senate for unfair means and plagiarism as prescribed in the regulations for suitable action. The Director may thereupon award any suitable punishment subject to provisions of SO 2-7 and /or any other regulation dealing with such cases. He may further order the cancellation of his/her examination.

(b) If an ex-student commits a breach of discipline as defined in SO2-1 within the Institute campus, the matter shall be reported to the Director for necessary action. The Director may, after due investigation either on his own or by a committee, report the matter to the BOG for suitable action including withdrawal of the degree awarded to the student.

SO 2-7.

(a) Before awarding the punishment under clauses SO 2-3 (a), (b), (c), (d) and (e), the student may be called by the concerned officer/officers/committee and given an opportunity to explain his/her conduct.

(b) Before awarding a punishment under clause SO2-3 (f) or (g), the concerned Dean shall issue a memorandum containing the substance of the charge and imputation of misconduct against the student(s) concerned, requiring the student(s) to submit his/their statement of defense within a specified period. On receipt of the reply, an Enquiry Officer/Committee shall be appointed by the Director to enquire into the Charges that are not admitted by the Student(s). The Enquiry Officer/Convenor of the Enquiry will issue a notice to the concerned student(s) specifying the date on which the students will have to appear before the Enquiry Officer/Committee in person, to answer to the charges.

The committee/enquiry officer will, after examining the charged student(s) and such other person(s) whose testimony will have a bearing on the incident, submit its report fixing responsibility in the event of the charges being established, to the Director.

The Director or the competent authority or such officer/person to whom the powers have been delegated shall consider the report and the proposed punishment, if any, by the Committee/Enquiry Officer and issue a show cause notice to the student(s) concerned as to why the proposed punishment be not awarded to the student(s). The student(s) concerned will be required to give the reply within a specified period. The Director after considering the reply shall pass such order of punishment as he deems fit.

SO 2-8. A student, who has been awarded the punishment under clause SO 2-3 (d), and is found guilty of another act of indiscipline during the remaining period of his/her stay in the Institute, shall be liable to be punished under clause SO2-3 (f) or SO2-3(g) depending on the seriousness of the misconduct/act of indiscipline as decided by the Director.

SO 2-9. In all cases where a punishment has been imposed on a student, a letter shall be sent to the parents/guardian of the student concerned informing them about the same.

SO 2-10. If a student is found to be a drug-addict, and, if the Institute feels that he can not be corrected of this menace while at the Institute campus(es), the guardian/parents of the student will be directed to withdraw the student from the Institute and get him treated for the drug addiction at some reputed Hospital/Centre. The student will be readmitted only after a certificate from the Hospital/Centre is produced stating that the student has been cured of drug addiction. In case, the guardian/parents of the student, having been directed as above, do not withdraw the student from the Institute, then the student will be rusticated and his enrolment will be suspended for a specific period, as the Institute deems necessary, and will be re-admitted only after the certificate as stated above is submitted.

SO 2-11. The cases of unfair means and plagiarism shall be governed by the appropriate regulations of a particular academic performance. General instructions for penal action for use of unfair means and plagiarism shall be notified to the students and the faculty by the concerned Deans, viz. Dean, UG Studies and Dean, PG Studies & Research.

#### SO 2.12 Terminations of Enrolment

The termination of enrolment of a student due to absence from classes and/or on academic grounds shall be done as per the regulations in force from time to time, for a particular academic programme.

#### SO 2.13 Summary Cancellation of Registration (Enrolment).

The Director may summarily cancel the registration or refuse permission of registration (enrolment) of any student or group/batch/class of students who indulge(s) in acts of indiscipline, misconduct, violation of the rules and regulations of the Institute, physical assault on any teacher or officer, or an employee or a student or a group of students of the Institute, illegal strike, absenting from class(es) without permission or without assigning any reason, or in case the Director is satisfied that their continuance in the Institute would be detrimental to the interest of the Institute or the Nation.

SO 2-14. In all matters not expressly provided for herein, the Director may take such action as he thinks fit and his decision shall be final. However, all such action(s) shall be reported to the Senate and the BOG at the next meeting immediately following such action(s).