

First BOARD OF STUDIES MEETING

28th August, 2017

Department of Chemistry and Chemical Sciences
School of Physical and Material Sciences



Minutes of the Meeting

CENTRAL UNIVERSITY OF HIMACHAL PRADESH

[Established under the Central Universities Act 2009]

Dharamshala, District Kangra - 176215 (HP)

www.cuhimachal.ac.in



Agenda Index

| Agenda Item No. | Items | Annexure/Page No. |
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| | Welcome of all the members by the Chairman | |
| | Introduction of members | |
| CCS-BoS-1/17-1 | Rules of Business to Conduct Meeting of BoS | Annexure-I |
| CCS-BoS-1/17-2 | Approval of the minutes of the CDC meeting and Courses suggested by the CDC members which are to be offered at PG Level in the Department of Chemistry and Chemical Sciences | Annexure-II |
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| CCS-BoS-1/17-4 | Any other item with the permission of the Chair | |


Secretary
BoS

Chair

Member

(9)

The first Meeting of Board of Studies (BoS) of the Department of Chemistry and Chemical Sciences, SoPMS was held on 28th August, 2017 at TAB Shahpur. Please find below the Minutes against each Agenda items:-

Agenda Item No. - CCS-BoS-1/17-1: Rules for Business for the conduct of the meeting of Board of Studies:

For the conduct of the meeting of Board of Studies the Executive Council of the University has approved Regulation No. 4. The Regulation given in Annexure-I is placed before the BoS for approval.

Decision:

All members agreed and approved it.

Agenda Item No. - CCS-BoS-1/17-2: Approval of Courses to be offered at PG Level in the Department of Chemistry and Chemical Sciences as Suggested by the Curricular Development Committee

To decide about the courses to be offered to the students of M.Sc. Chemistry as per the guidelines of UGC and Choice Based Credit System, a curricular Committee was constituted. The Committee held its meeting on 15th May, 2017. The details of the courses suggested by Curricular Development Committee Meeting have been placed before the members of the board for their approval.

The list of courses, respective course code, credits, detail syllabus and level is attached as Annexure II.

Decision:

All members agreed and approved it.

Agenda Item No. - CCS-BoS-1/17-3: Approval of the Expert's List for the Department of Chemistry and Chemical Sciences. The Expert's list is given in Annexure-III.

Decision:

All members agreed and approved it.

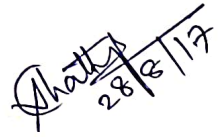
Agenda Item No. - CCS-BoS-1/17-4: Any Other Item with the Permission of the Chair

Following suggestions have been made by the Subject Experts and Board members:



1. In the 3rd semester students may take courses from other specialization (2 credits). But considering the present infrastructure the existing concept of offering specialization from 3rd semester may retain.
2. Some more books have been suggested.
3. Few "experts" have been incorporated in the Experts member list.

All the Agenda items are approved by the BOS.


28/8/17


Dr. Subhankar Chatterjee
(Member)

- absent -

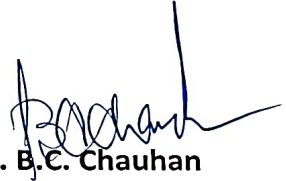
Dr. Vikram Singh
(VC's Nominee)



Dr. Dilbag Singh
(VC's Nominee)


28/8/2017

Prof. Gurmeet Singh
(Subject Expert)

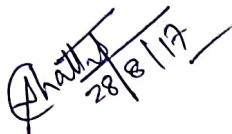


Dr. B.C. Chauhan
(Chairman and Convener)

- (11)
1. In the 3rd semester students may take courses from other specialization (2 credits). But considering the present infrastructure the existing concept of offering specialization from 3rd semester may retain.
 2. Some more books have been suggested.
 3. Few experts have been incorporated in the Experts member list.

One of the Subject expert, Prof. Sashi Kant Sharma, Shimla University was absent due to some urgent official work.

All the Agenda items are approved by the BOS.


28/8/17

Dr. Subhankar Chatterjee
(Member)

- Absent -


Dr. Vikram Singh
(VC's Nominee)



Dr. Dilbag Singh
(VC's Nominee)


28/8/2017

Prof. Gurmeet Singh
(Subject Expert)



Dr. B.C. Chauhan
(Chairman and Convener)

ANNEXURE-II

Proposed structure of courses to be offered in the Department of Chemistry and Chemical Sciences as per new Choice Bases Credit System (CBCS). A student needs to complete 80 credits to get Masters Degree.

CORE COMPULSORY COURSES

| A student has to offer 40 credits from core compulsory courses | | | | |
|--|-------------|--|----------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits* | Pre-requisite/Remarks |
| 1 | CCS 401 | Organic Chemistry I | 4 | |
| 2 | CCS 402 | Inorganic Chemistry I | 4 | |
| 3 | CCS 403 | Physical Chemistry I | 4 | |
| 4 | CCS 404 | Organic Chemistry Lab I | 2 | |
| 5 | CCS 405 | Inorganic Chemistry Lab I | 2 | |
| 6 | CCS 406 | Physical Chemistry Lab I | 2 | |
| 7 | CCS 407 | Organic Chemistry II | 4 | |
| 8 | CCS 408 | Inorganic Chemistry II | 4 | |
| 9 | CCS 409 | Physical Chemistry II | 4 | |
| 10 | CCS 501 | Chemistry General (Interdisciplinary Topics) | 4 | |
| 11 | CCS 556 | Major Project | 6 | |

**60 Lectures are recommended for 4 Credit courses & 30 Lectures are recommended for 2 Credit courses

CORE OPEN COURSES

| A student has to offer 12 credits from core open courses | | | | |
|--|-------------|---|----------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits* | Pre-requisite/Remarks |
| 1. | CCS 410 | Biophysical and Material Chemistry | 2 | |
| 2. | CCS 411 | Statistical error, electrochemical analyses, environmental analyses | 2 | |
| 3. | CCS 412 | Catalysis and green chemistry | 2 | |
| 4. | CCS 413 | Environmental chemistry | 2 | |
| 5. | CCS 414 | Chemistry of Xenobiotics Biodegradation-I | 2 | |
| 6. | | | | |
| 7. | CCS 538 | Biochemistry-I | 2 | |
| 8. | CCS 539 | Biochemistry-II | 4 | |
| 9. | CCS 540 | Advanced stereochemistry | 2 | |
| 10. | CCS 541 | Computer applications in chemistry-I | 4 | |

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| | | | | |
|-----|---------|--|---|--|
| 11. | CCS 542 | Computer applications in chemistry-II | 4 | |
| 12. | CCS 543 | Group theory and its applications in bonding | 2 | |
| 13. | CCS 544 | Structure and properties of solids | 2 | |
| 14. | CCS 545 | Chemistry of elements | 2 | |
| 15. | CCS 546 | Advanced bioinorganic chemistry | 2 | |
| 16. | CCS 547 | Biophysical chemistry | 2 | |
| 17. | CCS 548 | Data analysis & mathematical methods in chemistry | 2 | |
| 18. | CCS 549 | Electronic spectroscopy (absorption and emission) | 2 | |
| 19. | CCS 550 | Advanced statistical thermodynamics and symmetry | 4 | |
| 20. | CCS 551 | Physical methods of analysis and structure determination | 4 | |
| 21. | CCS 552 | Synthetic methodology & strategy | 2 | |
| 22. | CCS 553 | Chemoinformatics | 2 | |
| 23. | CCS 554 | Advance Bioorganic Chemistry | 2 | |
| 24. | CCS 555 | Advance Bio-Analytical techniques | 2 | |
| 25. | CCS 556 | Metabolomics and Biomarker study-I | 2 | |
| 26. | CCS 557 | Organic structure elucidation, characterization by spectrophotometry | 2 | |
| 27. | CCS 558 | Advance characterization techniques (FESEM, HRTEM, AFM, XRD) | 4 | |
| 28. | | Mathematics for Chemists | 2 | |
| 29. | | | | |
| 30. | | | | |
| 31. | | | | |

*60 Lectures are recommended for 4 Credit courses & 30 Lectures are recommended for 2 Credit courses

ELECTIVE SPECIALIZATION

(A student has to offer 16 credits from elective specialisation)
[CHOOSE 16 CREDITS FROM ANY ONE GROUP]

Note: A specialization shall only be offered if minimum 10 students have opted for it.

| Specialization I: ORGANIC CHEMISTRY SPECIALIZATION | | | | |
|---|-------------|--------------------------------------|----------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits* | Pre-requisite/Remarks |
| 1 | CCS 502 | Organic Chemistry Specialization I | 4 | |
| 2 | CCS 503 | Organic Chemistry Specialization II | 4 | |
| 3 | CCS 504 | Organic Chemistry Specialization III | 4 | |
| 4. | CCS 505 | Organic Chemistry Specialization IV | 4 | |

Singh

Alhady

Goel

Banerjee

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| | | | | |
|-----|---------|---------------------------------------|---|--|
| 6. | CCS 506 | Organic Chemistry Specialization V | 2 | |
| 7. | CCS 507 | Organic Chemistry Specialization VI | 2 | |
| 8. | CCS 508 | Organic Chemistry Specialization VII | 2 | |
| 9. | CCS 509 | Organic Chemistry Specialization VIII | 2 | |
| 10. | CCS 510 | Advance Organic Chemistry Lab I | 2 | |
| 11. | CCS 511 | Advance Organic Chemistry Lab II | 2 | |
| 12. | CCS 512 | Advance Organic Chemistry Lab III | 2 | |
| | CCS 513 | Advance Organic Chemistry Lab IV | 2 | |

| Specialization II: INORGANIC CHEMISTRY SPECIALIZATION | | | | |
|---|-------------|---|---------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits | Pre-requisite/Remarks |
| 1 | CCS 514 | Inorganic Chemistry Specialization I | 4 | |
| 2 | CCS 515 | Inorganic Chemistry Specialization II | 4 | |
| 3 | CCS 516 | Inorganic Chemistry Specialization III | 4 | |
| 4. | CCS 517 | Inorganic Chemistry Specialization IV | 4 | |
| 5. | CCS 518 | Inorganic Chemistry Specialization V | 2 | |
| 6. | CCS 519 | Inorganic Chemistry Specialization VI | 2 | |
| 7. | CCS 520 | Inorganic Chemistry Specialization VII | 2 | |
| 8. | CCS 521 | Inorganic Chemistry Specialization VIII | 2 | |
| 9. | CCS 522 | Advance Inorganic Chemistry Lab I | 2 | |
| 10. | CCS 523 | Advance Inorganic Chemistry Lab II | 2 | |
| 11. | CCS 524 | Advance Inorganic Chemistry Lab III | 2 | |
| 12. | CCS 525 | Advance Inorganic Chemistry Lab IV | 2 | |

| Specialization III: PHYSICAL CHEMISTRY SPECIALIZATION | | | | |
|---|-------------|--|---------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits | Pre-requisite/Remarks |
| 1 | CCS 526 | Physical Chemistry Specialization I | 4 | |
| 2 | CCS 527 | Physical Chemistry Specialization II | 4 | |
| 3 | CCS 528 | Physical Chemistry Specialization III | 4 | |
| 4. | CCS 529 | Physical Chemistry Specialization IV | 4 | |
| 5. | CCS 530 | Physical Chemistry Specialization V | 2 | |
| 6. | CCS 531 | Physical Chemistry Specialization VI | 2 | |
| 7. | CCS 532 | Physical Chemistry Specialization VII | 2 | |
| 8. | CCS 533 | Physical Chemistry Specialization VIII | 2 | |
| 9. | CCS 534 | Advance Physical Chemistry Lab I | 2 | |
| 10. | CCS 535 | Advance Physical Chemistry Lab II | 2 | |
| 11. | CCS 536 | Advance Physical Chemistry Lab III | 2 | |
| 12. | CCS 537 | Advance Physical Chemistry Lab IV | 2 | |

*60 Lectures are recommended for 4 Credit courses & 30 Lectures are recommended for 2 Credit courses

Sharma

Sharma

Sharma

Sharma

ELECTIVE OPEN COURSES

[For the students of the Department and students of other departments]

| A students can offer 4 credits from this list of courses | | | | |
|--|-------------|--|---------|-----------------------|
| Sr. No. | Course Code | Course Name | Credits | Pre-requisite/Remarks |
| 1. | CCS 415 | Green Chemistry and its application | 2 | |
| 2. | CCS 416 | Alchemy to modern Chemistry | 2 | |
| 3. | CCS 417 | Biosafety issues & Research ethics | 2 | |
| 4. | CCS 418 | Chemical data analysis | 2 | |
| 5. | CCS 559 | Advance Analytical techniques | 2 | |
| 6. | CCS 560 | Computational Chemistry | 2 | |
| 7. | CCS 561 | Food Chemistry | 2 | |
| 8. | CCS 562 | Clinical Chemistry | 2 | |
| 9. | CCS 563 | Chemistry of Organic materials | 2 | |
| 10. | CCS 564 | Assymatric organic synthesis/catalysis | 2 | |
| 11. | | | | |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
| 15. | | | | |

M.Phil & Ph.D. Courses:

| Sr. No. | Course Code | Course Name | Credits | Pre-requisite/Remarks |
|---------|-------------|---|---------|-----------------------|
| 1. | CCS 599 | Dissertation (M.Phil.) | 20 | |
| 2. | | | | |
| 3. | CCS 601 | Chemistry of Xenobiotics Biodegradation-II | 6 | |
| 4. | CCS 602 | Metabolomics and Biomarker study-II | 6 | |
| 5. | CCS 603 | Analytical Techniques in Metabolomics research | 6 | |
| 6. | CCS 604 | Microbial Metabolism for pollutant abatement-biochemical pathway analysis | 6 | |
| 7. | CCS 699 | Thesis (Ph.D.) | 60 | |






Name of the Topics for the course proposed above:-

[Faculties can modify the content as per their convenience and requirement]

ORGANIC CHEMISTRY:**Bonding in Organic Compounds****Stereochemistry and Conformational Analyses****Organic Reaction Mechanism****Pericyclic Reactions****Heterocyclic Chemistry****Chemistry of Natural Products-I****Advanced Organic Syntheses-I****Advanced Organic Syntheses-II****Chemistry of natural Products-II****Mass spectrometry****Nuclear Magnetic Resonance (NMR) Spectroscopy****Techniques of Chemical Separation****Green Chemistry****Organometallic Chemistry of Transitional Elements****Synthetic Methodology II****Advanced Pericyclic Reactions****Dynamic Aspects of Stereochemistry****Advance Heterocyclic Chemistry****Organometallic Reagents in organic syntheses and Structure Determination of Organic Compounds**

Akshay
28/8/12

Devi

Bohu

Ryb

Oxidation and Reduction of Functional Groups

Photo Organic Chemistry and Free Radical Reactions

Advance Spectroscopy

Chemistry of Medicinally Important Molecules

Synthetic methodology and strategy of few compounds

INORGANIC CHEMISTRY

Aspects of Chemical Bonding

Theory of Coordination Chemistry

Chemistry of d- and f- Block Elements (Comparative Study)

Organometallic Chemisty

Molecular Clusters

Bioinorganic Chemistry

Group theory and its Applications in Spectroscopy

Advanced Organometallic Chemistry

Nuclear Chemistry

NMR, ORD/CD

EPR, NQR, Mossbauer

I.R., Raman, Mass, PES, ESCA

Analytical techniques: Isolation, Characterization and Structure Determination

Inorganic Analyses

Inorganic Reaction Mechanism

Magnetochemistry

Solid state chemistry and X-ray crystallography

Inorganic Photochemistry

Shetty

Shetty

Shetty

Shetty

Chemistry of Complex Equilibria

Synthetic Methodology for Transition and Non-transition Metal Compounds

Inorganic substitution reactions Mechanism

Chemical Application of Group Theory

Principle of symmetry in Chemistry

Catalysis

Inorganic Polymers

PHYSICAL CHEMISTRY

Thermodynamics

Surface Chemistry and dielectric Behaviour

Molecular spectroscopy, structure and properties

Quantum Mechanics

Atomic structure and Spectroscopy

Chemical Kinetics and Reaction Dynamics

Advanced Quantum Mechanics-I

Advanced Quantum Mechanics-II

Perturbation Theory:

Statistical Mechanics-I

Group Theory-Introduction

Photochemistry

Electrochemistry

Group Theory-Applications

Solid State Chemistry

Polymers

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Advanced Quantum Mechanics-III

Statistical Mechanics-II

Non-Equilibrium Thermodynamics and Quantum Statistics

Principles & Basic Instrumentation of NMR/ESR/NQR/Mossbauer Spectra

Applications of NMR/ESR/Mossbauer Spectra

Introduction to 2D NMR: NOESY, COSY, HETCOR, HOMCOR, INADEQUATE, INDOR, INEPT for simple compounds and problems.

Advance Molecular Spectroscopy-I

UV-VIS Spectroscopy:

IR Spectroscopy:

Advance Molecular Spectroscopy-II

CHEMISTRY GENERAL (INTERDISCIPLINARY TOPICS)

Supramolecular Chemistry

Nanoscience and Technology

Medicinal Chemistry

① Ananth
28/8/17

SP

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Any Other Course Suggested by BOS members,
will discuss in Next Meeting, for Specialized Papers.

Sh Chatterjee
28/8/12

SEMESTER WISE COURSE STRUCTURE-DEPARTMENT OF CHEMISTRY-CUHP

| Semester | Total Credits | Core Compulsory | Credits | Credits | Core Open | Credits |
|----------|---------------|--|---------|----------|---------------|----------|
| I | 16 | CCS 401 - Organic Chemistry I | 4 | [Shaded] | [Shaded] | [Shaded] |
| | | CCS 402 - Inorganic Chemistry I | 4 | | | |
| | | CCS 403 - Physical Chemistry I | 4 | | | |
| | | CCS 404 - Organic Chemistry Lab I | 2 | | | |
| | | CCS 405 - Inorganic Chemistry Lab I | 2 | | | |
| | | CCS 406 - Physical Chemistry Lab I | 2 | | | |
| II | 14 | CCS 407 - Organic Chemistry II | 4 | 2 | [Shaded] | [Shaded] |
| | | CCS 408 - Inorganic Chemistry II | 4 | | | |
| | | CCS 409 - Physical Chemistry II | 4 | | | |
| | | Chemistry General-(Interdisciplinary topics) | 4 | | | |
| | | Major Project | 6 | | | |
| III | 8 | Elective specialization | | IV | 8 | [Shaded] |
| | | Advance Organic/Inorganic/Physical Chemistry Lab | 2 | | | |
| Semester | Total Credits | Computer applications in chemistry-I | 4 | Semester | Total Credits | Credits |
| | | Computer applications in chemistry-II | 4 | | | |
| I | 4 | Human Making & Skill Development courses | 2 | Semester | Credits | Credits |
| | | HM -I | 2 | | | |
| II | 4 | SD -I | 2 | IV | 2 | [Shaded] |
| | | HM -II | 2 | | | |
| | | SD -II | 2 | | | |
| | | Advance Organic/Inorganic/Physical Chemistry Lab | 2 | | | 2 |
| | | Elective Open | | | | |

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SEMESTER WISE COURSE STRUCTURE-DEPARTMENT OF CHEMISTRY-CUHP

| SEMESTER | SUBJECT | CREDITS | TOTAL CREDITS |
|----------------------|-------------------------|---------|---------------|
| I | CORE COMPULSORY | 16 | 20 |
| | CORE OPEN | 00 | |
| | ELECTIVE SPECIALIZATION | 00 | |
| | HM+SD | 04 | |
| | ELECTIVE OPEN | 00 | |
| II | CORE COMPULSORY | 14 | 20 |
| | CORE OPEN | 02 | |
| | ELECTIVE SPECIALIZATION | 00 | |
| | HM+SD | 04 | |
| | ELECTIVE OPEN | 00 | |
| III | CORE COMPULSORY | 04 | 20 |
| | CORE OPEN | 06 | |
| | ELECTIVE SPECIALIZATION | 08 | |
| | HM+SD | 00 | |
| | ELECTIVE OPEN | 02 | |
| IV | CORE COMPULSORY | 06 | 20 |
| | CORE OPEN | 04 | |
| | ELECTIVE SPECIALIZATION | 08 | |
| | HM+SD | 00 | |
| | ELECTIVE OPEN | 02 | |
| TOTAL CREDITS | | | 80 |

Dr. S. K. Singh
28/5/20

Dr. S. K. Singh

Dr. S. K. Singh

Inorganic Chemistry Books

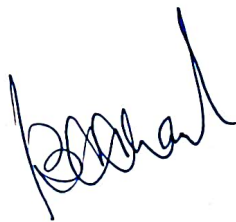
1. Advanced Inorganic Chemistry- F. A. Cotton & G. Wilkinson, John Wiley
2. Inorganic Chemistry- J.E. Huheey, E.A. Keiter & R. L. Keiter, Harper & Row
3. Chemistry of Elements- N. N. Greenwood & A. Earnshaw
4. Concept and Models of Inorganic Chemistry- Douglass, McDaniel & Alexander
5. Coordination Chemistry- S. F. A. Kettle
6. Theoretical Approach to Inorganic Chemistry- A. F. Williams
7. Inorganic Chemistry- D. F. Shriver, P. W. Atkins & C. H. Langford
8. Chemical Applications of Group theory- F. A. Cotton
9. Molecular Symmetry & Group Theory- R. L. Carter
10. Introduction to Ligand Fields- B. N. Figgis
11. Introduction to Ligand Field Theory- C. J. Ballhausen
12. Valence- C. A. Coulson
13. Chemical Crystallography- L. W. Bunn
14. Solid State Chemistry- C. N. R. Rao
15. Ionic Crystal Lattice & Nonstoichiometry- N. N. Greenwood
16. Inorganic Reaction Mechanism- M. L. Tobe
17. Mechanism of Inorganic Reactions- Katakis & Gordon
18. Kinetics and Mechanism of Reactions of Trans. Metal Complexes- R. G. Wilkins
19. Determination and use of Stability Constants- A. E. Martell & R. J. Motekaitis
20. An Introduction to Bioinorganic Chemistry- D. R. Williams
21. Inorganic Chemistry of Biological Processes- M. N. Hughes
22. Bioinorganic Chemistry- E. I. Ochiai
23. Bioinorganic Chemistry- R. W. Hay
24. Elements of Bioinorganic Chemistry- G. N. Mukherjee & A. Das
25. Organometallic Chemistry of Transition Metals- R.H. Cabtree
26. Organometallic Chemistry- R. C. Mehrotra & A. Singh



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27. Nuclear and Radio Chemistry- Friedlander, Kennedy & Miller
28. Radioactivity Applied to Chemistry- A. C. Wahl & N. A. Bonner
29. Magnetochemistry- Selwood
30. Introduction to Magnetochemistry- Earnshaw
31. Environmental Analysis- S. M. Khopkar
32. Physical Methods in Inorganic Chemistry- R. S. Drago
33. Instrumental Methods in Chemical Analysis- Willard, Meritt and Dean
34. Instrumental Methods in Chemical Analysis- G. W. Ewing
35. Vogel's Text Book of Quantitative Chemical Analysis G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denny
36. Advanced Experiments in Inorganic Chemistry- G. N. Mukherjee (U. N. Dhur)
37. Macro and Semi-micro Qualitative Inorganic Analysis- A. I. Vogel
38. Semi-Micro Qualitative Inorganic Analysis- G. N. Mukherjee (C.U. Press)
39. Quantitative Chemical Analysis- Kolthoff, Sandel, Meehan & Bruckenstein
40. Synthesis and Characterizations of inorganic Compounds- W. L. Jolly
41. Group Theory : Bishop (D.M)







Organic Chemistry Books

1. Organic Chemistry- I. L. Finar, Vols. 1 & 2, ELBS
2. Adv. Organic Chemistry: Reaction, Mechanism- Jerry March
3. Adv. Organic Chemistry-F. A. Carey & R. J. Sundberg
4. Organic Chemistry (3rd. edn) -Hendrikson, Cram, Hammond
5. Organic Chemistry- Clayden, Greeves, Warren & Wothers
6. Organic Chemistry- R. T. Morrison & R. N. Boyd
7. Organic Reaction Mechanics- A. Gallego, M. Gomer & M. A. Sierra
8. A Guide Book to Mechanism of Organic Reactions-Peter Sykes
9. Reaction Mechanism in Organic Chemistry- S. M. Mukherjee & S. P. Singh
10. Structure and Mechanism in Organic Chemistry- C. K. Ingold
11. Physical Organic Chemistry-J. Hiine
12. Physical Organic Chemistry-N. S. Isaacs
13. Orbital Symmetry and Organic Reactions-T. L. Gilchrist & R. C. Storr
14. Some Modern Methods in Organic Synthesis-W. Carruthers
15. Principles of Organic Synthesis-Norman, Coxon & Blakie
16. Current Trends in Organic Synthesis-C.Scolastico & F. Nicotra
17. Frontier Orbitals and Organic Chemical Reactions-I. Fleming
18. Pericyclic Reactions- Gill & Willis
19. Pericyclic Reactions- S. M. Mukherjee
20. Stereochemistry-E. Eliel & S. H. Wilen
21. Stereochemistry- D. Nasipuri
- 21a. Stereochemistry of Organic Compounds- P. Kalsi
22. NMR in Chemistry-A Multinuclear approach—W. Kemp
23. Application of N. M. R. Spectroscopy in Organic ChemistryL- L. M. Jackman M.
24. Interpretation of ^{13}C -NMR Spectra- F. W. Werli & T. W. Wirthlin
25. Mass Spectrometry-Organic Applications-K. Biieman

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26. Free Radicals in Organic Chemistry—Fossey, Lepost & Sorbs
27. Elements of Organic Photochemistry-D. O. Cowan & K. L. Drisco
28. Application of Organotransition Metal in Organic Synthesis-S.G. Davies
29. Comprehensive Heterocyclic Chemistry- A. R. Katritzky, & C. W. Rees (eds)
30. Heterocyclic Chemistry-J. A. Joule & K. Mills
31. Natural Product-A. Pelter
32. Natural Products: Chemistry & Biological Significance Mann, Davidson, Hobbs, Banthrope, Harbome & Longman
33. An Introduction to Medicinal Chemistry-(3rd.edn) G. L. Patrick
34. Fundamentals of Medicinal Chemistry-G. Thomas
35. Supramolecular Chemistry: Concepts & Perspective- J. M. Lehn
36. Experimental Organic Chemistry: Principles & Practice-L. M. Harwood & C. J. Roodey
37. Experiments and Techniques in organic Chemistry-Pasto, Johnson & Miller
38. Spectrometric Identification of Organic Compounds-(6th. edn)-Silverstein & Webster
39. An Introduction to Experimental Organic Chemistry- Robert, Gilbert, Rodewaid & Wingrove
40. Systematic Qualitative Organic Analysis-H. Middleton
41. Hand Book of Organic Analysis- H. T. Clarke
42. Text Book of Practical Organic Chemistry-A.I. Vogel

42. Asymmetry & Asymmetric character : G.M. Badger







Physical Chemistry Books

1. Physical Chemistry: A Molecular Approach-D. A. McQuarrie & J. D. Simon
2. Physical Chemistry- R. S. Berry, S. A. Rice & J. Ross
3. Introduction to Quantum mechanics- L. Pauling & E. B. Wilson
4. Quantum Mechanics J. L. Powel & B. Crasemann
5. Elementary Quantum Chemistry-F. L. Pilar
6. Quantum Chemistry- I. N. Levine
7. Chemical Kinetics-K. J. Laidler
8. Fundamentals of Chemical Kinetics-S. W. Benson
9. Theoretical Chemistry- S. Glasstone
10. The Principles of Chemical Equilibrium-K. Denbigh
11. The Physical Chemistry of Surfaces- N. K. Adams
12. Physical Chemistry of Surfaces- A. W. Adamson
13. Introduction to Molecular Spectroscopy-G. M. Barrow
14. Fundamentals of Molecular Spectroscopy- C.W. Banwell
15. Introduction to Quantum Mechanics- D. J. Griffith
16. Group Theory and Chemistry—D. M. Bishop
17. Thermodynamics and an Introduction to Thermostatistics- H. B. Callen
18. Coulson's Valence- R. McWeeny
19. Modern Electrochemistry-J.O'M. Bockris & A. K. N. Reddy
20. Principles of Physical Biochemistry- K. E. van Holde, C. Johnson & P. S. Ho
21. Polymer chemistry-P. J. Flory
22. Microwave Spectroscopy-C. H. Townes & A. L. Schawlow
23. Symmetry and Spectroscopy- D. C. Harris & M. d. Bertolucci
24. Solid State Physics- A. J. Dekker
25. Introduction to Solid State Physics- C. Kittel
26. Chemical Kinetics and Dynamics- J. I. Seinfeld, J. S. Francesco & W. L. Hase



Physical Chemistry Books

1. Physical Chemistry: A Molecular Approach-D. A. McQuarrie & J. D. Simon
2. Physical Chemistry- R. S. Berry, S. A. Rice & J. Ross
3. Introduction to Quantum mechanics- L. Pauling & E. B. Wilson
4. Quantum Mechanics J. L. Powel & B. Crasemann
5. Elementary Quantum Chemistry-F. L. Pilar
6. Quantum Chemistry- I. N. Levine
7. Chemical Kinetics-K. J. Laidler
8. Fundamentals of Chemical Kinetics-S. W. Benson
9. Theoretical Chemistry- S. Glasstone
10. The Principles of Chemical Equilibrium-K. Denbigh
11. The Physical Chemistry of Surfaces- N. K. Adams
12. Physical Chemistry of Surfaces- A. W. Adamson
13. Introduction to Molecular Spectroscopy-G. M. Barrow
14. Fundamentals of Molecular Spectroscopy- C.W. Banwell
15. Introduction to Quantum Mechanics- D. J. Griffith
16. Group Theory and Chemistry—D. M. Bishop
17. Thermodynamics and an Introduction to Thermostatistics- H. B. Callen
18. Coulson's Valence- R. McWeeny
19. Modern Electrochemistry-J.O'M. Bockris & A. K. N. Reddy
20. Principles of Physical Biochemistry- K. E. van Holde, C. Johnson & P. S. Ho
21. Polymer chemistry-P. J. Flory
22. Microwave Spectroscopy-C. H. Townes & A. L. Schawlow
23. Symmetry and Spectroscopy- D. C. Harris & M. d. Bertolucci
24. Solid State Physics- A. J. Dekker
25. Introduction to Solid State Physics- C. Kittel
26. Chemical Kinetics and Dynamics- J. I. Seinfeld, J. S. Francesco & W. L. Hase

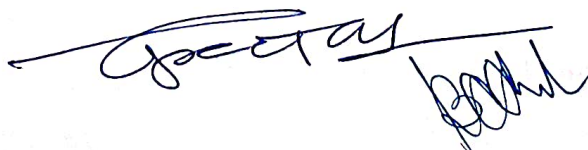


27. Text Book of Physical Chemistry- S. Glasstone
28. Statistical Mechanics- D. A. Mcquarrie
29. Statistical Mechanics-B. B. Laud
30. Statistical Mechanics- K. Huang
31. Practical Physical Chemistry- A. M. James & F. F. Prichard
32. Findlay's Practical Physical Chemistry- B. P. Levit
33. Experimental Physical Chemistry- Shoemaker & Garland
34. Introduction to Magnetic Resonance-A. Carrington & A. D. McLachlan
35. NMR, NQR, EPR and Mossbauer Spectro. in Inorganic Chemistry- R. V. Parish
36. Macromolecules: Structure and Function- F. Wold, Prentice-Hall
37. Principles of Biochemistry- A.L. Lehninger
38. Programming with FORTRAN - S. Lepchutz & A. Poe (Schaum Series)
39. Computer Programming in FORTRAN 77- V. Rajaraman
40. Computational Chemistry- A. C. Norris, John Wiley
41. Computational Chemistry- A. Konar
42. Computers in Chemistry – K. V. Raman, TMH
43. Electricity and Magnetism (Vol I) – J.H. Fewkes & J. Yarwood, OUP
44. Atomic Physics (Vol II) – J. Yarwood , OUP
45. Biochemistry – Voet and Voet
45. Kinetics & Mechanism. by Frost &
46. Statistical Mechanics : T.H. Hill ,
47. N.M.R. : Raymond, C. Chang,

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Suggested Readings

1. Rajaraman V., Computer Programming in FORTRAN 90 and 95, 4th edition, Pubs:Prentice Hall, India (2004).
2. Scheid F., Numerical Analysis: Schaum's Series, Pubs: McGraw Hill, Singapore (1988)



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