STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : **Chemistry**

Name/s of the Faculty : ***New Faculty* & Dr K. Vidya***

Course Title : **Synthetic Organic Chemistry and Natural Products**

Course Code : **19CH/PC/SO44**

Shift **II**

Week & No. of hours	**Units & Topics**	**Teaching Methodology**	**Text & References**	**Method of Evaluation**
Nov 22 – 23, 2023 (Day Order 1 & 2) 1 hour	**Unit 1** **Strategies for Synthesis** 1. 1 Definitions, Synthonsand Synthetic Equivalents,	Lecture & Discussion	Warren,Stuart. S. Organic Synthesis- the Disconnection Approach. New York:Wiley, 2013. Jonathan,Clayden,Nick Greeves, Stuart Warren.Organic Chemistry.New York: Oxford University Press, 2012. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007.	Short answer test
*1 hour	Unit 4 Alkaloids, Terpenoids and Steroids 4.1 Classification -	Lecture & Discussion	Norman, R.O.C and J.M.Coxon.Principles of Organic Synthesis.New York: CRC Press, 2012. Chatwal,Gurdeep R. Organic Chemistry of Natural Products Volume I, Mumbai: Himalaya Publishing House,2010. Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000.	Worksheet
Nov 24-30, 2023 (Day Order 1	1.1 Guidelines, Functional Group Interconversion and Planning for Synthesis of Organic Compounds	Lecture & Discussion	Warren,Stuart. S. Organic Synthesis- the Disconnection Approach. New York:Wiley, 2013. Jonathan,Clayden,Nick	**Worksheet**

to 6) 3 hours *3 hours	4.1 General Methods of Structure Determinationof Alkaloids Contd General Methods of Structure Determination of Terpenoids	Lecture & Discussion	Greeves, Stuart Warren.Organic Chemistry.New York: Oxford University Press, 2012. Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Worksheet
Dec 1-7, 2023 (Day Order 1 to 6) 3 hours *3 hours	1.2 Disconnection Approach – One Group C-X, Two Group C-X, One Group C-C and Two Group C-C Disconnections 4.1 Contd General Methods of Structure Determination of Steroids	Lecture & Discussion Lecture & Discussion	Warren,Stuart. S. Organic Synthesis- the Disconnection Approach. New York:Wiley, 2013. Jonathan,Clayden,Nick Greeves, Stuart Warren.Organic Chemistry.New York: Oxford University Press, 2012. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Quiz Worksheet

Dec 8-9, 2023 (Day Order 1, 3) 3 hours *3 hours	1.3 Chemoselectivity, Reversal Polarity (Umpolung) and Ammine Synthesis 1.4 Protection and Deprotection – Alcohols, Carbonyls 4.2 Structural Elucidation of Papaverine and Reserpine (Alkaloids),	Lecture & Discussion Lecture & Discussion	Warren, Stuart. S. Organic Synthesis- the Disconnection Approach. New York:Wiley, 2013. Jonathan,Clayden,Nick Greeves, Stuart Warren.Organic Chemistry.New York: Oxford University Press, 2012. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Short Answer Test
Dec 11-15, 2023 (Day Order 2 to 6) 3 hours *3 hours	1.4 Protection and Deprotection –Carboxylic Acids and Amino Functional Groups 1.5 Retrosynthetic Analysis-Alternate Synthetic Routes. 4.2 Structural Elucidation of Zingiberine and Longifolene (Terpenoids)	Lecture & Discussion Lecture & Discus sion	Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005 Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Quiz Test

Dec 16 – 22, 2023 (Day Order 1 to 6) 3 hours	1.5 Synthesis of Organic Mono and Bifunctional Compounds Via Disconnection Approach	Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007.	**Other Component Test (15 marks)**
*3 hours	4.3 Constitution of Cholesterol – Structure of the Nucleus, Position of the Hydroxyl Group	Lecture & Discussion	Chatwal,Gurdeep R. Organic Chemistry of Natural Products Volume I, Mumbai: Himalaya Publishing House,2010 Finar, I.L. Organic Chemistry-Volume II, London :ELBS, 2000	Quiz
Jan 3 – 6, 2024 (Day Order 1 to 4) 2 hours	1.6 Stereochemical Control of Products-Selective Aldol and Michael Reactions	Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007.	Test
*2 hours	4.3 Contd Double Bond, nature and position of the side-chain, position of the angular methyl Group	Lecture & Discussion	Chatwal,Gurdeep R. Organic Chemistry of Natural Products Volume I, Mumbai: Himalaya Publishing House,2010	**Other Component Test (10)**

Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1) 1 hours	**Unit 2 (14 Hours)** **Novel Reagents in Organic Synthesis** 2.1 Organic Reagents for functional group transformations –	Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006.	Test
Jan 18 -20, 2024 (Day Order 4 to 6) 1 hours *2 hours	**2.1** chiral diboranes (asymmetric synthesis), Unit 5 Heterocyclic Compounds and Natural Pigments 5.1 Nomenclature, synthesis and reactions of imidazole,	Lecture & Discussion Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005	Test Worksheet
Jan 22-29, 2024 (Day Order 1 to 6) 3 hours *3 hours	**2.1** 9-BBN, Osmium tetroxide, Lead Tetraacetate, 2,3-Dichloro-5,6-dicyano-1,4-benzoquinone (DDQ), 5.1 Nomenclature, synthesis and reactions of imidazole, oxazole, thiazole and syndones.	Lecture & Discussion Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005	Quiz Test
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	Iodoxy Benzoic acid (IDX), Perbenzoic Acid,	Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006.	Quiz

2 hours	5.2 Natural Pigments – Classification based on source and structure.	Lecture & Discussion	Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005	**Other Component Test (15 marks)**

Feb 3, 2024 (Day Order 2) and Feb 5- 6, 2024 (Day Order 5 to 6) 2 hours *1 hours	**2.1** N-bromosuccinamide (NBS), Phenylisothiocyanate 5.3 Anthocyanins– Introduction, Isolation,	Lecture & Discussion Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. New York :Springer, 2007. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005	Test Test
Feb 7 – 14, 2024 (Day Order 1 to 6) 3 hours *3 hours	**2.1** N,N'-Dicyclohexylcarbodiimide (DCC) 2.2 Baker's Yeast Determination of Structure of Anthocyanins 5.3 General methods for the synthesis of Anthocyanidins. Structural elucidation ofCyanin (Anthocyanin).	Lecture & Discussion Lecture & Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006.. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005	Worksheet Quiz
Feb 15 – 22, 2024 (Day Order 1 to 6)	**Unit 3 Organometallic Reagents in Organic Synthesis** 3.1 Lithium 5.4 Flavones and Flavonols: Introduction, Classification, Isolation, General Properties, Basic Structure of Flavones and Flavonols,	Lecture & Discussion Lecture & Discussion	Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005 Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Quiz Test

Feb 23 – 24, 2024 (Day Order 1 & 5)	3.1 Lithium: n-Butyl Lithium, Lithium diisopropylamide (LDA), 5.4 General Methods for Determination of the Structure of Flavones.	Lecture & Discussion Lecture & Discussion	Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005 Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Quiz Test
Feb 26 – Mar 1, 2024 (Day Order 2 to 6) And Mar 2, 2024 (Day Order 1)	**3.1** Aluminium: Hydroalumnation, carboalumnation 5.5 Structural Elucidation of Apigenin (Flavones),	Lecture & Discussion Lecture & Discussion	Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India : Narosa, 2005 Finar, I.L. Organic Chemistry-Volume II, London: ELBS, 2000. Bhat,V. Sujata ,Bhimsa A. Nagasampagi, MeenakshiSivaKumar.Chemistry of Natural Products ,India :	Quiz Test

Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) *3 hours	Zinc: Cyclopropanation, Lomordo reagent, 5.5 Structural Elucidation of Apigenin (Flavones), Quercetin (Flavonols) and Daidzein (Isoflavones)	Lectu re& Discussion Lectu re& Discussion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006. Carey ,A.Francis and Richard J.Sundburg. Advanced Organic Chemistry Part B: Reactions and Synthesis. NewYork :Springer, 2007. Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006.	Test Quiz
Mar 18 - 19, 2024 (Day Order 2 to 3) 3 hours *3 hours	3.1 Copper: Gilman reagent, Ullman reaction, Silicon: Alkyl and Vinyl silanes 3.2 Crown Ether Complexes 3.1 Tin: tri-n-Butyl Tin Hydride, Palladium: Suzuki coupling, Heck reaction, Sonagashira coupling	Lectu re and Discu ssion Lectu re and Discu ssion	Sanyal,S.N. Reactions, Rearrangements and Reagents.New Delhi:BharathiBhawan ,2006.	Work sheet Assignment
1 hour *2 hours	Revision and Discussion	Discu ssion		Worksheet

Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule:– November 2023- April 2024

Department : **Chemistry**

Name/s of the Faculty : ***New Faculty***

Course Title : **CORROSION AND ITS PREVENTION**

Course Code : **19CH/PE/CP15**

Shift : **II**

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	Unit 1 Principles of Electrochemistry 1.1 Electrochemistry – Basic principles – Electrode potential,	Lecture and Group Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry. Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi, Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	Work sheet
Nov 24-30, 2023 (Day Order 1 to 6)	Unit 1.1 Helmholtz electrical double layer, Electrochemical cell – Half reactions, Galvanic cell, calculation of the EMF of a cell 1.2 Electrochemical cell representation- EMF Series and its significance. Relation between EMF and Free energy – Determination of EMF of a half cell - Nernst equation and its derivation. 1.3 Calculation of half-cell and cell potential – calculation of equilibrium constant for the cell reaction	Lecture and Group Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry. Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi, Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	Quiz
Dec 1-7, 2023 (Day Order 1 to 6)	1.4 Reference electrodes – Saturated calomel electrode, Glass electrode, standard hydrogen electrode. 1.5 Overvoltage or overpotential – Concentration cell and EMF of concentration cell	Lecture and Group Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry. Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi,	Test

			Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	
Dec 8-9, 2023 (Day Order 1, 3)	Unit 2 Principles and Types of Corrosion 2.1 Introduction – Corrosion Rate Expression	Lecture and Discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Assignment
Dec 11-15, 2023 (Day Order 2 to 6)	2.1 Types of Corrosion – Chemical Corrosion, Electrochemical Corrosion 2.2 Types of Electrochemical Corrosion – Galvanic Corrosion, Concentration Cell Corrosion,	Lecture and Discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Worksheet
Dec 16 – 22, 2023 (Day Order 1 to 6)	2.2 Pitting Corrosion, Stress Corrosion, Inter-granular Corrosion. 2.3 Passivity, Factors influencing corrosion, EMF and Galvanic series. 2.4 Microbially influenced corrosion (MIC) – Electrochemical aspects and general mechanisms.	Lecture and Discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Worksheet
Jan 3 – 6, 2024 (Day Order 1 to 4)	Unit 3 Electrode Kinetics and Polarisation Phenomena 3.1 Electrode – Solution Interface – definition and types of Polarisation.	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1)	3.1 Exchange current density – Polarisation relationships	Lecture and Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry.	Quiz

			Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi, Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	
Jan 18 -20, 2024 (Day Order 4 to 6)	3.1 Exchange current density – Polarisation relationships	Lecture and Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry. Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi, Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	III Component Test
Jan 22-29, 2024 (Day Order 1 to 6)	3.2 Polarisation Techniques – Corrosion Rate Determination. Mixed potentials – concepts and basics. 3.3 Mixed Potential Theory – bimetallic couples, activation and diffusion controlled processes	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Jan 30 – Feb 2, 2024	Unit 4 Methods of Corrosion Control 4.1 Protection against	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New	Worksheet

(Day Order 1 to 4)	corrosion – Material selection and Proper Designing Principles, inhibitors and surface engineering 4.2 Cathodic Protection – Principles and Classification – Sacrificial Anodic Protection		York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	
Feb 3, 2024 (Day Order 2)	4.2 Impressed Current Cathodic Protection.	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Feb 5- 6, 2024 (Day Order 5 to 6)	4.2 Stray Current Corrosion. Anodic Protection	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.3 Passivity – Definition and parameters influencing passivity, design of Corrosion Resistant Alloys	Lecture and Group Discussion	J. O. M.Bockris and A.K. N Reddy, Modern Electrochemistry. Vol. I and II, New York: Plenum Press, 1970. Jain P.C. and Monika Jain, Engineering Chemistry, New Delhi, Dhanpat Rai Publishing Company Pvt. Ltd. 2011.	Quiz

Feb 15 – 22, 2024 (Day Order 1 to 6)	4.4 Coatings – Metallic Coatings – Organic and Polymer Coatings – Phosphating Unit 5 Corrosion Testing	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Feb 23 – 24, 2024 (Day Order 1 & 5)	5.1 NACE test methods – Open-circuit Potential – Time measurements – Cyclic polarization – Tafel plot for aluminium alloys	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Test
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	5.2 Linear polarisation – Potentiostatic steady state experiments – Small Amplitude Cyclic Voltammetry (SACV)	Lecture and Discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Assignment
Mar 2, 2024 (Day Order 1)	5.2 Small Amplitude Cyclic Voltammetry (SACV)	Lecture and Discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Worksheet

Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6) (Day Order 1 to 6)	5.3 Small Amplitude Cyclic Voltammetry (SACV) AC impedance methods – Slow strain rate test.	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Quiz
Mar 18 - 19, 2024 (Day Order 2 to 3)	Discussion of Questions	Powerpoint and discussion	M. G. Fontana, Corrosion Engineering, New York, McGraw-Hill Book Company, 1987. Denny A Jones, Principles and Prevention of Corrosion, New Jersey, Prentice Hall, 1996.	Quiz
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : Chemistry

Name/s of the Faculty : Dr. R. Sripriya

Course Title : NANOCHEMISTRY

Course Code : 19CH/PE/NC15

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	**Unit 1 Introduction to Nanoscience** 1.1 Concepts of Nanoscience and Nanotechnology, Nanosized effects, Surface to Volume ratio, Quantum structures, Quantum confinement effects 1.2 Classification of Nanosystems based on origin (natural and artificial), dimensionality and structural configuration (Carbon based, Metal based, Dendrimers, Composites)	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Group Discussion
Nov 24-30, 2023 (Day Order 1 to 6)	1.3 Special nanomaterials: Carbon Nanotubes, Fullerenes, Graphene and Self Assembled monolayers (SAMs), Nanoclusters	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Assignment

Dec 1-7, 2023 (Day Order 1 to 6)	1.3 Special nanomaterials: Carbon Nanotubes, Fullerenes, Graphene and Self Assembled monolayers (SAMs), Nanoclusters	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Assignment
Dec 8-9, 2023 (Day Order 1, 3)	1.4 Applications of Nanomaterials in electronics, Nanomechanics and nanobots, catalysis (gold nanoparticles), Quantum dot devices, Medicine and Drug delivery	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry. New York: John Wiley & Sons, 2001	Short test
Dec 11-15, 2023 (Day Order 2 to 6)	1.5 Nanowires and Nanomachines	PowerPoint presentation, Lecture and discussion	Guozhong C. Nanostructures & Nanomaterials: Synthesis, Properties & Applications, London: Imperial College Press,2004	Assignment
Dec 16 – 22, 2023 (Day Order 1 to 6)	**Unit 2 Fabrication of Nanomaterials** 2.1 Techniques for Synthesis of Nanophase Materials – Top-down vs Bottom-up Approach	PowerPoint presentation, Lecture and discussion	Guozhong C. Nanostructures & Nanomaterials: Synthesis, Properties & Applications, London: Imperial College Press,2004	Assignment
Jan 3 – 6, 2024 (Day Order 1 to 4)	2.2 Physical Methods of Synthesis-High energy Ball milling, Arc discharge, Plasma synthesis, Aerosol	PowerPoint presentation, Lecture and discussion	Guozhong C. *Nanostructures & Nanomaterials: Synthesis, Properties & Applications*, London: Imperial College	Group discussion

	synthesis, Physical and Chemical Vapour deposition, Electrodeposition		Press,2004 Ramachandra R., Singh S, *Nanoscience and Nanotechnology- Fundamentals and Frontiers*. New Delhi , Wiley,2013	

Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1)	2.3 Chemical Methods of Synthesis–Chemical reduction , Solvothermal,	PowerPoint presentation, Lecture and discussion	Guozhong C. *Nanostructures & Nanomaterials: Synthesis, Properties & Applications*, London: Imperial College Press,2004 Ramachandra R., Singh S, *Nanoscience and Nanotechnology- Fundamentals and Frontiers*. New Delhi , Wiley,2013	Assignment
Jan 18 -20, 2024 (Day Order 4 to 6)	Hydrothermal, Microemulsion, Sol gel method 2.4 Synthesis and applications of Pure Metal nanoparticles (Gold and Silver) and metal oxide nanoparticles (ZnO, TiO_2)	PowerPoint presentation, Lecture and discussion	Guozhong C. *Nanostructures & Nanomaterials: Synthesis, Properties & Applications*, London: Imperial College Press,2004 Ramachandra R., Singh S, *Nanoscience and Nanotechnology- Fundamentals and Frontiers*. New Delhi , Wiley,2013	Assignment
Jan 22-29, 2024 (Day Order 1 to 6)	2.5 Nanomaterial fabrication techniques- Lithography, Electrospinning	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry. New York: John Wiley & Sons, 2001	Short test
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	**Unit 3** **Nanocomposites** 3.1 Definition of composite materials: Classification based on matrix and reinforcements, Properties and	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry.	Group Discussion

			New York: John Wiley & Sons, 2001	
Feb 3, 2024 (Day Order 2)	Processing of nanocomposites	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry. New York: John Wiley & Sons, 2001	Group Discussion
Feb 5- 6, 2024 (Day Order 5 to 6)	3.2 Types of nanocomposites: polymer-clay nanocomposites,	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Assignment
Feb 7 – 14, 2024 (Day Order 1 to 6)	Conducting nanocomposites, types of nanofiller- metal oxides, layered silicates, nanowires, nanotubes and quantum dots.	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Assignment

Feb 15 – 22, 2024 (Day Order 1 to 6)	3.3 Characterisation of nanocomposites: thermal, mechanical, surface, physical properties-density, viscosity, spectral analysis 3.4 Application of nanocomposites	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Short test
Feb 23 – 24, 2024 (Day Order 1 & 5)	**Unit 4** **Properties and Characterisation Techniques of Nanophase Materials** 4.1 Size Dependent properties of Nanomaterials: Optical properties (Surface Plasmon resonance), mechanical, electrical, magnetic and thermal properties. Kinetic and Thermodynamic Features of Nano materials 4.2 Characterisation techniques* (with reference to nanomaterials): UV-Visible Spectroscopy-Band Gap calculation, X ray diffraction. , Wide angle extended Xray absorption technique	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Group Discussion
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	Electron Microscopy – SEM/TEM, DLS, Defects in Nanomaterials, Co-relation of XRD and TEM	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and	Test

			Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	
Mar 2, 2024 (Day Order 1)	**Unit 5** **Impacts of Nanomaterials** 5.1 Nanomaterials and the Environment – Exposure, Fate, Transport and Transformation	PowerPoint presentation, Lecture and discussion	Rao,C.N.R Muller, Achim, Cheetham,K Anthony, The Chemistry of NanomaterialsSynthesis,Properties and Applications. New York: WileyVCH, 2004. Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007	Test
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.2 Nanomaterials and Biological systems – Toxicity, Exposure and Absorption, Metabolism	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry. New York: John Wiley & Sons, 2001	Group discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	Absorption, Metabolism	PowerPoint presentation, Lecture and discussion	Pradeep T, Nano: The essentials - understanding Nanoscience and Nanotechnology. New Delhi: McGraw Hill Education, 2007. Kenneth J.Klabunde. Nanoscale materials in Chemistry. New York: John Wiley &	Group discussion

			Sons, 2001	
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			